A Theory of Opinion Writing in a Political Hierarchy

Tom S. Clark Emory University
Clifford J. Carrubba Emory University

We develop a model of opinion writing in the judicial hierarchy. The model adopts a case-space approach to judicial decision making with informational asymmetries across levels of the hierarchy. In the model, a lower court writes an opinion with two features: a legal rule and a level of quality. An upper court must then decide whether to review the decision. The model yields new insights about the strategic incentives created by the judicial hierarchy, including relationships among judicial ideology and opinion quality, judicial quality and the content of an opinion's rule, and the effect of the case facts on these relationships. The findings suggest that several common tests employed in the literature may not discriminate among competing sets of first principles.

When judges decide cases, their opinions have the force of law. Indeed, a great deal of the law governing American life is made by judges in the course of deciding cases. While the Supreme Court sits atop the American judicial hierarchy and ultimately has the authority to review decisions made by lower courts, most cases never reach the Supreme Court and remain resolved by the lower courts. In fact, the lower courts exercise a considerable degree of power in determining judge-made law.

Despite the substantive importance of judge-made law, little research has focused on how the judiciary's hierarchical structure influences the body of judge-made law. To be sure, scholars have extensively studied problems of compliance in the judicial hierarchy (e.g., Cameron, Segal, and Songer 2000; Klein and Hume 2003; Staton and Vanberg 2008; Songer, Segal, and Cameron 1994; Westerland et al. 2010), but less studied has been the law-creation function of lower courts. Law creation takes place through the writing of judicial opinions. As a consequence, a theory of the opinion-writing process is needed in order to better understand how lower courts shape American law. We formally model how the judicial hierarchy influences the way lower courts write their opinions.[1]

Our model of opinion writing contemplates the multidimensional nature of judicial opinions. When a judge writes an opinion for the court it consists of a legal rule—which both implies a decision on the merits of the case and instruction about how the law should be applied in future instances—and the argumentation used to explain and justify that legal rule. The quality of this argumentation is considered important for a variety of reasons. For example, how well the judge motivates and describes the legal rule will influence how easy it is for future judges to apply the legal rule, how well other public and private actors can anticipate how the law will be applied in the future, and how clearly and how well the legal rule will connect to other (at least tangentially) related legal rules. Thus, the quality of the legal rule is often as important as its actual content (e.g., Bueno de Mesquita and Stephenson 2002; Lax and Cameron 2007; Staton and Vanberg 2008). Further, there is good reason to believe that the ideological valence and the quality of a lower court opinion are strategically interdependent. As research has demonstrated, the judicial hierarchy provides strong incentives for lower courts to behave strategically (e.g., Cameron, Segal, and Songer 2000; Clark 2009;

[1]Supplemental results and proofs of all formal results and comparative statics are included in an online appendix available at www.journals.cambridge.org/jop.

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Cross and Tiller 1998; Haytens 2008; McNollgast 1995).

In this article, we develop a model of opinion writing in the judicial hierarchy that incorporates both the content and quality of the opinion. Our model builds from previous insights in the study of judicial opinion writing (especially Lax and Cameron 2007) as well compliance and law creation in the judicial hierarchy (e.g., Cameron, Segal, and Songer 2000; Carrubba and Clark 2010). Specifically, we model the joint importance of legal rules, opinion quality, and case outcomes. Our model also builds from, but contrasts with, standard models of principal-agent relations; the model takes advantage of the unique information and strategic environments present in the context of rule making and law creation that do not exist in standard models of agency. Specifically, we model the choices a lower court has over the way to dispose of a case, the content of the legal rule used to reach that disposition, and the quality with which an opinion is crafted.

We use this model to answer three previously unexplored questions. First, what relationships does the judicial hierarchy induce between a lower-court judge's ideology and the content and quality of her judicial opinions? Second, what relationships does the judicial hierarchy induce between a lower-court judge's underlying quality and the content and quality of her judicial opinions? Third, how does the actual case at hand affect the content and quality of her judicial opinion?

These questions are both normatively and positively important. Normatively, it seems desirable that the judicial hierarchy helps ensure fair and consistent application of the law. As discussed above, the quality and content of appeals court decisions heavily shape to what degree this ideal is achieved. Because U.S. courts have geographically defined jurisdiction, the more appeals court judges' underlying quality and ideological tastes influence the law, the more inconsistently laws will be applied across the country. Similarly, if the actual attributes of the case under consideration affect what the law is going to look like, as different courts consider disparate cases on common legal questions we will see cross-circuit divergence in the law.

The answers to these questions also have interesting implications about how judge-made law is formed from a positive political theory perspective. For example, we find that observational data will often be misleading. Higher-quality opinions are not necessarily associated with higher-quality judges. Thus, when media or politicians describe a nominee to the Supreme Court as being an especially high-quality judge because of the reputed quality of his or her opinions, that inference may well be wrong. In fact, the high-quality of that judge's opinions may simply be compensating for a relatively extreme view on the law. The degree to which these inferences may be confounded turns out to be a function of the features of the case the judge decides (e.g., the case facts or the value of the disposition). Below, we explore this and other related implications.

Theories of Opinion Writing

The literature on law creation through judicial opinions has yielded several important lessons from which our analysis builds. Most of the literature has focused, however, on intracourt bargaining in the context of collegial courts (e.g., Epstein and Knight 1998; Maltzman, Spriggs, and Wahlbeck 2000; Murphy 1964), rather than on law creation in the judicial hierarchy (but, see Klein 2002). In this vein, formal models of opinion writing generally adopted models of policy bargaining that had been developed in the setting of legislative politics. For example, various incarnations of the median voter theorem and the take-it-or-leave-it agenda-setter model have been invoked to explain opinion writing (e.g., Hammond, Bonneau, and Sheehan 2005), while other models have sought to incorporate the institutional features of the judiciary into policy-based models of bargaining (e.g., Carrubba et al. 2007). These models have largely dominated the empirical research on bargaining. See Clark and Lauderdale (2010) for a review of the empirical literature.

More recently, theorists have begun to exploit the distinct features of judicial decision making to develop more sophisticated models of the opinion-writing process. Heeding Kornhauser's (1992b) observation that the construction of a legal opinion is different from standard approaches to bargaining, the literature has begun to more earnestly investigate "case-space" models of judicial decision making (Cameron 1993). The core distinction is direct—in a strictly policy dimension, actors bargain over a point in space and have spatial preferences over the location of the policy. In a case-space model, actors bargain over how best to divide up a space of potential cases. A legal rule is a cutting point or plane that divides all possible future cases into dichotomous outcomes. This representation of judicial decision making has gained a great deal of traction in the literature (see, e.g., Lax 2011) and helped focus political science studies of the law

on the examination of how judges instrumentally shape law to achieve their goals rather than seeing law as in direct competition with policy-motivated judges (e.g., Fallon 2001; Shapiro 2006). For our purposes, the most important lesson is that the interplay between case facts and how the rules judges prefer partition the fact space into dichotomous judgments gives rise to a potentially complicated information environment, in which dispositions and rules jointly convey information about unobservables that can inform how the Supreme Court would ultimately rule on the case (e.g., Perry 1991). In our analysis, we explicitly model these various features of the judicial decision-making environment.

Beyond models of bargaining over legal rules, other models of law making have exploited different features of judicial opinion writing, often with an emphasis on judicial hierarchy. With insights that closely parallel results from theories of bureaucratic design (e.g., Huber and Shipan 2002), Staton and Vanberg (2008) consider the conditions under which courts may announce rules and write opinions that are intentionally vague. The key insight from their model for our purposes is that beyond the particular policy endorsed, the author of an opinion has a choice to make about the degree of precision with which that rule is announced. Lax (Forthcoming) develops a case-space model to make a similar argument in the context of the distinction between legal ''rules'' and ''standards.'' Both models, however, are concerned with the incentives created by the hierarchical structure of the judiciary, which is missing from most other theories of judicial opinion writing. Our model incorporates the basic insights of these models, though we turn the analytic perspective upside down, by examining bottom-up law creation.

Finally, Lax and Cameron (2007) develop a model of bargaining within a court in which there also exist two dimensions. As with all other models, there exists a policy dimension; however rather than include a ''specificity'' dimension, Lax and Cameron include in their model a ''quality'' dimension. Quality is distinct for them from specificity in that a very vague rule may nevertheless be of high quality, and vice versa. Quality refers to the extent to which future outcomes will vary around the rule or policy endorsed by the instant opinion. As a consequence, the quality with which an opinion is written is a key feature of the utility a judge derives from a given opinion. While Lax and Cameron are not explicitly concerned with the judicial hierarchy, in characterizing the nature of a judicial opinion as a combination of both an ideological rule and a quality component, their model lays important groundwork from which our model builds. We incorporate the multidimensional nature of opinion writing into our model.

We model a type of opinion quality that can be interpreted in several ways. Among the possible interpretations of quality, there are three we find particularly useful. The first interpretation is precisely the type of quality that Lax and Cameron model—the extent to which an opinion as written leads to outcomes in future cases that are consistent with the opinion's doctrinal goal. They model opinions as distributions of cutpoints in case space, with both a mean and a variance. Any given application or interpretation of a precedent may lead to outcomes that vary from the original opinion's intent. The greater the variance of the distribution, the lower the quality of the opinion. A second, related interpretation of quality is that a higher-quality opinion is a more well-reasoned, grounded opinion. This is a conception of quality that is consistent with legal discourse about judicial opinions. More high-quality opinions are more closely connected to existing doctrine and contain more compelling and articulate interpretations of the law and convincing legal arguments. Of course, what is convincing is often a subjective matter, a topic to which we return in the discussion below.[2] Third, one can think of quality as the clarity with which an opinion is communicated. This is related, but conceptually distinct, from the first notion above. An opinion may be very clearly communicated but nevertheless lead to variable outcomes in the future (perhaps because its application is difficult or nuanced). On the other hand, an opinion that is flexible/variable may nevertheless be communicated with greater or lesser clarity. We think there are substantive justifications for why the courts may value each of these types of quality, and each is consistent with our modeling structure. Each of these is compatible with the analysis below.

In what follows, we develop a model of judicial opinion writing that both incorporates the hierarchical nature of judicial decision making and the multidimensional nature of judicial opinions. Specifically, we consider law making by lower courts subject to oversight by superior courts in which the lower courts write opinions that contain both policy and a level of quality.

[2]It is important to keep in mind, though, that our concept of quality is a feature of the opinions the courts produce, rather than the case itself.

The Model

In this section, we develop and analyze a model of opinion writing. In our model, opinions exist in two dimensions—a legal rule dimension and a quality dimension. We assume that, all else equal, the Supreme Court prefers higher-quality legal opinions and rules closer to its own ideal rule. As we demonstrate below, this assumption derives from the various conceptions of opinion quality articulated above. Proofs and supplemental results are gathered in an online appendix.

Elements of the Model

Players and sequence of play. The following model extends previous work on law creation in the judicial hierarchy (Carrubba and Clark 2010) as well as judicial opinion writing (Lax and Cameron 2007). There are two players, an Upper Court (*UC*) and a Lower Court (*LC*), with "ideal rules" on the real number line, U and L, respectively. Without loss of generality assume that $U = 0$, and $L > 0$. The game consists of three moves. First, Nature draws a bundle of case facts, which is represented as a point in a unidimensional fact space, $f \in \mathbb{R}$.[3] *LC* observes f, while *UC* does not. By modeling cases as coming from a unidimensional space, we simplify the structure of potential legal rules. Legal rules in our model are simply cutpoints in that unidimensional space; in a more complicated model, cases would be drawn from a multidimensional space, which would allow the courts to create more nuanced partitions of case space, for example emphasizing certain facts over others (see, e.g., Lax 2007).

Second, *LC* writes an opinion, o, which consists of a rule, r, that divides the fact space into dichotomous dispositions, and some quality, q. Formally, a rule is a mapping from the fact space to a dichotomous judgment space such that all cases with $f > r$ are placed into the *No* disposition, all cases with $f < r$ are placed into the *Yes* disposition, and cases with $f = r$ can be placed into either disposition. As an expositive example, consider search-and-seizure cases. The fact space represents the "intrusiveness" of a search; the judgment space is the decision to either admit or exclude the evidence from the search. The rule identifies the level of intrusiveness beyond which evidence is inadmissible. We assume that the judgment must be consistent with the announced rule—that judges cannot "lie" about case facts. Of course, this does not mean that rules are perfectly clearly articulated (this is a feature of quality as we noted above), but it does mean that in any given case, a rule is announced and a disposition is induced by that rule. Judges cannot announce one rule and choose a disposition that is inconsistent with that rule.

Third, *UC* observes the opinion o and the resulting disposition and must decide whether or not to audit *LC*'s decision. If *UC* audits the decision, *UC* observes f and is free to write any new opinion it chooses. A strategy for the Lower Court is an opinion, consisting of a pair of a rule and a quality $o = \langle r \in \mathbb{R}, q \geq 0 \rangle$; a strategy for the Upper Court is a pair of an audit probability, and an opinion conditional upon auditing, $\langle a(o), r_{UC}, q_{UC} \rangle$. Because the Upper Court's optimal opinion is invariant to the Lower Court's strategy, setting the rule at its ideal point $r_{UC} = U = 0$ and choosing some unique optimal $q_{UC} = Q$, we collapse the Upper Court's strategy into a single choice, the probability of auditing the Lower Court, $a(o)$.

Beliefs. We assume a court does not know with certainty how it is going to rule on a case until it actually hears the case. We represent this uncertainty by assuming the Upper Court is uncertain about the location of the case facts relative to its preferred rule, while the Lower Court has complete information, because it has already heard the case. The Upper Court needs to learn more about the instant case to learn the extent to which its preferred rule and the lower court's rule imply different resolutions to the legal dispute and that informational asymmetry can only be resolved by reviewing a case. (Note, this does not necessarily imply that the Upper Court is completely unaware of the actual factual circumstances of the case. Rather, this simply implies the Upper Court may have some uncertainty about its preferred disposition until it actually hears the case.) *UC*'s uncertainty about f is characterized by a belief that f is distributed across the fact space according to an unbounded distribution $g(\cdot)$. Let $b(o)$ represent *UC*'s posterior belief that the disposition announced by opinion o corresponds with *UC*'s preferred disposition.

Utilities. Each court derives utility from three components of the model: the rule contained in an opinion, the quality of the opinion, and the disposition

[3] Case facts do not necessarily represent the nuanced "facts" as they are often conceived in normal discourse. Rather, the case facts represent the case's location in "case space" which implies how different legal rules would dispose of the case.

induced by the opinion. The Upper Court also pays a cost for reviewing the Lower Court, which represents an opportunity or resource cost; this can be thought of as capturing the cost associated with committing some of its (finite) resources to reviewing and deciding the case.

One way of representing the courts' utilities over an opinion's rule and quality is just as in Lax and Cameron (2007), as distributions with a mean (the rule) and precision (the quality). This approach can capture two of the notions of quality we are interested in, quality as the clarity of the legal rule itself (i.e., the extent to which the rule deterministically partitions the fact space) and quality as the clarity of expression of that rule (i.e., how hard it is for lower courts to apply the legal rule to different cases and for nonjudicial actors to understand the law). The clearer the rule and/or expression of the rule, the lower the variance. An alternative, mathematically equivalent, approach is to introduce the two concepts as additively separable components of the courts' utility functions—the rule represents the mean of the distribution and the quality the amount of variance. We opt for the additively separable representation because it allows for the third interpretation of the quality parameter we would like to capture, as the ''persuasiveness'' of the opinion. The more well-reasoned and better legally grounded the opinion, the more persuasive it will be to other judges. Including quality as an additively separable component of the utility function allows for this interpretation; more persuasive opinions are higher ''quality.'' In sum, the courts' utility functions allow for multiple interpretations of what quality means, including ones in which an opinion is conceptually not a perfect partition of the fact space.

For each of these interpretations of quality, we model the high court as preferring higher quality. However, crafting those higher-quality opinions is hard work. Judges much engage in research, writing, and revision, spending precious hours carefully crafting their opinions (Coffin 1980). Thus, we assume that the Lower Court must pay a cost, $c(q)$ to write an opinion above a baseline level of quality, which we normalize to $q = 0$ (see, e.g., Lax and Cameron 2007, 282). One can think about the baseline quality as the level of quality that the lower court would unilaterally choose to invest.

Beyond the quality of an opinion, we assume both courts derive utility from the rule contained in the opinion and the disposition induced by that rule. While theoretical models of collegial courts often assume judges care only about legal rules (e.g., Hammond, Bonneau, and Sheehan 2005; Lax 2007),[4] models of the judicial hierarchy more often assume the courts only care about case dispositions (e.g., Cameron, Segal, and Songer 2000; Clark 2009; Klein and Hume 2003; Songer, Segal, and Cameron 1994). Indeed, there is good reason to believe that courts care about dispositions (beyond the tests provided in those studies). Consider cases involving the constitutionality of statutes. It is hard to believe that the justices during the New Deal, for example, did not care whether the specific statutes they were reviewing stood or not. Similarly, examples of cases outside of constitutional review are also easy to identify—*Youngstown Steel*, *Nedow*, and *Baker v. Carr* are three prominent examples. Surely, the justices care about outcomes in capital punishment cases. More broadly, we have anecdotal reason to believe that the outcome of the case at hand matters. For example, Justice Ginsberg has remarked that conservative groups have chosen cases with sympathetic litigants in order that the Court's preference for a particular disposition enables the conservative interests to achieve a comparatively preferable rule (Bazelon 2009). Similarly, in his recent dissent in *Brown v. Plata*, Justice Scalia observes ''There comes before us, now and then, a case whose proper outcome is so clearly indicated by tradition and common sense, that its decision ought to shape the law, rather than vice versa. One would think that, before allowing the decree of a federal district court to release 46,000 convicted felons, this Court would bend every effort to read the law in such a way as to avoid that outrageous result.'' Clearly, Scalia thinks the outcome of the case can be important and even paramount to the interpretation of the law. All of this is not to say that we are making any particular assumption about *how* important the disposition is; we simply allow that the justices derive some nonzero utility from the case disposition.

Specifically, we assume the Upper Court receives $-(U - r)^2 = r^2$ from the final rule r, $\phi > 0$ if the disposition implied by the selected rule accords with the disposition implied by $U = 0$, and some additional benefit from the equilibrium quality of the final opinion, q or Q. *UC* also pays a cost, k, to audit *LC*'s decision. The Lower Court receives $-(L - r)^2$ from the final rule, $\phi > 0$ if the disposition implied by the selected rule accords with the disposition

[4]Interestingly, despite the theory literature's focus, the bulk of empirical judicial politics literature, most notably the Attitudinal Model, actually focuses solely on the disposition.

implied by L and pays a cost $c(q)$ for whatever level of effort the Lower Court puts into the quality of its opinion. The function $c(q)$ is increasing in q at an increasing rate (i.e., it is convex).

Analysis

The solution to this model is a set of isomorphic pure-strategy perfect Bayesian equilibria.[5] For ease of exposition, we first consider the two players' best-response functions and then present the equilibria in Propositions 1 and 2. Proofs and supplemental results are gathered in the appendix.

Best Response Functions

Upper-Court Best-Response Function. First consider the Upper Court's best-response function. Upon observing the Lower Court's opinion, o, the Upper Court must evaluate whether it wants to review the case or not. If it reviews the case it receives a known payoff with certainty. To wit, it pays a cost k in exchange for getting a rule at its ideal point, $r = U = 0$, and an opinion of quality Q. This choice also ensures that the Upper Court gets its preferred disposition conditional on the case facts. If it does not review the case, the Upper Court accepts the Lower Court's opinion—and therefore the Lower Court's proffered rule r and quality q—knowing that it may not be getting its preferred disposition (depending upon the realized case facts). Thus, a first result is that the Upper Court will review any opinion for which the lottery of possible outcomes associated with not reviewing the case is worse than the cost of reviewing. We can express this result as a function of the rule and quality contained in the opinion.

Lemma 1. *The Upper Court is indifferent over reviewing an opinion from the set* $\overline{o} = \langle \overline{r}; \overline{q} \rangle$, *where* $\overline{r} = \sqrt{k - (1-b)\phi + (q - Q)}$ *and* $\overline{q} = r^2 - k + (1-b)\phi + Q$. *The Upper Court reviews an opinion* $o = \langle r, q \rangle$ *whenever* $r \geq \overline{r}$ *(alternatively, when* $q \leq \overline{q}$*).*

Lemma 1 also demonstrates there exist some opinions for which the Upper Court has a strictly dominant strategy. First, there are opinions it will never review, even if it knows with certainty that it is receiving the "wrong" disposition. That is, there are opinions that are sufficiently attractive that they outweigh the cost of review, even though the Court would, ceteris paribus, prefer the different case disposition. Second, there are some opinions the Upper Court will review even if it is sure it is receiving its preferred disposition (i.e., it observes the *No* disposition).[6] These are opinions for which the added quality or improvement in the legal rule warrants expending the resources to review the case.

Corollary 1 (Upper Court Dominant Strategies). *The Upper Court does not review an opinion,* $o = \langle r; q \rangle$ *if* $r \in [0, \underline{r}]$ *for any* $b \in [0,1]$, *where* $\underline{r} = \sqrt{k - \phi + (q - Q)}$. *Equivalently, the Upper Court does not review an opinion,* $o = \langle r, q \rangle$ *if* $q \in [\underline{q}, \infty)$ *for any* $b \in [0,1]$, *where* $\underline{q} = \underline{r}^2 - k + \phi + Q$. *By contrast, if the Upper Court observes* ($r \geq 0$, *No*), *the Upper Court reviews if* $r > \sqrt{k + (q - Q)}$ *and does not review if* $0 \leq r \leq \sqrt{k + (q - Q)}$. *Define* $\underline{o} = \langle \underline{r}, \underline{q} \rangle$.

Lower-Court Best-Response Function—*No* Strategies. Anticipating the Upper Court's decision calculus, the Lower Court must decide what opinion to write. For ease of exposition, we separate discussion into possible strategies conditional upon what disposition the Lower Court is considering. First, suppose the Lower Court is considering opinions that will yield the *No* disposition. Because we assume that the Lower Court prefers *Yes* for a wider range of case facts than the Upper Court (i.e., $L > U$), the Upper Court can anticipate that whenever the Lower Court offers an opinion that yields *No*, the Upper Court also prefers *No*.[7] As a result, the Lower Court has two possible options. It can offer an opinion that the Upper Court is at worst indifferent over reviewing, knowing that the disposition will not change upon review, or it can decide that the investment in quality necessary to make the Upper Court indifferent is too costly and instead just offer the lowest possible quality opinion ($q = 0$), anticipating the Upper Court will review.

[5] We focus on pure-strategy equilibria but conjecture that some mixed strategy equilibria may exist under knife-edge conditions.

[6] For any $r > 0$, the *No* disposition implies the Upper Court would not want to reverse the Lower Court (because *No* implies $f > r$).

[7] By Lemma 7 (in the appendix), the Lower Court never offers a rule $r \notin [0, L]$. Upon observing the *No* disposition and opinion $o' = r', q'$, the Upper Court knows with certainty $f > r'$, and by Lemma 7, $r' > 0$. Thus, the Upper Court will be certain it prefers the *No* disposition

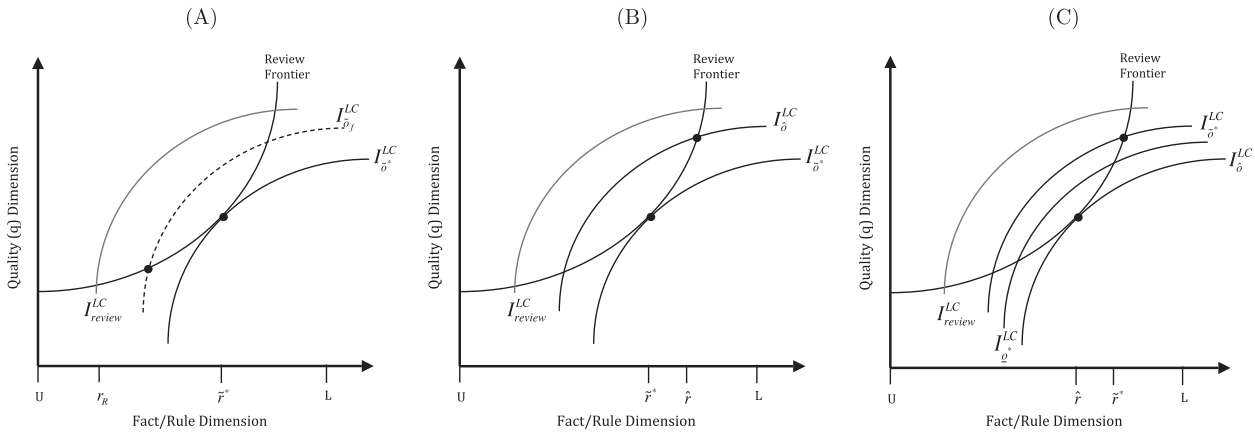
The Lower Court's *No* strategy best-response function can be illustrated using Figure 1(A). The *x*-axis represents the fact/rule dimension and the *y*-axis represents the quality dimension. The convex curve labeled "Review Frontier" characterizes the set of opinions that the Upper Court is indifferent over reviewing, conditional on knowing it is getting its preferred disposition (i.e., the set of opinions in the set $\overline{o}$ for which $b = 1$). The Upper Court reviews all opinions below this curve (Corollary 1). Among the set of unreviewed *No* opinions the Lower Court has a most preferred rule-quality pair. This opinion lies on the Lower Court indifference curve just tangent to the Review Frontier, at the point $\tilde{o}^*$. As long as the Lower Court's realized case facts are to the right of that optimal rule, the Lower Court can choose its optimal *No* opinion. However, once the case facts are to the left of that optimal rule, the Lower Court can no longer choose its optimal opinion, because that opinion would now yield a *Yes* disposition. Instead the Lower Court now must choose its constrained best alternative. The constrained best alternative is the opinion located along the Review Frontier, but farther left, such that $r = f$. Formally, we denote this opinion as $\tilde{o}_f$. Figure 1(A) shows the indifference curve for one such opinion with a dashed line. (There exists one such indifference curve for *each* point along the Review Frontier and to the left of $\tilde{r}^*$.)

Lemma 2 (Optimal No Opinion Not Reviewed). *The optimal opinion, conditional on the disposition being* No, *from among those opinions the Upper Court will not review, is*

$$\tilde{o}(f) = \begin{cases} \tilde{o}^* = \langle \tilde{r}^* = \frac{L}{1+\frac{\partial(\tilde{q}^*)}{\partial r}}; \tilde{q}^* = \tilde{r}^{*2} + Q - k \rangle \\ \quad if \ \frac{L}{1+\frac{\tilde{r}^{*2}+Q-k}{\partial r}} \in [0, \min\{f, L\}] \\ \tilde{o}_f = \langle \tilde{r}_f = f; \tilde{q}f = \min\{f, L\}^2 + Q - k \rangle \\ \quad otherwise \end{cases}$$

Of course, Lemma 2 describes the Lower Court's best-response function, conditional on offering a *No* opinion, not its equilibrium strategy. Figure 1(A) also shows one possible Lower Court indifference curve over being reviewed (grey concave curve). Once the case facts are sufficiently far to the left, $f < r_R$, the Lower Court prefers to be reviewed (formally notated as $\tilde{o}_r$) rather than to write a *No* opinion that the Upper Court is indifferent over reviewing.

FIGURE 1 Best Response and Equilibrium Behavior



Note: Panel (A) shows Lower and Upper Courts' preferences over *No* opinions. The Lower black concave curve shows the Lower Court's indifference curve for its optimal *No* opinion that is not reviewed, $\tilde{o}^*$. The convex black curve shows the frontier where the Upper Court is indifferent for reviewing an opinion conditional on knowing it is receiving its preferred disposition (the set of opinions, $\underline{o}$). The dashed concave curve shows the Lower Court's indifference curve for one possible constrained *No* opinion; and the upper grey concave curve shows the Lower Court's indifference curve over being reviewed. To not be reviewed when reaching the *No* disposition, the Lower Court must write an opinion along the Upper Court's indifference curve; to reach the *No* disposition, the opinion must contain a rule (x-axis) no further to the right than the case facts. Panels (B) and (C) show Lower Court and Upper Court indifference curves in equilibrium. Concave curves show Lower Court's indifference curves over alternative opinions; dotted lines show various potential indifference curves over review; convex curve shows frontier where the Upper Court is indifferent over reviewing opinions given the relevant preference ordering.

In sum, the Lower Court has two options that lead to a *No* disposition. It can write its optimal *No* opinion, provided the case facts allow that optimal opinion to reach a *No* disposition; if not, it can write the best possible opinion that leads to the *No* disposition. In either case, if the best possible opinion is dominated by the Lower Court's utility from being reviewed, then it must choose between "throwing its hands up" and writing a no-quality opinion and triggering review or instead writing an *Yes* opinion. We now turn to the Lower Court's optimal *Yes* strategies.

Lower-Court Best-Response Function—*Yes* Strategies. Because the Lower Court prefers *Yes* for a wider range of case facts ($L > U$), any opinion with a rule to the right of U and a disposition of *Yes* may be one for which the two courts disagree about the preferable disposition. This potential conflict of interests (depending upon the actual case facts) leaves the Lower Court with three options. One option is to write an opinion that the Upper Court does not prefer to review even if it knows that it is not getting its preferred disposition. Among the set of opinions that meet this criteria, the Lower Court will only choose ones that leave the Upper Court just indifferent over review, conditional upon knowing it is not getting its preferred disposition.[8] Since the Lower Court never wants to offer more quality than necessary, any other opinion is strictly dominated. These opinions are given by the set $\underline{o} = \langle \underline{r}, \underline{q} \rangle$, which is defined formally in Corollary 1. Among the set $\underline{o}$, the Lower Court has an opinion that optimally balances how much it concedes to the Upper Court in rule and quality. This opinion, $\underline{o}^*$, is defined in Lemma 3 below.

The opinion $\underline{o}^*$ is the Lower Court's first best choice from the set $\underline{o}$. However if the case facts are to the right of the rule $\underline{r}^*$, the opinion $\underline{o}^*$ cannot be chosen because it would yield a disposition of *No*. In this case the Lower Court's constrained best choice from the set $\underline{o}$ is the opinion on the line $\underline{o}$ with a rule as close to $\underline{r}^*$ as possible, $r = f$. We denote this opinion $\underline{o}_f$.

Lemma 3 (Optimal *Yes* Opinion Never Reviewed). *The optimal opinion for a Lower Court considering the set of opinions $o > \underline{o}$ is $\underline{o}^* = \langle \underline{r}^*, \underline{q}^* \rangle$, where $\underline{r}^* = \frac{L}{1+\partial c(\underline{q}^*)/\partial r}$ and $\underline{q}^* = (\underline{r}^*)^2 - k + \phi + Q$. When $f > \underline{r}^*$, the optimal Yes opinion is given by $\underline{o}_f = \langle \underline{r}_f = f; \underline{q}_f = f^2 - k + \phi + Q \rangle$.*

The second option is to write an opinion that the Upper Court does not prefer to review when it is uncertain over whether the Lower Court declared its preferred disposition or not. There is a set of possible opinions that could constitute this alternative, $\hat{O}$. This set is defined by Lemma 4.

Lemma 4 (Candidate Equilibrium Yes Opinions). *Suppose an equilibrium in which the Lower Court pools on an opinion that reaches the* Yes *disposition and is not reviewed. The set of possible opinions to be considered for such an equilibrium is given by the set $\hat{O}$, characterized by the boundaries, $\underline{o}$, $\overline{o}$, $q = 0$, $r = L$.*

If some element $\hat{o} \in \hat{O}$ is a best response for the Lower Court, it is necessarily true that $\hat{o}$ is played by a mix of Lower Courts with case facts both to the left and the right of the Upper Court's ideal point. Lower Courts with case facts to the left of the Upper Court's ideal rule ideally would like to signal that they are offering the Upper Court's preferred disposition. Successfully doing so would allow them to propose a more favorable opinion in terms of rule and quality that the Upper Court would leave unreviewed. However, Lower Courts with case facts between the Upper Court's ideal rule and this hypothetical rule have every incentive to mimic that opinion. They would write a very favorable opinion and would manage to get their preferred disposition, one the Upper Court does not support, without review by Upper Court. Because every opinion in the set $\hat{O}$ is one in which some set of Lower Courts with case facts to the right of the Upper Court's ideal point can mimic Lower Courts with case facts to the left of the Upper Court, separation is never possible among this set of opinions. This observation is formally stated by Lemma 5.

Lemma 5 (Pooling on *Yes* Opinions). *There exists no equilibrium in which Lower Courts with case facts $f \leq 0$ choose a rule $r' > 0$ and separate from all Lower Courts with case facts $f \in (0, r']$.*

A direct implication of Lemmas 3–5 is that any equilibrium entailing Lower Courts writing an opinion that yields a *Yes* disposition that is unreviewed must entail pooling among Lower Courts with case facts to the left and right of the Upper Court's ideal rule.

Corollary 2 (All *Yes* Strategies Entail Pooling Behavior). *All strategies leading to the* Yes *disposition that are not reviewed entail pooling by all Lower Courts*

[8] See Lemma 8 in the appendix.

with $f < 0$ and some subset of Lower Courts with $f \in [0, \hat{r})$ on $\hat{o} \in \hat{O}$.

These alternatives constitute the set of isomorphic equilibria as characterized in Propositions 1 and 2 below. Which element of $\hat{O}$ is the actual alternative played, $\hat{o}$, just depends upon the opinion around which beliefs coordinate. Returning to a comparison between the two possible best responses entailing the *Yes* disposition, choosing $\hat{o}$ is superior from the Lower Court's point of view since the Upper Court will accept a less desirable opinion when it thinks it has a chance of getting its preferred disposition. However, it is only an option if the realized case facts are to the left of $\hat{r}$ (otherwise, the opinion would lead to the *No* disposition). Thus, in considering these two possible opinions, the Lower Court will write $\hat{o}$ if $f \leq \hat{r}$ and the best feasible $\underline{o}$ otherwise.[9] Finally, as above, if the equilibrium quality for the Lower Court's preferred opinion that yields *Yes* is too costly, the Lower Court prefers to write an opinion with $q = 0$ that it knows will be reviewed.

Equilibrium

We now turn to the equilibria of the model. As noted above, the solution to this model is a set of isomorphic pure-strategy perfect Bayesian equilibria. We begin by noting that, following the analysis of the best response functions, the Lower Court effectively has three sets of options: (1) offer an opinion that yields the *No* disposition, (2) offer an opinion that yields the *Yes* disposition, or (3) offer an opinion that it intends to be reviewed. In general, the Lower Court will prefer the opinions that yield the *No* dispositions in the sense that it considers the rule/quality pairs more desirable than those associated with the *Yes* disposition.[10] How desirable the rule/quality opinion pair is for either the *No* or the *Yes* disposition depends upon whether, and if so how severely, the realized case facts constrain the Lower Court from proposing its optimal choice. All else equal, the Lower Court is going to be more inclined towards the opinions that yield the *No* disposition, $\tilde{o}$, when the costliness of investing in quality is higher.

Lemma 6. *For* c$(\cdot)$ *sufficiently large, the Lower Court prefers to play $\tilde{o}$ rather than $\hat{o}$.*

Intuitively, the Lower Court has to invest more in quality to compensate for offering a disposition, *Yes*, that the Upper Court is unsure if it wants. So, the more costly quality, the more attractive the "cheaper" opinion. The following two definitions establish the cutpoints at which the Lower Court is indifferent between the optimal *No* and *Yes* opinions and the case fact constrained best *No* and *Yes* opinions, respectively.

Definition 1. *Define $o_I = \langle r_I; q_I \rangle$ as the opinion that makes the Lower Court indifferent between playing $\tilde{o}$ and $\hat{o}$ when neither opinion is reviewed.*

Definition 2. *The Lower Court is indifferent between $\underline{o}_f$ and $\tilde{o}_f$ whenever $c(\underline{q}_f) - c(\tilde{q}_f) = \phi$*

For ease of exposition, the equilibrium is presented in two parts, for c sufficiently large and for c sufficiently small. When the cost of investing in quality is sufficiently high, a Lower Court with case facts $f < L$ would rather write an opinion of lower quality that contains a less preferable rule (from its own perspective) (i.e., $U_{LC}(\tilde{o}^*) \geq U_{LC}(\hat{o})$). When the cost of investing in quality is sufficiently low, the opposite relationship holds.

Proposition 1. *For c sufficiently large, $\exists$ an equilibrium $\forall \hat{o} \in \hat{O}$ such that*

$$o^* = \begin{cases} \hat{o} & \text{if } f < r_I \text{ and } U_{LC}(\hat{o}) > U_{LC}(o_r) \\ \tilde{o}_f & \text{if } f \in \left[\max\{r_I, r_R\}, \tilde{r}^*\right] \\ \tilde{o}^* & \text{if } f > \tilde{r}^* \text{ and } U_{LC}(\tilde{o}^*) > U_{LC}(o_r) \\ o_r & \text{if } \begin{cases} f < r_R \text{ and } U_{LC}(o_r) > U_{LC}(\hat{o}) \\ f > \tilde{r}^* \text{ and } U_{LC}(o_r) > U_{LC}(\tilde{o}^*) \end{cases} \end{cases}$$

$$a(o)^* = \begin{cases} 0 & \text{if } \begin{cases} o = \hat{o} \\ o = \tilde{o} \end{cases} \\ 1 & \text{if } \begin{cases} o \neq \hat{o} \text{ and } o \notin \underline{o} \text{ and disposition is Yes} \\ o = o_r \end{cases} \end{cases}$$

$$b(o)^* = \begin{cases} \hat{b} & \text{if } o = \hat{o} \\ [0, \hat{b}) & \text{if } o \neq \hat{o} \text{ and } o \notin \underline{o} \text{ and disposition is Yes} \\ 1 & \text{if disposition is No} \\ [0, 1] & \text{otherwise} \end{cases}$$

$$\text{where } \hat{b} = \frac{\int_{-\infty}^{0} g(f)df}{\int_{-\infty}^{\hat{r}} g(f)df}.$$

[9] Of course, for this move to be supported in equilibrium, the Upper Court must have beliefs about the case fact location that allow it to be at least indifferent over review. We address this in the equilibrium analysis below.

[10] Of course, this advantage may be outweighed by the loss of the preferred disposition.

Proposition 2. *For c sufficiently small,* $\exists$ *an equilibrium* $\forall \hat{o} \in \hat{O}$ *such that*

$$o^* = \begin{cases} \hat{o} & \text{if} \quad f \le \hat{r} \\ \underline{o}^* & \text{if} \quad f \in (\hat{r}, \underline{r}^*] \text{ and } U_{LC}(\underline{o}^*) > U_{LC}(\tilde{o}_f) \\ \underline{o}_f & \text{if} \quad \begin{cases} f \in (\underline{r}^*, \tilde{r}^*) \text{ and } U_{LC}(\underline{o}_f) > U_{LC}(\tilde{o}_f) \\ f > \tilde{r}^* \text{ and } U_{LC}(f) > U_{LC}(\tilde{o}^*) \end{cases} \\ \tilde{o}_r & \text{if} \quad \begin{cases} f \in (\underline{r}^*, \tilde{r}^*) \text{ and } U_{LC}(o_f) > U_{LC}(\tilde{o}_f) \\ f \in (\hat{r}, \tilde{r}^*] \text{ and } U_{LC}(\tilde{o}_f) > U_{LC}(\underline{o}^*) \end{cases} \\ \tilde{o}^* & \text{if} \quad f \ge \tilde{r}^* \text{ and } U_{LC}(\tilde{o}^*) > \max\{U_{LC}(\underline{o}_f), U_{LC}(\underline{o}_r)\} \\ o_r & \text{if} \quad \begin{cases} f < \hat{r} \text{ and } U_{LC}(o_r) > U_{LC}(\hat{o}) \\ f > \hat{r} \text{ and } U_{LC}(o_r) > \max\{\tilde{o}(f), \underline{o}_f\} \end{cases} \end{cases}$$

$$a(o)^* = \begin{cases} 0 \quad \text{if} & \begin{cases} o = \hat{o} \\ o = \tilde{o} \end{cases} \\ 1 \quad \text{if} & \begin{cases} o \ne \hat{o} \text{ and } o \notin \underline{o} \text{ and} \\ \quad \text{disposition is Yes} \\ o = o_r \end{cases} \end{cases}$$

$$b(o)^* = \begin{cases} \hat{b} & \text{if } o = \hat{o} \\ [0, \hat{b}) & \text{if } o \ne \hat{o} \text{ and } o \notin \underline{o} \text{ and disposition is Yes} \\ 1 & \text{if disposition is No} \\ [0,1] & \text{otherwise} \end{cases}$$

$$\text{where } \hat{b} = \frac{\int_{-\infty}^{0} g(f)df}{\int_{-\infty}^{\hat{r}} g(f)df}.$$

Figure 1(B)–(C) illustrates the equilibrium space. The two panels show two possible orderings of the various opinions the Lower Court may write in equilibrium, where the particular ordering is determined by model parameters. The figure allows us to see visually which of the possible opinions will be optimal for the Lower Court given the configuration of model parameters. In characterizing the equilibrium, we allow for alternative orderings of equilibrium opinions against being reviewed.

Consider first panel (B), in which the costliness of investing in quality is sufficiently low—i.e., $U_{LC}(\tilde{o}^*) \ge U_{LC}(\hat{o})$. The *x*-axis measures the position of the rule *r* in fact space, and the *y*-axis measures the opinion's quality, *q*. The concave black lines are LC's indifference curves associated with $\tilde{o}^*$ and $\hat{o}$, and the gray line represents a *potential* indifference curve for the Lower Court's utility from being reviewed. Starting on the right side of the figure, for case facts $f \ge \tilde{r}^*$ the Lower Court can choose its optimal opinion, $\tilde{o}^*$, which it obviously does. For case facts $f < \tilde{r}^*$ this choice is no longer an option, because the opinion would not lead to the *No* disposition. Instead the Lower Court must choose between two possible second-best alternatives. One option is to set the rule at $r = f$ and write the opinion $\tilde{o}_f$, the opinion that yields the disposition *No* with a rule as close to its optimal rule, $\tilde{r}^*$, as possible. Another option is to set the rule at its most preferred *Yes* opinion for the given case facts. (If $f < \hat{r}$, it can play $\hat{o}$, otherwise it must play the best $o \in \underline{o}$ that is available for those case facts.) For case facts sufficiently close to $\tilde{r}^*$ the Lower Court prefers $\tilde{o}_f$, but eventually the constrained best $\tilde{o}_f$ is worse than the constrained best *Yes* opinion, and the Lower Court switches. The rule r_I is the rule for which the Lower Court is indifferent between these two alternatives. Note that if writing an opinion that is reviewed, $o_r = \langle r, q = 0 \rangle$, is worse than writing $\hat{o}$ the Lower Court never prefers to be reviewed in this case. (In Figure 1B, this will occur as the gray indifference curve moves downward, below the upper black indifference curve—i.e., being reviewed dominates writing the equilibrium *Yes* opinion, $\hat{o}$.) We discuss what happens as the relative payoff from being reviewed increases below.

Figure 1(C) illustrates the equilibrium space in which $U_{LC}(\tilde{o}^*) < U_{LC}(\hat{o})$. Recall that in this scenario the cost of investing in quality is sufficiently low such that a Lower Court with case facts $f < L$ prefers writing an opinion of higher quality with a more preferable rule (from its own perspective). Again, the *x*-axis measures the location of the rule in fact space, and the *y*-axis measures opinion quality. The three black concave lines are the Lower Court indifference curves for its optimal unreviewed *No* opinion ($\tilde{o}^*$), its optimal *Yes* opinion immune to review ($\underline{o}^*$), and the pooling *Yes* opinion ($\hat{o}$). We order Lower Court preferences $U_{LC}(\tilde{o}^*) < U_{LC}(\underline{o}^*) < U_{LC}(\hat{o})$ so that the figure characterizes the most complicated possible equilibrium space. We discuss how the figure changes as the ordering over its most preferred second-best opinion that yields the *Yes* disposition yet is not reviewed ($\underline{o}^*$) changes subsequently.

This time starting on the left side of the figure, for case facts $f \le \hat{r}$ the Lower Court can and does choose its most preferred option, $\hat{o}$. Once the case facts cross $\hat{r}$ the Lower Court can no longer play $\hat{o}$ and get the *Yes* disposition. However, for case facts between $\hat{r}$ and $\underline{r}^*$, the Lower Court can still offer its optimal unreviewed *Yes* opinion, $\underline{o}^*$.[11] Once case facts are to the right of $\underline{r}^*$ even this option is not available.

[11] As noted above, $\hat{o}$ is weakly preferred to this alternative since the Lower Court must offer a generous enough opinion such that the Upper Court prefers not to review $\underline{o}^*$ even knowing that it wants the *No* disposition with certainty.

Now the Lower Court must decide whether it prefers the constrained best option that still yields the *Yes* disposition or the constrained best that yields the *No* disposition ($\underline{r}^* < f < \tilde{r}^*$). The rule $r_{I,f}$ is the rule for which the Lower Court is indifferent between these alternatives, to the left the Lower Court plays $\underline{o}_f$ and to the right it plays $\tilde{o}_f$. Once the case facts cross $\tilde{r}^*$ the Lower Court is free to play its optimal No disposition, $\tilde{o}^*$. Finally, notice that if $U_{LC}(\underline{o}^*) \geq U_{LC}(\hat{o})$ we simply would have no region in which the Lower Court played $\hat{o}$,[12] whereas if $U_{LC}(\tilde{o}^*) \geq U_{LC}(\underline{o}^*)$ we would have no $\underline{o}$ regions and the figure would look similar to Figure 1(B).

How does the alternative of simply writing an opinion that will be reviewed, $o_r = \langle r_r, q = 0 \rangle$, enter into the Lower Court's equilibrium behavior? Just as the Lower Court never writes o_r if the Lower Court prefers writing $\hat{o}$ to being reviewed for c sufficiently large (Figure 1B), the Lower Court never writes o_r if the Lower Court prefers writing $\tilde{o}^*$ to being reviewed for c sufficiently small (Figure 1C). As the Lower Court's relative value of playing o_r increases (e.g., say the Upper Court's cost of review shrinks and so the Lower Court must write increasingly generous opinions all else equal), for c sufficiently large the Lower Court plays o_r instead of $\hat{o}$ and review intrudes on the equilibrium space from left to right, whereas for c sufficiently large the Lower Court plays o_r instead of $\tilde{o}^*$ and review intrudes on the equilibrium space from right to left.

Finally, we note that a broad range of off-path beliefs can support the equilibria characterized above. The one restriction is that upon observing a *Yes* disposition with an opinion other than $\hat{o}$, the Upper Court cannot think it is more likely that it has received its preferred disposition than if it had observed $\hat{o}$. This restriction is derived formally in Lemma 9 in the appendix. One point about the beliefs is worth highlighting. For any opinion in $\hat{O}$ the Upper Court is indifferent over reviewing an opinion written in the set $\overline{o}$ and strictly prefers not reviewing otherwise. As a result, a mixing strategy by the Upper Court is only sustainable for the knife-edge case in which beliefs somehow have coordinated around the Lower Court playing exactly $\overline{o}$. Since mixing is unsustainable for almost the entire set of isomorphic equilibrium, we focus on the pure strategy options.

Comparative Statics

One of the central relationships we can explore using this model is how the underlying quality and extremity of the Lower Court affects the opinion—both in terms of the rule and its quality—that the Lower Court produces. In the appendix we derive the following results.

Result 1. *The higher the quality of the Lower Court, the weakly more extreme the rule and the weakly higher the quality of the opinion.*

To understand this result, first consider the equilibrium opinions $\tilde{o}^*$ and $\underline{o}^*$. Intuitively, for both of these opinions the Lower Court is free to select an optimal balance between the location of the rule and the amount of quality. Thus, as the quality of the Lower Court increases, producing higher quality rules becomes cheaper, and the Lower Court produces a higher-quality rule in order to write a rule closer to its ideal point. This result parallels that derived in Lax and Cameron (2007), which demonstrates that high-quality judges with extreme preferences can deter a minority coalition's ability to "peel" off the median justice while nevertheless writing and ideologically extreme opinion.

Now consider the cutpoints such that the Lower Court is indifferent between playing the various *Yes* and *No* opinions. First, let r_I represent the cutpoint in fact space such that the Lower Court is indifferent between playing $\hat{o}$ and $\tilde{o}_f$. Since the opinion $\hat{o}$ is a higher-quality rule with a more extreme rule than the opinion $\tilde{o}_f$, r_I moves to the right and the Lower Court writes $\hat{o}$ for a wider range of case facts. Second, let $r_{I,f}$ represent the cutpoint in fact space such that the Lower Court is indifferent between playing $\underline{o}_f$ and $\tilde{o}_f$. The same relationship holds—$r_{I,f}$ moves to the right (i.e., increases)—as the Lower Court's underlying quality increases and the Lower Court writes $\underline{o}_f$ for a wider range of case facts as well.

Put together, we observe weakly increasing quality and extremity of the rule as the Lower Court finds producing higher-quality opinions cheaper. For case facts producing the opinion $\hat{o}$ the opinion is invariant; however, for all other case facts the Lower Court writes higher-quality rules that are closer to its ideal point.

The same relationships hold as the Lower Court becomes more extreme. The greater the disagreement between the Lower and Upper Courts over the rule, the more the Lower Court cares about moving rules away from the Upper Court's ideal point, and therefore the more quality the Lower Court is willing to invest in making that shift happen.

Result 2. *The more extreme the Lower Court, the weakly more extreme the rule and the weakly higher the quality of the opinion.*

[12]Technically, $\hat{o} = \underline{o}^*$

While these first two results might seem obvious, two points are worth making. First, the result only holds because of the underlying trade-off between quality and rule placement. For example, if the Lower Court could not ''buy off'' the Upper Court with higher-quality opinions, a more extreme Lower Court would not generate more extreme rules (see Carrubba and Clark 2010). Relatedly, while the relationship between extremity of the Lower Court and extremity of the rule might be less interesting, the critical implication is that more extreme Lower Courts also generally will produce higher-quality opinions. And, similarly, higher-quality Lower Courts also generally produce more extreme rules. These relationships will drive some of the most interesting implications we draw in the discussion section below.

Next, notice that Results 1 and 2 are both weak relationships. If the case facts are sufficiently close to the upper court's most preferred rule, the lower court's opinion is invariant to the lower court's most preferred rule, L, and quality, $c(\cdot)$. Thus, the relationships in Results 1 and 2 are conditionally monotonic and only hold if the case facts are sufficiently extreme (i.e., close to the lower court's most preferred rule).

This result provides some substantive nuance to the first two results. Even with the trade-off between quality and rule, more extreme Lower Courts are not necessarily going to produce more extreme rules. And higher-quality Lower Courts are not necessarily going to produce higher-quality opinions. These relationships only hold when the case facts are sufficiently ''extreme,'' meaning the case facts allow for a greater range of rules to be applied while reaching the Upper Court's preferred disposition. When the case facts allow less leeway in the rule in order to reach the Upper Court's preferred disposition, the Lower Court actually is less able to manipulate results. This finding we believe is counterintuitive since one might have supposed that it would be exactly the cases that the Upper Court is less sure of that the Lower Court would have the greatest degrees of freedom. We elaborate further on the interesting roll of the case facts in the discussion section below.

Result 3. *The relationships in Results 1 and 2 depend upon the case facts of the instant case.*

Finally, these relationships have interesting implications for the disposition of the cases. As the Lower Court becomes either more ideologically extreme or of higher quality, the cutpoints in rule/fact space at which the Lower Court prefers to switch to a *Yes* opinion move in such a way that the Lower Court prefers to write a *Yes* opinion for a greater range of case facts. Stated differently, as the Lower Court becomes either more extreme or of higher quality, the Lower Court will be more likely to write an opinion that endorses its relatively preferred disposition.

Result 4. *The higher the quality or the more extreme the Lower Court, the (weakly) more likely we are to observe the Lower Court issuing its preferred disposition.*

This final result is particularly striking. Theories of the judicial hierarchy that reject strategic decision making on the part of the lower courts point to evidence that as judges become more ideologically distant from the Supreme Court, they make more decisions against the Supreme Court's preferred dispositional direction as supporting their view (e.g., Hettinger, Lindquist, and Martinek 2004). However, in our model of strategic judicial decision making, this pattern emerges endogenously in equilibrium. This result suggests, then, one difficulty in using observational data on case dispositions to discriminate among competing theories of judicial decision making. This result also suggests an additional implication—that when judges find writing their preferred rules to be *easier* (or, alternatively, when they are willing to invest the effort to write a high-quality opinion), they will be more likely to reach their preferred dispositions. Thus, in line with a Posnerian (1995) view of judicial workmanship, if a judge is not willing to expend the necessary effort, he may instead prefer to concede his influence over the law and case outcomes. We now turn to the implications of these results for the study of law in the judicial hierarchy.

Discussion

Our model provides insights into at least three puzzles about law making in the judicial hierarchy. We address each of these puzzles in turn.

Judicial ideology and lower-court opinions. The first puzzle to which our model speaks concerns the effect of ideological alignment throughout the tiers of the hierarchy on the ideological valence and quality of the legal rules crafted by the lower courts. Most studies of the judicial hierarchy have assumed that lower courts are faced with a strategic tension in the spirit of classical principal-agent problems:

when deciding a case, does the lower court comply with the Supreme Court's preferred legal rule or instead use its own preferred legal rule (e.g., Cameron, Segal, and Songer 2000; Clark 2009; Klein and Hume 2003; Zorn and Bowie 2010). Those studies reveal that, where standard incentives for resolving moral hazard dilemmas are operative, lower-court judges will faithfully comply with their superior judges' preferences; where those incentives are inoperative, lower-court judges will shirk. That view of the courts, while very important for the development of our understanding of the judicial hierarchy, misses much of what the judicial hierarchy does. In particular, the principal-agent view envisions the judicial hierarchy as a simple bureaucratic structure involved with case sorting and rule application, very much in the spirit of an administrative agency.

However, the judicial hierarchy is much more than a rule-application institution, and appellate courts are not simply concerned with error correction (see, inter alia, Lax 2011). Instead, the lower courts are involved in crafting legal rules in the course of deciding cases, and the Supreme Court's primary function is to oversee the construction of rules and provide a unifying force to ensure consistency in the law and coordination between judge-made law and other sources of authority, such as statutes and the Constitution. Our model builds on existing research on law creation in the lower courts (e.g., Carrubba and Clark 2010; Klein 2002) to show how the degree of ideological diversity in the lower courts affects the ideological content and quality of those legal rules. In particular, as a lower-court judge becomes more ideologically divergent from the Supreme Court, the lower-court's opinions will become (weakly) more ideologically divergent from the Supreme Court's preferred rule but also (again, weakly) of higher quality. This relationship arises because as judges become more ideologically divergent from the Supreme Court, they have a greater incentive to invest in quality in order to write opinions they find more appealing from an ideological perspective.

Several interesting implications from these relationships emerge. First, if the Supreme Court wants the rules applied by lower courts to closely reflect its own preferred rules, it can do so by adopting a review strategy that appears to be heavily focused on case dispositions rather than simply on the rules. Thus strategic auditing by the Supreme Court in the spirit of Cameron, Segal, and Songer actually creates an incentive for lower-court judges to craft and apply rules that are more similar to the Supreme Court's preferred legal rule.[13] We return to this point below. Second, more ideologically extreme judges will write, ceteris paribus, more high-quality opinions. Because those judges have a stronger incentive to pull the content of the opinion away from the Supreme Court, they will be willing to invest additional quality to make more ideologically disparate (from the Supreme Court's perspective) decisions palatable. Finally, more ideologically extreme lower court judges are also less likely to be reviewed. If a judge's decision is reviewed she knows that the rule is going to be moved away from her preferred rule and to the Supreme Court's most preferred rule. The more extreme the lower-court judge, the worse this outcome, and therefore the more she is willing to compromise in the content (rule placement) and quality of her opinion in order to avoid being reviewed. As a consequence, judges who are known to write well-reasoned opinions and are rarely reviewed may very well be of high quality—we will discuss this possibility below—but they also may be ideologically extreme judges who prefer to invest quality and have a preferable legal rule in their opinions. These relationships have clear implications for the politics of judicial promotion, where advocates for nominees often point to opinion quality and reversal rates as indicators of a judge's underlying quality rather than their ideological valence.

Judicial quality and lower-court opinions. The second puzzle to which our analysis speaks concerns a related dynamic. Just as a judge's preferences over policy outcomes influence the ideological valence and quality of the rules she constructs, so too does a judge's underlying quality. Indeed, opinion writing is a primary form of judicial work; in order to craft a well-reasoned, high-quality opinion, judges must invest time and effort. However, judges have preferences over how to spend their time and effort, and, ceteris paribus, effort spent on opinion writing might be diverted to other, more enjoyable enterprises (e.g., Posner 1995). Despite the importance of opinion quality, this issue has received very little attention in the formal literature on judicial opinion writing and virtually is ignored in the literature on judicial hierarchy.

Based upon our model, we find two new results regarding judge quality. First, we find an interesting,

[13]Going beyond the context of our model, there may be an interesting strategic reason for the Upper Court to pursue this strategy. If the Upper Court is uncertain about the distribution of case facts in the world, then a single draw from that distribution leading to a favorable or unfavorable disposition can be informative to the Upper Court about how distasteful the legal rule is, in practice.

yet intuitive, relationship between a judge's underlying quality and the ideological valence and quality of her opinions. The intuition is equivalent to the ideology discussion above. As a judge becomes of higher-quality, she will find it more attractive to write a higher-quality opinion and, as a consequence, she can pull the content of her opinion closer to her most preferred legal rule while still avoiding review by the Supreme Court. Thus, higher-quality judges write weakly higher-quality and more extreme opinions. Second, a higher-quality lower court judge is less likely to be reviewed. Again, the intuition is straightforward. The higher the lower-court judge's quality, the more quality the lower-court judge is willing to invest in order to avoid review. In our model, review occurs when the best opinion immune from review is less attractive to the lower-court judges than an opinion that it knows will trigger review.[14] The less costly quality is, the more likely the lower-court judge is willing to make the necessary investment to avoid review. Put differently, this result holds because a higher-quality lower-court judge has a greater range of opinions that she prefers to write rather than to "give up" and trigger review.

With these results in hand, notice that judicial ideology and judicial quality are observationally equivalent. More extreme judges are more likely to write higher-quality, more extreme opinions and are less likely to "give up" and be reviewed. Higher-quality judges operate in exactly the same way. Thus, if we see a judge with a track record of high-quality opinions that are rarely reviewed, we cannot conclude that the judge is of high quality. It is just as likely that she is an ideologically extreme judge. Similarly, if we observe a judge with a track record of extreme opinions, it is just as likely that the judge is of high quality as it is that she is extreme herself. (Though, the relative "extremity" of a judge's opinions is bounded by her own extremity—a judge never writes an opinion more extreme than her own ideal point.) By implication, examining judicial opinions can lead to a confounding of ideology and quality. On average, more extreme judges are also going to appear to be the higher-quality judges, whether it is true or not.

[14]We note that the way in which review arises in our model is different from that in Carrubba and Clark (2010). In that model, a lower court with uncertainty about the Upper Court's cost of review can be reviewed when it pursues a risk-seeking strategy. We limit our analysis here to a game of complete information in order to uncover dynamics of review that arise under qualitatively different mechanisms.

Case facts and the nature of judicial opinions. Our model also reveals that the facts of a given case can affect the rule announced by the lower court. When case facts are close to the lower court's preferred legal rule, the lower court will be able to exercise a greater degree of influence over that rule. In this sense, our model suggests a kind of path-dependency in the content of judge-made law. Kornhauser (1992a) suggests that because judges decide cases one at a time, in sequence, and because their decisions build upon each other in turn, the order in which cases arrive at the courts has an effect on the content of judge-made law. Of course, our model is a static one, but it does suggest the types of dynamics at work in such an analysis.

This relationship also suggests interesting strategic incentives for activist groups seeking to make policy gains through the courts. For example, suppose an interest group is pursuing a change in the law and it can anticipate a sympathetic response at the circuit level, but not from the Supreme Court. In this case, the interest group wants to select a case with facts that are are a relatively easy call for the Supreme Court and more likely to be a challenge to the assigned appeals court. This sort of case will allow the appeals court to sculpt a relatively desirable rule from the interest group's perspective.

This implication is relevant for existing literature. Research on policy activism through the courts has been specifically concerned with the way in which groups seek to bring cases to the courts that will yield favorable outcomes (e.g., Wedeking 2010) and how the Supreme Court may actively seek out cases conducive to its policy goals (e.g., Baird 2007). Our model reveals that which types of cases one would want to bring in order to realize the best policy outcome will depend on the alignment of policy preferences among the activist, the lower courts, and the Supreme Court.

Related, the role of the case facts in shaping the Lower Court's choices creates opportunity for the Lower Court to be strategic in additional ways. Notice that when the case facts are further to the right than the Lower Court's ideal rule, it can write an opinion with a comparatively favorable rule. This is because any rule it can possibly write will induce a disposition with which the Upper Court agrees. By contrast, if the case facts are between the Upper and Lower Courts' preferred rules, the Lower Court faces a trade-off. It can either (1) write a relatively desirable rule and yield the disposition or (2) write a less attractive rule but win the disposition. Which of these options it prefers depends on how "bad" the

rule must be to win the disposition. Going beyond the context of our model, if the Lower Court is dealing with an area of law in which the rule is the critical issue, it has an incentive to write opinions that limit the decision's broader implications until a case with facts that allow it to heavily influence the broader contours of the law arises. Then, the Lower Court wants to lock in as broadly applicable a rule as it can. Of course, if the Upper Court also considers the rule to be critical, the Lower Court would have to temper how far it tries to pull the opinion, but the basic trade-off still holds.

The facts of the case also intermediate the relationships described previously. Both the extent to which lower court judges' policy preferences and lower-court judges' underlying quality can influence the content of the law is constrained by the facts of the instant case. When the case facts are close to the Supreme Court's most preferred rule, the lower-court judges' ideology influences neither the quality of the opinion nor the placement of the rule. Only when the case facts are sufficiently extreme do these relationships hold. Thus, our model reveals an interaction between the nature of the case before the court and the characteristics of the court deciding the case in their effects on the opinion written by the lower court. This finding enriches theoretical analyses of rule making in the courts and the evolution of legal doctrin (e.g., Kornhauser 1992a; Lax 2007).

Finally, beyond the case facts of the particular case, our model also reveals a strategic incentive for the Supreme Court to place weight on the disposition of individual cases. While our assumption that the courts place value in individual case dispositions is responsible for some of the dynamics we uncover, the model reveals a striking instrumental motivation for why the courts would behave as if they value individual case dispositions. The extent to which the Supreme Court cares about a given case's disposition, relative to the legal rule, will influence the extent to which a legal rule will reflect the lower-court's preferences. Counterintuitively, the more the Supreme Court cares about the disposition of a case, the (weakly) more the legal rule used to reach that disposition will reflect the Supreme Court's preferred rule. As the Court becomes increasingly concerned with the case disposition, a lottery over outcomes in the event of uncertainty on the part of the Supreme Court becomes less attractive. Thus, in order to avoid review, the lower court must use legal rules that increasingly approximate the Supreme Court's ideal rule in order to minimize the chance that the Supreme Court is not getting its preferred disposition.

Conclusion

We have developed a model of opinion writing in a judicial hierarchy that builds from existing models of opinion writing (Lax and Cameron 2007) and rule creation in the judicial hierarchy (Carrubba and Clark 2010). By conceiving opinion writing as a multidimensional process—involving both ideological and quality dimensions—our model yields insights into the relationships among features of the judge (including her ideological preferences and skill) and features of the judge's opinions (such as the content of her opinions and the effort with which they are crafted). The results of our analysis build on scholarship which posits that the nature of cases that come before the courts will affect the rules made and lead to a certain type of path-dependence in the law (e.g., Kornhauser 1992a). Our analysis also yields insights into how opinion quality and content can substitute for each other, with implications for how one should interpret reversal rates and opinion quality when trying to infer information about the judge who produced those opinions.

Of course, in order to focus on these dynamics, our model employs a number of simplifying assumptions. We have assumed that the case space in which the courts operate can be represented by a simple, unidimensional fact space. An interesting avenue for further extension would be to consider a multidimensional case space. We also think it would be particularly fruitful to explore how strategic litigants and judges may use different factual dimensions to build a line of doctrine through a series of cases.

Moreover, our model points to a series of conclusions and implications on which future research can, and should, build. First, our model reveals that the relationship between judicial reversal rates and opinion quality may be an ambiguous indicator of underlying judicial quality. What is more, they are certainly not indicators of ideological moderation. Given the central role reversal rates and quality have come to play in popular discourse surrounding judicial nominations, our model may have significant implications for policy debates about judicial selection. A second implication for future investigation concerns strategic litigation. The analysis above reveals that the rules developed by lower courts are a function of the cases brought to the courts; this finding has implications for strategic litigants seeking cases to establish legal precedents. Related, the ability of strategic litigants and agenda setters to send signals to the Supreme Court about compliance or

noncompliance by the lower courts would complicate the information environment in which the Supreme Court decides whether to review a case. Future research on law creation in the judicial hierarchy can and should take account of the role these actors play. A final implication for future research concerns the Supreme Court's auditing strategy; our model demonstrates that by placing an emphasis on the case disposition in its auditing strategy, the Supreme Court can actually induce lower courts to create and employ rules that reflect the Supreme Court's preferred rule. We expect that some or all of these implications will serve as fertile ground for future investigation.

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Appendix: Proofs and Supplemental Results

Supplemental Results - Weakly Dominated Strategies

Lemma 7. *The Lower Court never offers* $o = \langle r; q \rangle$, *where* $r \notin [0,L]$.

Proof of Lemma 7. This proof is constructed in two steps. First, the Lower Court never prefers to offer $r < 0$. Suppose the Lower Court offers $\langle r = 0; q' \rangle$ and is reviewed. Any deviation to $\langle r < 0; q' \rangle$ will also be reviewed, so the Lower Court is no better off with that deviation. Suppose the Lower Court offers $\langle r = 0; q' \rangle$ and is not reviewed. Any deviation to $\langle r < 0; q' \rangle$ leaves the Lower Court no better off either with the outcome $\langle r = 0; q' \rangle$ from being reviewed or with the outcome $\langle r < 0; q' \rangle$ from not being reviewed.

Second, the Lower Court never prefers to offer $r > L$. Suppose the Lower Court plays $\langle r = L; q' \rangle$ and is reviewed. Any deviation to $\langle r > L; q' \rangle$ will also be reviewed. Suppose the Lower Court plays $\langle r = L; q' \rangle$ and is not reviewed. Any deviation to $\langle r > L; q' \rangle$ leaves the Lower Court strictly worse off either with the outcome $\langle r = 0; q' \rangle$ from being reviewed or with the outcome $\langle r > 0; q' \rangle$ from not being reviewed. ■

Lemma 8. *The Lower Court never plays* o' *where* $o' > \underline{o}$.

Proof of Lemma 8. The line $\underline{o} = \langle \underline{r}; \underline{q} \rangle$ defines the set of all $\langle r; q \rangle$ pairs that the Upper Court is indifferent over reviewing when $b = 0$. Given they will not be reviewed, $\frac{\partial U_{LC}}{\partial q} < 0$ and $\frac{\partial U_{LC}}{\partial r} > 0$ for all $r \in [0, L]$, the Lower Court is strictly worse off offering any $o' = \langle r, q \rangle$ where $o' > \underline{o}$. Thus, *LC* would only prefer to play o' if o' would not be reviewed but $\underline{o}$ would. However, by Corollary 1 *UC* never reviews $\underline{o}$, thus *LC* never prefers to play o'. ■

Proofs - Best Response Functions

Proof of Lemma 1. $U_{UC}(review|r) = \varphi + Q - k$ and $EU_{UC}(\neg review|r) = -r^2 + b\varphi + q$, where b is the Upper Court's beliefs over the probability that the Lower Court has declared a rule that yields the Upper Court's preferred disposition. The Upper Court reviews a case whenever $EU_{UC}(review|r) > EU_{UC}(\neg review|r)$. ■

Proof of Corollary 1. The Upper Court prefers not to review for $b \geq 0$ if $EU_{UC}(review|r) = \varphi + Q - k \leq \mathrm{EU}_{UC}(\neg review|r) = r^2 + q$. If the Upper Court observes $(r \geq 0, No)$, $b = 1$ because the Upper Court always wants *No* for any $f > 0$, and the Upper Court knows that $f > r$ upon observing $(r \geq 0, No)$. The Upper Court is indifferent over changing the rule when it knows it is getting its preferred disposition when $r = \sqrt{k + (q - Q)}$. ■

Proof of Lemma 2. By Corollary 1, the Upper Court reviews any opinion $o' < o_e$, where $o_e = \langle r = \sqrt{k + (q - Q)}, q = r^2 - k + Q \rangle$. Thus, an opinion with the *No* disposition that will not be reviewed must satisfy the condition $o \geq o_e$. Because any opinion $o \geq o_e$ with *No* will not be reviewed, playing an opinion $o > o_e$ with the *No* disposition leaves the Lower Court strictly worse off than playing an opinion on the line o_e. Thus, the optimal opinion from among those that will not be reviewed and leading to the *No* disposition falls along the line o_e. The opinion rule must also be constrained to in the range [0, min $\{f,L\}$] by Lemma 7 and because, any rule $r > f$ yields *Yes*. The Lower Court's utility is maximized in this range by $\tilde{o}$. ■

Proof of Lemma 3. Solving $\underline{r}$ for q yields $\underline{q} = \underline{r}^2 - k + \phi + Q$ (Corollary 1). Substituting $\underline{q}$ into U_{LC} yields $U_{LC}(\underline{r}) = -(L - \underline{r})^2 + \phi - c(\underline{r}^2 - k + \phi + Q)$. Solving $\frac{\partial U_{LC}(\underline{r})}{\partial \underline{r}} = 0$ for $\underline{r}$ yields $\underline{r}^* = \frac{L}{1+c'((\underline{r}_i^*)^2 - k + \phi + Q)}$. Because the second derivative is positive, $\underline{o}^*$ is the Lower Court's optimum of the set of pairs $\langle r, q\rangle$ that yield $o \leq \underline{o}$. Because $f > \underline{r}^*$ leads to the *No* disposition, the next best alternative is the optimal opinion that will not be reviewed but leads to the *Yes* disposition, which is on the line $\underline{o}$ (Lemma 8). Any opinion o' which is further away from $\underline{o}^*$ than $\underline{o}_f$ leaves *LC* strictly worse off, while any opinion o'' closer to $\underline{o}^*$ leads to the *No* disposition rather than the *Yes* disposition. ■

Proof of Lemma 4. If the Lower Court offers $o' < \overline{o}$, the Upper Court reviews by Lemma 1. By Corollary 1, the Upper Court never reviews any opinion $o'' > \underline{o}$. By definition, $q > 0$, and by Lemma 7, *LC* will never play an opinion with $r > L$. Thus, if in equilibrium, *LC* pools on an opinion with the *Yes* disposition, it must fall within these boundaries. ■

Proof of Lemma 5. Consider the following possible equilibrium. *LC* with $f \leq 0$ plays $o' \in \hat{O}$ and it separates from all *LC* with case facts $f \in (0, r']$. For o', $b = 1$, and the Upper Court does not review by Lemma 1.

Let $LC(f)$ denote a Lower Court with case facts f. Three possible equilibrium moves by $LC(f \in (0, r'])$ must be considered: (i) $o \geq \underline{o}$, (ii) $o \in (\underline{o}, o']$, and (iii) $o < o'$. First, by Lemma 3 if $LC(f \in (0, r'])$ is going to play some $o \geq \underline{o}$, she plays $\underline{o}^*$. She does not prefer to play $\underline{o}^*$ when $U_{LC}(o'|f \in (0, r']) > U_{LC}(\underline{o}^*|f \in (0, r'])$, which holds when $(L - r')^2 - (L - \underline{r}^*)^2 \geq c(q') - c(q\underline{r}_i^*)$. However,

$$U_{LC}(o'|f \in (0, r']) < U_{LC}(\underline{o}^*|f \in (0, r']) \Rightarrow$$
$$U_{LC}(o'|f \leq 0) < U_{LC}(\underline{o}^*|f \leq 0).$$

Thus, if $U_{LC}(o'|f \in (0, r']) < U_{LC}(\underline{o}^*|f \in (0, r'])$ holds, when this constraint is not met we have pooling on $o' = \underline{o}^*$.

Second, for any $LC(f \in (0, r'])$ playing $o \in (o', \underline{o}]$, in equilibrium if the Upper Court observes *Yes*, the Upper Court knows $f > 0$, $b = 0$, and by Lemma 1 the Upper Court reviews. However, if any $LC(f < 0)$ prefers to play $\hat{o}$ rather than be reviewed, then any $LC(f \in [0, \hat{r}])$ also prefers to play $\hat{o}$ rather than be reviewed. If the Upper Court observes *No*, then $b = 1$ because $r > 0$ and *No* imply that $f > r > 0$. By Lemma 1, the Upper Court does not review. However, this move makes LC strictly worse off. While not reviewed, the opinion $o > o'$ is strictly worse than o' from *LC*'s perspective and does not yield φ, whereas o' is not reviewed either and does yield φ. Thus, *LC* strictly prefers o' to any $o \in > (o', \underline{o}]$.

Third, suppose $LC(f \in (0, r'])$ plays some $o'' < o'$. For all $LC(f \in (0, r''])$, playing o'' yields a disposition of *Yes*. Thus, *UC* knows $f > 0$, $b = 0$, and by Lemma 1 the Upper Court reviews. Again, if any $LC(f < 0)$ prefers to play $\hat{o}$ rather than be reviewed, then any $LC(f \in [0, \hat{r}])$ also prefers to play $\hat{o}$ rather than be reviewed. Thus, *LC* would never deviate. ■

Proof of Lemma 6. Comparing *LC*'s expected utility from playing $\tilde{o}$ against its expected utility from playing $\tilde{o}$, conditional upon not being reviewed, yields the following condition for preferring $\tilde{o}$:

$$-(L - \hat{r})^2 - c(\hat{q}) + \phi > -(L - \tilde{r})^2 - c(\tilde{q})$$

which, reorganized, becomes

$$c(\hat{q}) - c(\tilde{q}) < (L - \tilde{r})^2 - (L - \hat{r})^2 + \phi.$$

Because $\tilde{r}$ is a weakly decreasing function of c, and is bounded by 0 and f and $f < \hat{r}$, the right-hand side of the equation is strictly positive and bounded between $L^2 - (L - \hat{r})^2 + \phi$ and ϕ. Whenever $\tilde{q} \in [0, \hat{q}]$, left left-hand side is bounded between 0 and ∞. Therefore, for an arbitrarily large $c(\cdot)$, *LC* prefers $\tilde{o}$, and for an arbitrarily small $c_i(\cdot)$, *LC* prefers $\hat{o}$. Whenever $\tilde{q} > \hat{q}$, the left-hand side is strictly negative, and the Lower Court prefers to play $\hat{o}$. ■

Proofs - Equilibrium

Lemma 9. *Given possible equilibrium behavior described in Lemma 5, the set of Upper Court beliefs that can support an equilibrium are as follows. On the equilibrium path, upon observing $\hat{o}$ and the Yes disposition, the Upper Court's beliefs are given by Bayes' Rule, and $b^* = \hat{b} = \frac{\int_{-\infty}^{0} g(f)df}{\int_{-\infty}^{\hat{r}} g(f)df}$. Off the equilibrium path, observing any $o \neq \hat{o}$ and the disposition Yes, the Upper Court's beliefs can cover the interval $[0, \hat{b})$.*

Proof of Lemma 9. For $(\hat{o}$, *Yes*$)$, $\hat{o}$ is on equilibrium path and so beliefs must be updated by Bayes Rule. Thus, $b^* = \frac{\int_{-\infty}^{0} g(f)df}{\int_{-\infty}^{\hat{r}} g(f)df}$. For $(o \neq \hat{o}$, *Yes*$)$, in order to sustain an equilibrium, the Upper Court must prefer to review, and therefore, by Lemma 1, the

support for b can cover the interval $[0, \hat{b})$. Otherwise, the Upper Court's beliefs are unconstrained. ■

Proof of Proposition 1. Suppose a sufficiently large c that the Lower Court prefers $\tilde{o}^*$ to $\hat{o}$. By Lemma 6, this condition is satisfied when $c(\hat{q}) - c(\tilde{q}) \geq (L-\tilde{r})^2 - (L-\hat{r})^2 + \phi$. Further assume that $U_{LC}(\hat{o}) > U_{LC}(o_r)$ and $f < r_I$. In this case, *LC* strictly prefers to play $o = \hat{o}$, because for $f < r_I$, the best opinion that can lead to the *No* disposition is $\tilde{o}_f$, but by Definition 1, for these case facts $U_{LC}(\hat{o}) > U_{LC}(\tilde{o}_f)$. Playing any other opinion that reaches the *Yes* disposition leaves *LC* strictly worse off, because any opinion other than $\hat{o}$ or $o' \in \underline{o}$ will be reviewed by *UC*. By definition, $U_{LC}(\hat{o}) \geq U_{LC}(\underline{o})$, and by assumption, *LC* prefers $\hat{o}$ to being reviewed. Thus, *LC* prefers to play $\hat{o}$ to any other alternative.

Now, assume that $U_{LC}(\hat{o}) \leq U_{LC}(o_r)$ and $f < r_R$. In this case, *LC* is best off playing o_r; by the same logic as above, for $f < r_R$, *LC* prefers the alternative opinion—in this case, o_r —to $\tilde{o}_f$. By the same logic as above, *LC* plays o_r rather than $\tilde{o}_f$. Thus, for $f < \max\{r_I, r_R\}$, *LC* prefers either $\hat{o}$ or o_r, whichever is preferable to *LC*.

Now, consider $f \in \left[\max\{r_I, r_R\}, \tilde{r}^*\right]$, where $\tilde{r}^*$ is the rule contained in opinion $\tilde{o}^*$, defined in Lemma 2. In this case, *LC* can reach an "No" opinion by playing $\tilde{o}_f$. Because $f > \max\{r_I, r_R\}$, $U_{LC}(\tilde{o}_f) > U_{LC}(\tilde{o}_r)$ and $U_{LC}(\tilde{o}_f) > U_{LC}(\hat{o})$. The optimal *No* opinion *LC* can play when $f < \tilde{r}^*$ is $\tilde{o}_f$, by Lemma 2.

Finally, consider $f > \tilde{r}^*$. The optimal *No* opinion is $\tilde{o}^*$ (Lemma 2). By Lemma 6, *LC* prefers $\tilde{o}^*$ to $\hat{o}$, and therefore *LC* will prefer whichever of $\tilde{o}^*$ and o_r yields the greater utility.

To see that this is an equilibrium, notice that *UC* never has an incentive to review any equilibrium opinion other than o_r. By Lemmas 5 and 9, *UC* will weakly prefer to not review opinion $\hat{o}$ but will review any other $o' \notin \hat{O}$ that leads to the *Yes* disposition. By Lemma 9, upon observing $\hat{o}$ and the *Yes* disposition, *UC*'s posterior belief is given by $\hat{b}$. Upon observing any off-the-path opinion other than $\hat{o}$ or $o' \in \underline{o}$, *UC*'s posterior is given by $b \in [0, \hat{b})$ and therefor prefers to review any opinion other than the equilibrium opinion or $o' \in \underline{o}$ with the *Yes* disposition. By contrast, observing any opinion with $r > 0$ and the *No* disposition, *UC* knows with certainty it prefers the *No* disposition, and therefore $b = 1$. Given $b = 1$, by Lemma 2 and Corollary 1 *UC* weakly prefers to not review any opinion $\tilde{o}$. Thus, when *LC* prefers to be reviewed, it will play either $\hat{o}$ or $\tilde{o}$ and play o_r when it does prefer to be reviewed rather than play $\hat{o}$ or $\tilde{o}$. ■

Proof of Proposition 2. Suppose a sufficiently small c that the Lower Court prefers $\hat{o}$ to $\tilde{o}^*$. By Lemma 6, this condition is satisfied when $c(\hat{q}) - c(\tilde{q}) < (L-\tilde{r})^2 - (L-\hat{r})^2 + \phi$. When $f < \hat{r}$, $\hat{o}$ is a possible strategy and will not be reviewed in equilibrium. The only other strategy leading to the *Yes* disposition that will not be reviewed is $o' \in \underline{o}$. By definition, *LC* weakly prefers any $\hat{o} \in \hat{O}$ to any $o' \in \underline{o}$, and by Lemma 6, *LC* prefers $\hat{o}$ to $\tilde{o}^*$. Because $\tilde{o}^*$ is the optimal opinion leading to the *No* disposition (Lemma 2), if *LC* prefers $\hat{o}$ to $\tilde{o}^*$, *LC* prefers $\hat{o}$ to any opinion leading to the *No* disposition. Thus, if it does not prefer to be reviewed, *LC* prefers to play $\hat{o}$ whenever $f < \hat{r}$.

Consider next $f \in [\hat{r}, \underline{r}^*)$. In this case, $\hat{o}$ is not a viable strategy, because it leads to the *No* disposition. The optimal *Yes* opinion, then, is $\underline{o}^*$ (Lemma 3). The Lower Court will play that when $U_{LC}(\underline{o}^*) > U_{LC}(\tilde{o}_f)$ (the best "No" strategy available to the Lower Court). By contrast, when $f \in [\underline{r}^*, \tilde{r}^*)$, *LC* is constrained to the best *Yes* opinion it can write, which is $\underline{o}_f$ (Lemma 3). Thus, it will choose $\underline{o}_f$ as long as $U_{LC}(\underline{o}_f) > U_{LC}(\tilde{o}_f)$, which holds whenever $\phi > c(\underline{q}_f) - c(\tilde{q}_f)$ (Definition 2). Otherwise, it will play $\tilde{o}_f$, the optimal *No* opinion (Lemma 2).

Next, for $f > \tilde{r}^*$, the Court can play $\tilde{o}^*$ —the optimal *No* opinion that will not be reviewed (Lemma 2), $\underline{o}_f$, or o_r. By assumption, *LC* prefers $\tilde{o}^*$ to o_r. Thus, it will play $\tilde{o}^*$ whenever $U_{LC}(\tilde{o}^*) > U_{LC}(\underline{o}_f)$ and $\underline{o}_f$ otherwise.

Finally, if for any given facts, the optimal opinion that will not be reviewed yields lower utility that being reviewed, the Lower Court strictly prefers to play o_r.

To see that this is an equilibrium, note that when *LC* plays $\hat{o}$ with the *Yes* disposition, $b = \hat{b}$ (Lemma 9) and *UC* weakly prefers to not review. For any other $o' \notin \underline{o}$ with the *Yes* disposition, $b < \hat{b}$ (Lemma 9), and *UC* prefers to review. For any $o' \in \underline{o}$, by Lemma 1 *UC* weakly prefers to not review for any $b \in [0,1]$. By assumption, *LC* prefers to play $\hat{o}$ rather than be reviewed and therefore has no incentive to deviate from $\hat{o}$ when $f < \hat{r}$. Also notice that when $r > 0$ and the disposition is *No*, $b = 1$ and *UC* prefers not to review (Corollary 1). By assumption, $\tilde{o}^*$ is preferable to o_r, and so *LC* has no incentive to deviate when $f > \tilde{r}^*$. ■

Proofs - Comparative Statics

Proof of Result 1. Notice first that the rule and quality implied in opinions $\tilde{o}^*$ and $\underline{o}^*$ are both increasing in $c(\cdot)$ (the function $c(\cdot)$ is convex). The rule and quality implied by opinions $\hat{o}$, $\underline{o}_f$, and $\tilde{o}_f$ are all invariant to $c(\cdot)$. Notice next that if *LC* is comparing an equilibrium opinion $o' = \langle r', q' \rangle$ leading to a *Yes* disposition and an equilibrium opinion $o'' = \langle r'', q'' \rangle$ leading to a *No* disposition, it must be the case that $f \in (r'', r')$. This comparison can therefore only be made when $r'' < r'$. Further, because these are equilibrium opinions, it must be the case that $r' > r''$, if *UC* will not review. By the proof of Lemma 6, $c(\cdot)$ decreases, *LC* is therefore more likely to prefer the opinion with higher quality. The same logic applies to the effect of $c(\cdot)$ on the equilibrium rule. ■

Proof of Result 2. Notice first that the rule and quality implied in opinions $\tilde{o}^*$ and $\underline{o}^*$ are both increasing in L. The rule and quality implied by opinions $\hat{o}$, $\underline{o}_f$, and $\tilde{o}_f$ are all invariant to L. Notice next that if *LC* is comparing an equilibrium opinion $o' = \langle r', q' \rangle$ leading to a *Yes* disposition and an equilibrium opinion $o'' = \langle r'', q'' \rangle$ leading to a *No* disposition, it must be the case that $f \in \langle r'', r' \rangle$. This comparison can therefore only be made when $r'' < r'$. Further, because these are equilibrium opinions, it must be the case that $q' > q''$, if *UC* will not review. By the proof of Lemma 6, as L increases, *LC* is therefore more likely to prefer the opinion with higher quality. The same logic applies to the effect of L on the equilibrium rule. ■

Proof of Result 3. This result is a direct implication of Results 1 and 2. ■

Proof of Result 4. This result is a direct implication of Results 1 and 2. ■

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Tom S. Clark is Associate Professor of Political Science, at Emory University, Atlanta, GA 30322.

Clifford J. Carrubba is Associate Professor of Political Science, at Emory University, Atlanta, GA 30322.