An established line of research demonstrates that vague judicial opinions are less likely to be implemented than clear opinions. Vague opinions thus present a puzzle. Why would judges craft opinions that risk noncompliance? We argue that the relationships between judges and other policy makers in separation-of-powers systems are central to understanding this puzzle. Opinion vagueness can reflect efforts to resolve core tradeoffs associated with judicial policymaking that bear some resemblance to standard accounts of political delegation. Vagueness offers judges the ability to manage their uncertainty over policy outcomes and to hide likely defiance from public view. At the same time, vagueness removes a central source of pressure for compliance that judges can place on other policy makers. Using a game-theoretic model, we identify conditions under which judges use vagueness precisely as legislatures use statutory discretion. We also demonstrate conditions under which judges use vagueness in ways unanticipated by standard delegation accounts.

Some of the most salient—and controversial—judicial decisions involve the exercise of judicial review to void a public policy. When judges exercise this power, their opinions not only give reasons for declaring a policy invalid, but they also suggest implications for future policy choices. Significantly, courts are more or less clear in outlining these implications. Consider two examples. In a landmark decision on party finance legislation, the German Constitutional Court voided existing eligibility requirements for receiving public subsidies. It then instructed the federal legislature to revise the requirements so as to provide public subsidies for any party receiving at least 0.5% of the vote in an election. In a subsequent revision of the statute, the Bundestag adopted this prescription exactly. In contrast, consider the U.S. Supreme Court’s second Brown v. Board of Education decision. Instead of laying down a definitive remedy after holding racial segregation of schools unconstitutional, the court famously demanded that integration should proceed with “all deliberate speed.” The precise actions that would be consistent with the decision—at least for an indefinite initial period—were left ambiguous.

Why do judges choose to be vague about the policy implications of their decisions in some cases and highly specific in others? Scholars have long argued that judicial ambiguity promotes noncompliance (Baum 1976; Johnson 1979; Wasby 1970). As we know in hindsight, the Brown decision encountered “massive resistance” and, for a long time, public schools in many parts of the country were not desegregated in a meaningful way (Rosenberg 1991). Detailed case studies (Dolbeare and Hammond 1971; Frank 1958; Rosenberg 1991; Sorauf 1959), as well as systematic analysis of agency compliance with U.S. Supreme Court decisions (Spriggs 1997) provide strong evidence that this is a broader phenomenon. Vague rulings decrease the likelihood of compliance. Assuming that judges value the proper implementation of their decisions and that they have control over opinion clarity, vague opinions present a puzzle. Why would judges craft decisions that raise the possibility of noncompliance?

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We would like to thank Cliff Carrubba, Stefanie Lindquist, Kevin McGuire, Chris Zorn, three anonymous referees, and seminar participants at Duke University, Florida State University, Rice University, University of Texas School of Law, and Vanderbilt University for helpful comments on previous versions of this article.

1BVerfGE 24,300:342.

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ISSN 0092-5853
A common answer to this puzzle highlights processes internal to judicial deliberation. As scholars of Brown note, the desire to craft consensus among a group of justices with diverse preferences may require opinion writers to sacrifice clarity (Cray 1997; Schwartz 1983; Ulmer 1971). Thus, vagueness can be a strategy for reducing what legal scholars commonly call “decision costs” (Sunstein 1996, 17). Similarly, vagueness in opinions may result from the nature of the legal provisions at issue. Vague constitutional language may prevent highly specific rulings, or a line of vague precedents may lead to ambiguous subsequent decisions. While these internal and legal dynamics are no doubt relevant, in this article, we argue that vagueness can also result from concerns external to judicial deliberations. Vagueness can serve important political purposes in the relations between courts and other policy makers. Significantly, these external concerns affect judicial decisions irrespective of internal and legal incentives for vagueness and are even applicable in situations in which a single judge decides cases. That is, external processes can induce vagueness even when there is no deliberation.

To foreshadow, we argue that, in part, variance in opinion vagueness can reflect efforts to resolve core trade-offs associated with judicial policymaking. Vagueness allows judges to manage two fundamental challenges. First, building on the legal literature on minimalism (Sunstein 1996; Vermuele 2000) and the political economy literature on delegation (Bawn 1995; Epstein and O’Halloran 1999; Huber and Shipan 2002), we argue that vagueness enables judges to deal with their limited policymaking abilities in an uncertain world. Second, and consistent with an emerging compliance literature in judicial politics (Carrubba 2005; Staton 2006; Vanberg 2005), we argue that vagueness can help judges to build and maintain institutional prestige in the face of potential opposition. While ambiguity allows judges to deal with these two challenges, it undermines their ability to induce particular policy outcomes. Thus, control over opinion clarity presents judges with a tradeoff between managing their uncertainty and institutional prestige on the one hand and their control over policy outcomes on the other. In what follows, we suggest that the precise nature of this tradeoff varies across cases and political contexts. We identify conditions under which judges use vagueness as legislatures use statutory discretion under common models of political delegation. In addition, we demonstrate that judges also use vagueness in ways unanticipated by the standard delegation story.

Although we frame our discussion around interbranch policymaking at the highest level of government, our argument is general. Delegation is often—not just in the judicial context—achieved by providing instructions that are sufficiently ambiguous to allow agents to adapt policy in light of their superior knowledge and expertise. Such vague rules not only grant greater discretion. Ambiguity also makes it increasingly difficult for outsiders to detect when agents are failing to comply, because it is harder to tell which actions are consistent with the principal’s instructions. Because vagueness directly implicates compliance, delegation via ambiguous rules gives rise to complex dynamics in the relationship between agents and principals that have not received attention in traditional accounts. We move these dynamics to the forefront of the analysis. The implications that follow are relevant for all delegation relationships in which compliance with the principal’s instructions cannot be taken for granted. In this sense, the argument is relevant for delegation within the judicial hierarchy, the implementation challenges confronting trial court judges (e.g., Feeley 2004), as well as common agency dilemmas in bureaucratic politics.

Our approach has a number of implications for the study of judicial politics. The argument suggests that judges may strategically use opinion vagueness to build institutional strength. As we discuss in the conclusion, one consequence is that empirical tests of separation-of-powers models that focus on binary codings of judicial rulings (e.g., “conservative” or “liberal,” “progovernment,” “antigovernment”) are likely to underestimate the extent of strategic judicial behavior. This implies that empirical studies of judicial behavior should focus on the quality of the rules courts produce and not just on binary characteristics of merits votes. Moving away from dichotomous dependent variables towards richer measures of judicial “outputs” reflects not only a concern for the features of judicial opinions on which practitioners focus, but also an opportunity to test existing theoretical arguments fully. The model also suggests that questions over the appropriateness of judicial vagueness might be evaluated across the “reasons” for ambiguity we investigate here. Judicial vagueness in search of policy expertise might be evaluated differently than vagueness that is designed to avoid political confrontation. In the remainder of this article, we summarize our argument, develop a

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3 Most accounts model delegation via the principal’s choice of a “discretion interval” within which the agent must set policy (e.g., Epstein and O’Halloran 1999), thus abstracting away from the problem of compliance. Huber and Shipan (2002) incorporate the possibility of noncompliance, but the compliance decision is not endogenous to the degree of delegation.

4 The particular nature of the delegation problem will vary across contexts, of course. For example, the compliance problem might be less problematic when delegation occurs within a judicial hierarchy as higher courts can engage in “auditing” behavior (e.g., Cameron, Segal, and Songer 2000). At the same time, the vagueness of the initial decision directly affects the ability of litigants to establish whether a lower court fails to follow precedent.
model of judicial opinion vagueness, and discuss its implications for opinion writing. We conclude by returning to the significance of our model for theories of delegation and judicial decision making.

The Challenge of Judicial Policy Making

Deciding how specific to be in the “instructions” given to other policy makers about what implementation of a decision requires them to do constitutes a central choice that judges face in resolving a case. In addition to legal factors and concerns derived from the internal dynamics of collegial courts, the external relations between courts and other policy makers generate a number of distinct considerations for judges that are likely to be important in this context. The first concerns the limited policy expertise of judges. Drafting public policies to achieve a given political outcome is often a complex technical problem. Consider Brown again. Striking down school segregation is only part of eliminating an unconstitutional public policy. Determining which specific policies will achieve integration and with which side effects presents a technical challenge requiring specialized knowledge (Vermuele 2000, 76). As Gilligan and Krehbiel have argued in the legislative context, while policy makers may know “what outcomes are desired,” they may not know “what [means] will yield desired outcomes” (1990, 536). Chief Justice Warren recognized this difficulty in Brown. Ulmer writes, “In the deep South... [Warren] believed it would require all the wisdom at the command of the Court to abolish segregation with minimal upheaval and strife. He particularly stressed how segregation was abolished was important” (1971, 693). Thus, a central difficulty in judicial policymaking is to solve a “means-ends” problem by structuring the implementation process in such a way as to allow technical expertise to inform choices among alternative policy options.

The need to solve this “means-ends” problem is, of course, not unique to judicial decision making. As a well-established literature on delegation has demonstrated, the need for policy expertise has important consequences for the delegation of authority between legislatures and bureaucrats (see Bawn 1995; Epstein and O’Halloran 1999; Huber and Shipan 2002). What is important for our purposes is that relative to the policy makers with whom they interact, judges are typically more constrained in their ability to solve this “technical” aspect of policymaking (Easterbrook 1984, 1987). In deciding cases, judges confront a wide range of issues and usually do not possess specialized knowledge in all of them. They typically have only limited access to technical information necessary for evaluating alternative policies, information that may be biased by litigant interests. Other policymaking institutions, especially legislatures and executives, do not confront the same constraints. Legislatures usually feature specialized committee systems that promote the development of policy expertise. Legislators and executives can rely on extensive staff and considerable bureaucratic support in drafting public policies. In short, judges may be in an excellent position to evaluate political outcomes that are constitutionally required or prohibited. But they will typically be in a less favorable position to design the specific policies necessary to bring about those outcomes than other policy makers. 5

This relative lack of policy expertise presents judges with a trade-off similar to the trade-off faced by legislators in trying to decide how much discretion to provide to administrative agencies (Huber and Shipan 2002). By issuing a highly specific decision that identifies the political outcome to be achieved as well as the specific policy to be employed for achieving that purpose, judges run the risk of “locking in” an inappropriate policy that does not achieve its desired purpose and may even produce a worse outcome—inducing what legal scholars call “error costs.” Vagueness is one tool that judges can use to deal with this sort of dilemma. By giving other policy makers discretion to use their policy expertise, a vague decision that specifies ultimate political outcomes without providing specific instructions concerning implementation may allow judges to hedge against their limited policymaking abilities. But of course—and this is the key insight of the delegation literature—vagueness is not costless. Providing discretion raises the possibility that other policy makers will use their expanded authority to promote their own interests. As a consequence, principals must be sensitive to the divergence of preferences between them and the policy makers to whom they delegate.

The judicial context adds an important twist. Because judicial decisions are not self-enforcing, compliance cannot be taken for granted. When confronted with a judicial decision that makes an unwelcome policy demand, legislative majorities (or other policy makers) may be tempted to evade or defy the decision. Whether they will choose

5It is worth distinguishing this argument from the kind of “informational judicial review” analyzed by Rogers (2001). Rogers argues that judicial review can serve an important function in the policymaking process because it allows judges to review policies in light of information that can only come to light after implementation. In this way, judicial review can serve to “weed out” policies that turn out to be inefficient ex post. Our argument focuses on a different aspect of the judicial process: the prescriptive problem of determining policies that will achieve judicially mandated outcomes. In this context, judges do not possess the informational advantage they enjoy in the context of Rogers’ argument.
to do so depends largely on the political costs of resistance. Defiance may be costly for a variety of reasons (see Whittington 2003). Judicial review can serve as an institution that polices mutual restraint among competing political factions (Ramseyer 1994; Stephenson 2003). Undermining judicial independence can therefore threaten the long-run interests of parties in maintaining a “cooperative” outcome of restrained competition. Moreover, resisting judicial decisions can be electorally costly if the judiciary enjoys broad public support, a condition that is met in most advanced democracies (Gibson, Caldeira, and Baird 1998). To the extent that citizens believe that governments should respect judicial decisions, defiance of a decision can result in a public backlash that is costly for governments (Canon 2004; Staton 2006; Vanberg 2005).

Importantly, the costs that elected officials must potentially bear if they defy a decision depend on how easy it is for others—either other political elites or citizens at large—to tell that a decision has not been properly implemented and on how easy it is for them to make a credible case to others that a decision has been ignored (Vanberg 2005, 21f.). Of course, courts have some control over the extent to which observers can detect noncompliance (Staton 2006). Indeed, much of this depends on how clear a judicial opinion is. The more clearly the court articulates its policy demand, the costlier it is to deviate from it since noncompliance is easier to detect. Vagueness, on the other hand, reduces the costs of noncompliance: if a decision is sufficiently vague, it may not be obvious that a legislative majority (or other policy maker) is not complying with a decision, even if the policy that is adopted in response deviates considerably from the court’s demand. In other words, opinion specificity can increase pressure for faithful compliance because policy makers may incur considerable political costs if they are (or are perceived to be) caught in a flagrant attempt to disregard a judicial decision. The more clearly an opinion states the policy implications of the decision, the easier it is to verify whether policy makers have faithfully complied, making it more likely that external actors can monitor and impose costs for noncompliance (Spriggs 1996, 1127; Vanberg 2005, 48).

As an illustration, consider the contrast between the remedy in Brown II and the following case from Mexico. In 2001, the Mexican Supreme Court was called upon to address the failure of the federal Secretary of Agrarian Reform to remove members of an indigenous commune in Ensenada, Baja California, from a valuable piece of beachfront property that they had gained illegally in the 1970s. The community had been renting parcels of land, largely to American retirees, despite a long-standing court order recognizing the title of the original owners. Per Article 107 of the Mexican Constitution, the district court judge transferred the case to the Supreme Court to ensure compliance. The Court found itself confronted by a community intent on resisting the eviction of their lessees and federal authorities who showed little enthusiasm for removing them by force. One option for the Court might have been to order the Secretary of Agrarian Reform to make a good faith effort to solve the problem, say by requiring eviction within a “reasonable time frame” in order to balance respect for the rule of law and public safety. Instead, the Court set a particular date and time for the physical removal of the community members and their lessees, and indicated that the Secretary would be removed from office if he did not comply. In short, the Court’s order was so clear as to leave little interpretive room over what compliance required. Reluctantly, and in the context of significant media coverage, the Secretary marshaled the authorities necessary to comply with the order and the original title was finally respected.

While a clear ruling can generate tremendous pressure for compliance, increasing specificity in the face of opposition is not always desirable. Precision provides judges with leverage vis-à-vis (potentially) recalcitrant policy makers, but this strategy, if unsuccessful, can also be costly. If other policy makers are determined to resist a judicial decision and will defy even the clearest judicial order, specific demands by a court only serve to highlight the relative lack of judicial enforcement power. Such open defiance is costly for courts. Public perceptions of judicial legitimacy and influence likely depend critically on the avoidance of defiance (Carrubba 2005) because defiance tends to have a corrosive effect: noncompliance by a policy maker today may begin to undermine the general perception that court decisions must be respected, and thus induce more and more noncompliance as citizens and political elites become less likely to react when policy makers fail to adhere to judicial rulings. Once defying decisions becomes a “normal” part of politics, judges lose influence as policy makers are no longer expected to heed rulings they dislike. To prevent such an erosion of authority, judges may choose to be vague when they expect defiance in order to protect the court against open institutional challenges while still striking down a policy to which they object.

In short, the specificity of judicial opinions is likely to be shaped by a variety of concerns—managing a lack of policy expertise, increasing pressure for compliance, and protecting against open resistance—that pull judges in opposite directions, and whose influence will be shaped by their political environment. We now turn to a model.

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6The federal government had illegally expropriated the property and granted it to the community (Incidente de Inejectucción 163/97).
that formalizes these tradeoffs and suggests how judges might evaluate them in particular cases.

A Model of Judicial Opinion Vagueness

Consider the following extensive form game of incomplete information played between a “court” and a “legislature.”

Like most models in the delegation literature, we focus on a simple, one-dimensional spatial model. The game begins when the court reviews a policy and issues an opinion. The opinion demands that policy be set at the court’s ideal point, but opinions can vary in how clearly they articulate that demand; that is, the language of the opinion can be more or less vague about the precise policy implications that follow from it. The level of opinion specificity is captured by a parameter \( \varepsilon \).

In response to the court’s decision, the legislature implements a policy, \( p \in R \). In keeping with other models of delegation, the policy outcome that results is a function of the policy chosen by the legislature and an exogenous shock. That is, the final policy outcome is given by \( X = p - \varepsilon \), where \( \varepsilon \) is a parameter drawn from a uniform distribution on \([−\alpha, \alpha]\). Substantively, this device captures the uncertainty that players may face about the policymaking environment: they have some idea of the consequences that follow from their policy choices, but they cannot forecast them precisely. The greater the interval \([−\alpha, \alpha]\), the less certain the actors are about the connection between policies and outcomes.

We assume that both players care about the final policy outcome. We model this aspect of their preferences using a standard quadratic loss function. Without loss of generality, let the ideal point of the court be \( C = 0 \) and the ideal point of the legislature be \( L > 0 \). The parameter \( L \) thus captures the degree of preference divergence between court and legislature. In addition to their policy concerns, the players also have the institutional concerns outlined above: the legislature cares about the potential costs of defying a judicial decision, while the court cares about the costs of being defied. As we have argued, both types of costs are shaped by the specificity of a judicial opinion. The following utility function for the legislature captures these considerations:

\[
U_L(p) = -(L - (p - \varepsilon))^2 - abp^2.
\]

The first term of the utility function represents the policy payoff resulting from the legislature’s choice of policy. The second term represents the costs that the legislature must incur for deviating from the court’s opinion. These costs depend on three factors. The parameter \( b \geq 0 \) captures the potential costs for deviating from a decision outlined above (e.g., under the “electoral backlash” scenario, \( b \) can be interpreted as the degree of public support for the court.) As \( b \) increases, a given deviation becomes costlier for the legislature. Second, the costs of deviating depend on the severity of the deviation (measured by the quadratic difference between the court’s demand and the legislature’s policy). To the extent that deviation is costly, more aggressive deviations from the court’s demands are likely to result in higher costs if only because it is increasingly obvious that officials are flouting the court’s decision. Finally, the costs of deviation depend on the clarity of the court’s opinion. A perfectly specific opinion \((a = 1)\) that makes crystal clear what compliance requires maximizes the costs that the legislature must pay for a deviation. As an opinion becomes less clear \((a \text{ declines})\), the costs that a legislature incurs for a given deviation decrease. A perfectly vague opinion \((a = 0)\) allows the legislature to implement any policy without cost since no policy is incompatible with the court’s demands.

\[\text{Assuming that } b \geq 0 \text{ implicitly means that the legislature is not rewarded for noncompliance above and beyond what it obtains from the policy outcome. If such “rewards” are possible, the court will be even more inclined to use vagueness than indicated in our results below.}\]

\[\text{Recall that the court, by assumption, issues a policy demand at its ideal point. Thus, the legislature’s policy choice } p \text{ represents the deviation from the court’s demand.}\]

\[\text{In the context of our model, a perfectly vague opinion is an opinion that attacks the status quo policy as illegitimate, but does not impose any specific demands on the legislature for reforming that policy. Consider Brown again. By demanding that segregation end “with all deliberate speed,” the Court—at least for an undefined initial period—made no concrete demands regarding school policy. In this sense, the opinion was perfectly vague. The important distinction between such an opinion and upholding the status quo is that the opinion fails to give the status quo policy the stamp of approval that it would receive from an endorsement of the policy. Instead of entrenching the status quo, the court is creating conditions for changing it. The substantive conclusions we reach below}\]
We represent judicial preferences with the following utility function:

\[ U_C(a) = -(p - \varepsilon)^2 - acp^2. \]

The first term of the utility function captures the court’s policy preferences, imposing greater loss on the court as the final policy outcome diverges from its ideal point. The second term captures the costs of noncompliance. These costs increase as the level of noncompliance becomes more severe, making it more and more obvious that the court is unable to force compliance with its decision. Moreover, as we argued above, the costs of noncompliance depend on the specificity of a judicial opinion. By writing a very clear opinion, the court highlights any deviation between its demand and the legislative response, thus exposing itself fully to the costs of noncompliance.

As an opinion becomes more and more vague, these costs diminish since it is less clear whether a legislative response is in compliance with a judicial decision. Finally, the parameter \( c \geq 0 \) indicates how much the court values its policy concerns relative to its noncompliance concerns. As \( c \) increases, the court is more and more concerned about avoiding open defiance of its decisions. Allowing \( c = 0 \) permits us to consider what happens when courts do not care about noncompliance at all. Not surprisingly, this parameter will have important implications for how judges evaluate the core delegation tradeoff.

As we argued above, judges may often be at an informational disadvantage in making policy compared to legislative bodies. When issuing a decision that requires a legislative response, judges thus confront a classic delegation dilemma. They may want to give vague instructions to legislators in order to allow them to bring their relative policy expertise to bear in implementing a decision. At the same time, doing so raises the specter of noncompliance, since a lack of clear instructions makes it easier for legislative majorities not to comply with a decision. We capture this informational asymmetry through a simple device. We assume that the legislature is perfectly informed about the random policy shock \( \varepsilon \) that determines the relationship between the policy that is chosen and the outcome that results (i.e., the legislature knows \( \varepsilon \)). Judges, in contrast, know the distribution of \( \varepsilon \), but not its exact value when they must issue an opinion.\(^{12}\)

\(^{12}\)The assumption that legislators are perfectly informed makes the model more tractable, but is not critical to the conclusions. If legislators confront some policy uncertainty, the results remain unchanged as long as the legislature enjoys an informational advantage over judges. Classic studies of delegation (e.g., Epstein and O’Halloran 1999) typically assume that legislators are imperfectly informed and face a problem of delegation to perfectly informed bureaucrats. We do not mean to suggest that such delegation problems between legislators and bureaucrats do not exist or that legislators face no policy uncertainty. Our argument is simply that relative to judges, legislators confront less policy uncertainty.
attention to subtle dynamics in delegating authority that are missing in the traditional treatment.

**Equilibrium**

Consider the legislature’s best response to a given judicial opinion. The legislature chooses the policy that maximizes its utility, given the exogenous parameters \((L, b, \text{ and } \varepsilon)\) and the specificity of the judicial opinion \((a)\). The legislature’s optimal policy is given by

\[
p^* = \arg \max_p -(L - p + \varepsilon)^2 - abp^2 = \frac{L + \varepsilon}{1 + ab}.
\]

This policy has a number of intuitive properties. If the court adopts a completely vague decision \((a = 0)\), the legislature’s best response is to adopt policy \(L + \varepsilon\), resulting in policy outcome \(L\). Because the legislature faces no cost for deviating from the court’s demands, it can fully exploit its expertise to induce the outcome it most prefers. As a judicial decision becomes more specific, pressure on the legislature to move policy towards the court’s ideal point of 0 grows. However, the ability of the court to pressure the legislature is limited by the costs that officials must incur for defiance. Even for a completely specific decision, the legislature’s best response is given by \(\frac{L + \varepsilon}{1 + ab}\), which approaches the court’s demand only as \(b\) becomes arbitrarily large. The less officials have to fear for ignoring a decision (e.g., the less public support the court enjoys), the bolder legislative majorities will be in deviating.

Having characterized the legislature’s optimal policy response, we can consider the decision problem confronting judges. The court’s choice is more complicated, because it faces policy uncertainty. The court can use specificity to influence the legislature’s policy choice, yet how close to the court’s ideal point it would like the legislature to set policy depends on the policy shock about which the court is uncertain. Moreover, the specificity of the opinion will also affect how “visible” deviations from the court’s demand are, thus affecting the court’s institutional payoffs. Given the legislature’s optimal policy \(p^*\), for any realized value of \(\varepsilon\), the court’s ex post utility equals

\[
u_c^*(a) = -(L + \varepsilon - \varepsilon)^2 - \frac{ac(L + \varepsilon)^2}{(1 + ab)^2}.
\]

Since \(\varepsilon\) is uniformly distributed on the interval \([-\alpha, \alpha]\), the court’s ex ante expected utility is

\[
EU_c(a) = \int_{-\alpha}^{\alpha} \left(-\left(\frac{L + \varepsilon + \varepsilon}{1 + ab} - \varepsilon\right)^2 - \frac{ac(L + \varepsilon)^2}{(1 + ab)^2}\right) \frac{1}{2\alpha} \, d\varepsilon.
\]

The court seeks a level of specificity \((a)\) that maximizes this expression (subject to the constraint that \(a \in [0, 1]\)). The solution to the court’s decision problem, together with the legislature’s optimal response, defines a unique, subgame-perfect equilibrium of the game. The appendix contains the derivation and technical statement of the equilibrium. Here, we illustrate the equilibrium graphically, focusing on the main variable of interest: judicial opinion vagueness.

Figure 1a and 1b illustrate the specificity of the judicial opinion in equilibrium as a function of the preference divergence between court and legislature (the horizontal axis) and the degree to which the court is concerned about the institutional ramifications of noncompliance (the vertical axis). As we move to the right in the figures, legislative preferences diverge more and more from judicial preferences. As we move up in the figures, the court is increasingly concerned about the institutional implications of noncompliance. The figures are distinguished by the costs confronting the legislature for defying a judicial decision. In Figure 1a, these costs are moderate to low \((b < 1)\), while they are potentially large in Figure 1b \((b > 1)\). The distinction between these two cases has some interesting, subtle implications to which we return below. First, however, we focus on the general lessons that emerge from both figures. Most immediately, the figures demonstrate that there are three general regions in which the behavior of the court differs: In region A, the court issues a completely vague opinion \((a = 0)\). In region B, it is highly specific about the implications of its decision \((a = 1)\). In region C, it issues an opinion that is neither completely clear nor completely vague \((a \in [0, 1])\).

The figures offer some general lessons about the impact of preference divergence on the specificity of judicial opinions. As long as the court’s institutional concerns are not too significant relative to the costs that the legislature suffers for deviation (i.e., \(\varepsilon < b^2 + 2b\); the lower part of both figures), the court’s decision becomes increasingly specific as legislative-judicial preferences diverge. The intuition behind this result is familiar. A vague decision that delegates control over the policy outcome to the legislature hedges against the court’s policy uncertainty by providing greater discretion to the better-informed policy maker. But this protection comes at a price. It ensures that the policy outcome will reflect the legislature’s preferences. When legislative and judicial preferences are

\[13\]Specifically, in region C, \(a^* = \frac{\varepsilon b}{2ab - \varepsilon b + \varepsilon^2 (2 + \varepsilon)}\).

\[14\]For \(\varepsilon > b\), the court may cross from a completely vague to a completely specific opinion. For \(\varepsilon < b\), the court becomes more specific as it moves from region A to region C to region B. Within region C, \(\frac{da^*}{dL} > 0\).
sufficiently close, this cost is more than outweighed by the informational gain the court secures by allowing the legislature to take advantage of its policy expertise. As preferences begin to diverge, however, the legislature will make use of discretion in a way that leads to outcomes that are increasingly disliked by the court. The “price” the court must pay for the legislature’s expertise increases and the court becomes more concerned with reining in legislative policymaking by issuing more specific opinions.

The figures also allow us to consider the impact of policy uncertainty on opinion vagueness. As the court’s uncertainty about the implications of specific policies increases, the cut points along with the thresholds that separate the three regions, shift to the right (see the appendix for a technical derivation). Region A expands at the expense of regions B and C, and region C expands at the expense of region B. The result is that, all else being equal, an increase in the court’s policy uncertainty can only induce the court to issue a more ambiguous opinion. The intuition is straightforward: increasing policy uncertainty means that the court must be more concerned about the possibility that a highly specific opinion, which does not provide much room for the legislature to make use of its policy expertise, will lock in an inappropriate policy. When it is less certain about the connection between policies and outcomes, the court will therefore prefer to delegate more authority to the better informed policy maker.

So far, the model suggests a number of implications that reflect results from standard delegation models (e.g., Epstein and O’Halloran 1999; Huber and Shipan 2002). Like legislatures in their relations with bureaucrats, courts can make use of vague opinions to delegate policymaking authority to better informed “agents,” and they will be more tempted to do so the less informed they are about the consequences of different policies, and the greater the convergence of preferences between them and other policy makers. The following observation summarizes this insight:

**Observation 1**: Under a wide range of circumstances, courts use opinion vagueness precisely as legislatures use discretion in common delegation models. Specifically, opinion vagueness
should (a) increase as judicial policy uncertainty increases, and (b) decrease as judicial and policy maker preferences diverge.

As we show next, the model also highlights that judges can use vagueness in ways that differ fundamentally from the standard delegation story. These differences derive from two aspects of vagueness that are central in the judicial context. In standard accounts, it is assumed that the problem the principal is trying to solve by delegating is to overcome a lack of policy expertise. Moreover, the principal can effectively constrain the agent to implement policy within the bounds that the principal sets. That is, the principal cannot set policy outside of the discretion interval (e.g., Epstein and O’Halloran 1999) or the principal can expect full compliance with some probability (e.g., Huber and Shiban 2002). The typical judicial delegation problem is more difficult. Courts cannot directly compel compliance with their decisions. Rather, courts must persuade other policy makers to follow the court’s directions. A chief way in which they can do so is to raise the costs to other policy makers of pursuing policies that are inconsistent with the court’s demands. A primary tool in doing this is to be highly specific about the policy implications of the court’s decision, thus highlighting attempts at evasion. That is, judges can use highly specific demands to increase pressure for compliance. But there is also a flip side. Suppose judges expect that a decision—even if highly specific—will encounter resistance. To the extent that judges care about the institutional implications of noncompliance, they can use vague language to “mask” it by avoiding specific demands.

The figures reveal the impact of these dynamics. Most dramatically, once judicial concerns for the institutional implications of noncompliance become sufficiently large (i.e., $c > b^2 + 2b$; the upper part of the figures), the court issues a completely vague opinion for any level of preference divergence and for any level of policy uncertainty. (We return to a discussion of the dynamics when $c < b^2 + 2b$ in the next section.) Given the court’s overwhelming concern for avoiding open noncompliance in this case, the benefit of “masking” outweighs the benefit of using specific language to move the legislative response towards the court’s ideal point. The traditional delegation...
dynamics disappear, and judges use vagueness in a way completely foreign to standard delegation models. Vagueness is used as a tool to maintain institutional prestige in the face of certain defiance, not as a means to deal with policy uncertainty. Observation 2 summarizes this implication:

**Observation 2:** When they expect resistance to their decisions, judges may use vague language in an attempt to mask noncompliance and to shield the court against the negative institutional consequences of open defiance.

An example may help to illustrate. In 1980, the German Constitutional Court issued a decision in a case brought by civil servants, who had challenged the full taxation of their pension benefits, arguing that such taxation constitutes a violation of the equal treatment clause in light of the limited taxation of regular retirement benefits. The court agreed and issued a decision that denied the civil servants immediate relief but admonished that in light of the limited taxation of their pension benefits, arguing that such taxation of their pension benefits, bringing by civil servants, who had challenged the full 

The previous section outlines the central implication of our argument: interactions with policy makers who are charged with implementing judicial decisions can induce judges to make use of vague language for distinct reasons. On the one hand, judges may use vague language in ways akin to traditional delegation arguments by providing discretion to better-informed agents. On the other hand, they may use vagueness for a decidedly different purpose, namely to mask resistance to their decisions when they are concerned about the institutional implications of noncompliance. In this section, we explore this second use of vagueness, and some of the subtle effects it generates, in more detail.

The intuition for these effects derives from the fact that opinion specificity (or its flip side, vagueness) is a double-edged sword. When confronting recalcitrant legislators, the court can attempt to minimize the divergence between judicial demands and the legislative response by placing pressure on the legislature to comply. Doing so means writing a more specific opinion. Yet to the extent that the legislature does not fully comply, a specific opinion only highlights noncompliance. An alternative to specificity is therefore to use ambiguous language to mask resistance. But a vague opinion will only encourage the legislature to deviate more aggressively from the court’s demands. In short, vagueness is a double-edged sword, and it generates delicate trade-offs for judges in dealing with noncompliance. Not surprisingly, how exactly the court resolves the trade-off between these two options—pulling the legislative response towards the court’s opinion by being specific or using vagueness to mask noncompliance—depends on the relative sizes of $b$, $c$, and the degree of preference divergence. Moreover, the effects of these variables can be highly interactive.

It is easiest to illustrate this by returning to the figures and examining the impact of the parameter $c$. Consider Figure 1a first. In this figure, the legislature faces low to moderate costs for not complying with a ruling ($b < 1$).

As a consequence, the court can bring only limited pressure to bear on the legislature by increasing the specificity of its opinion. The result is that all else being equal, as the court becomes more concerned about the institutional consequences of noncompliance, i.e., as $c$ increases, the court always prefers to deal with potential resistance by masking it with vague language rather than by trying to force compliance by being specific. (In the figure, for any value of $L$, increasing $c$ can only lead to lower vagueness levels.)

Because specificity is a tool with limited effectiveness, vagueness as a mask predominates.

However, once the costs confronting the legislature are substantial enough ($b > 1$), these straightforward
FIGURE 2 Equilibrium Opinion Specificity ($b > 1$)

![Figure 2](image)

**Region 1:** As $c$ increases, the opinion becomes increasingly vague.

**Region 2:** As $c$ increases, the opinion becomes more and more specific. Once $c$ crosses $L_1$, the opinion becomes completely vague.

**Region 3:** As $c$ increases, the opinion goes from being completely specific to being completely vague.

In short, the parameter $c$ does not have a monotonic impact on how judges write opinions. Because vagueness and specificity can both be used as tools to deal with the potential for resistance to judicial decisions, institutional concerns for avoiding open defiance create complex dynamics disappear and judges confront a more difficult calculus. Consider Figure 2, which reproduces Figure 1b, stripping out some notation and adding a new division of regions. Because the court now possesses real leverage—the legislature must pay considerable costs for not complying—the trade-off between using specificity to force compliance and using vagueness to hide resistance becomes much more subtle. In region 1, legislative and judicial preferences do not diverge much. Here, an increase in $c$ leads judges to issue a more ambiguous decision.\(^{16}\)

The intuition behind this result is that the legislature’s policy is already so close to the court’s ideal point that it is better to hide remaining differences than to try to induce further policy concessions. In region 2, where preference divergence between court and legislature is intermediate, the trade-off plays out differently. As the court is more concerned about the institutional effects of noncompliance, it initially prefers to rein in the legislature by using greater specificity to force compliance. But once the court becomes highly concerned about open defiance, the trade-off reverses and it issues a completely vague opinion.\(^{17}\)

Finally, in region 3, where legislative and judicial preferences diverge considerably, the court initially issues a completely specific opinion in order to exert maximum pressure for compliance. As its concern for noncompliance continues to rise, it issues a completely vague opinion to mask noncompliance (once $c$ crosses $L_1$). The intuition behind both results is the same. Because the court confronts legislatures whose preferences diverge considerably from its own, the benefit of drawing the legislative response towards its ideal point by being more specific is attractive—provided the court does not care too much about the fact that doing so will also highlight the remaining differences between its demands and the legislature’s response. Once the court is sufficiently concerned about the effects of perceived noncompliance (i.e., once $c$ crosses $L_1$), it therefore changes its tactic and uses vagueness to mask its inability to force compliance.

\(^{16}\)Below $L_2$, $\frac{\partial a^*}{\partial c} < 0$. Once $c$ crosses $L_2$, $a = 0$.

\(^{17}\)Below $L_3$, $\frac{\partial a^*}{\partial c} > 0$. For $c \in [L_3, L_1]$, $a = 1$. Once $c$ crosses $L_1$, $a = 0$. 
dynamics in how judges articulate their demands—at least until such concerns become so overwhelming that they issue completely vague opinions under all conditions. Under some conditions, increasing sensitivity to noncompliance always results in more ambiguous opinions (regions 1 and 3). Under other circumstances, such sensitivity may result in more specific or in more ambiguous opinions (region 2). One implication of these dynamics is that empirical investigations of the judicial use of vagueness must carefully consider the subtle interactions among the various factors that influence how judges use language to manage their relationships with other policy makers.

**Broader Implications and Conclusion**

The preceding discussion illustrates that the interactions between courts and other policy makers—while partially analogous to delegation problems between legislators and bureaucrats—exhibit important dynamics that go beyond the standard delegation story. Courts must balance three concerns: managing policy uncertainty, increasing pressure for compliance, and masking potential resistance to their decisions. How judges address these concerns largely depends on their “leverage”—the costs that other policy makers face for resisting judicial decisions, and the extent to which judges are sensitive to the institutional implications of noncompliance.18 Where leverage is high, vagueness may primarily be used to deal with policy uncertainty in ways that are analogous to the traditional dynamics of delegation between legislators and bureaucrats. Where leverage is low, however, vagueness may also serve the purpose of hiding noncompliance, a usage that differs fundamentally from what is described in the standard account.

These results have direct relevance for understanding the interactions between courts and other policy makers cross-nationally and cross-temporally. Over the last two decades, and in particular following the constitutional revolutions in post-communist Europe, courts with the power of constitutional review have become central institutions of governance in many of the world’s democracies. As survey research has demonstrated, these courts differ substantially in the degree of public support they enjoy (Gibson, Caldeira, and Baird 1998). Some (like the U.S. Supreme Court or the German Bundesverfassungsgericht) enjoy reasonably high public confidence, particularly relative to other branches of government. Others (like the constitutional courts of Russia and Bulgaria) enjoy much lower levels of support. To the extent that public support constitutes one central source of the political costs that executives must bear for evading judicial decisions, this suggests that courts around the world possess varying degrees of leverage. Consequently, these courts may use vague language in their opinions in very different ways. Given its generally robust level of support, institutional concerns over noncompliance may be less important for the U.S. Supreme Court, which may primarily use vagueness to take advantage of the policy expertise of other policy makers. In contrast, the Russian Constitutional Court is much more likely to find itself in the upper regions of the figures, where institutional concerns over noncompliance dominate. Such a court is more likely to employ vagueness as a “defensive mechanism.”

More generally, we might expect that long-established courts with great institutional standing, and thus great leverage, are going to use vagueness to take advantage of the policy expertise of other actors. But the situation is very different for newly established courts, which have had little opportunity to establish their institutional legitimacy and to build up a strong base of popular support (Carrubba and Rogers 2003; McGuire 2004). Such courts are likely to be focused on establishing a track record for successful resolution of disputes without open defiance of their decisions. Judges in such circumstances may use vagueness when they expect resistance to “mask” noncompliance while asserting the court’s authority. Indeed, a familiar story about how courts build institutional strength suggests that they do so by stating important principles while carefully managing compliance by limiting the short-run costs on powerful political actors (e.g., Carrubba 2005; Epstein and Knight 1998, 154–56). There is an analogy here to the received wisdom about John Marshall’s opinion in *Marbury*: Marshall establishes judicial review while astutely avoiding a confrontation with the Jefferson administration. While there was nothing ambiguous about Marshall’s opinion, the vagueness strategy we have sketched—which bears a closer resemblance to the Court’s opinion in *Brown II*—has a similar practical effect: both strategies allow judges to develop

18 As discussed in the introduction, the external dynamics that are the focus of this article are not the only factor driving opinion specificity. In particular, the internal dynamics of decision making on a collegial court, as well as the nature of legal provisions at issue, are likely to be important. The purpose of the current argument is not to downplay the importance of these factors; rather, it is to highlight the fact that the external relations of courts with other policymakers are likely to have important ramifications for the content of judicial opinions.

19 Even courts with high diffuse support may sometimes find themselves under tremendous pressure to defer to other political authorities (Staton 2006).
an important legal principle without imposing costs on a sitting government.

The potential for such strategic use of vagueness in the face of anticipated resistance has broader implications for the empirical study of judicial behavior as well. If judges control opinion vagueness and use that control strategically to manage potential noncompliance, then empirical tests of common separation-of-powers (SoP) models that use binary measures of judicial opinions (e.g., progovernment versus antigovernment decision) are likely to underestimate the extent of strategic judicial behavior. A primary implication of SoP models is that courts sometimes strategically uphold statutes when they expect resistance to a judicial veto (e.g., see Carrubba 2005; Carrubba and Rogers 2003; Epstein and Knight 1998; Rogers 2001; Staton 2006; Vanberg 2005). However, our argument suggests that if judges can control opinion clarity, they have another option available. In particular, judges may choose to strike down the government’s policy (coded as antigovernment in standard datasets), but write an opinion that is vague enough on the remedy that the government can effectively reinstate the status quo policy at little cost. If judges pursue this strategy at least on occasion, then standard tests are likely to underestimate the extent of strategic judicial behavior and the impact of external political factors on judicial decision making. This result provides a particular theoretical justification for moving beyond the binary codings of judicial opinions and votes that characterize much of current scholarship to more nuanced measures that represent the rich content of judicial opinions, including their specificity. In addition to being theoretically appropriate in testing the spirit of SoP models, such an approach has the potential to begin bridging the gap between traditional legal scholarship and quantitative work in judicial politics by taking more seriously aspects of judicial opinions that legal scholars regard as fundamental.

While our interest in this article is primarily explanatory, the argument is relevant for normative discussions of the appropriateness of judicial deference to legislative majorities via vague decisions. A common understanding of the purpose of judicial review is to provide a “check” or at least a “sober second thought” in democratic systems designed to enhance majoritarian influence over public policy. Judicial decisions that employ vague language to take advantage of the policy expertise of other actors seem—at least on the surface—compatible with this “guardian vision.” In such cases, judges are using vagueness to induce outcomes that they expect to be preferable, given the risk that judges themselves are unable to determine appropriate public policy. In other words, while judges increase the power of legislative majorities through such decisions, they do so in search of informational gains that might advance the common welfare. In contrast, vague decisions that are designed to avoid political confrontation have a normatively more ambiguous status. In such cases, judges consciously surrender power to other policy makers, rather than attempting to check their actions. On one hand, such uses of vagueness can be interpreted as an abdication of the judicial role. On the other hand, they might be considered farsighted attempts to “lose the battle, but win the war” by preserving—and potentially enhancing—judicial power for future cases. Ultimately, normative evaluations of the appropriateness of ambiguous decisions depend on how one evaluates this trade-off.

Beyond Judicial Politics

Finally, the argument contributes to our understanding of political delegation generally. The most interesting implications of the model obtain when delegation relationships have two characteristics: (1) compliance is ultimately determined by the costs confronting the agent for resisting the principal, and these costs depend in part on the specificity of the principal’s instructions, and (2) noncompliance is costly for principals (above and beyond its implications for policy outcomes). If these conditions are met, the dynamics we have reviewed should apply, no matter whether we are considering legislators and bureaucrats, agency heads and their subordinates, advisory commissions and executives, or managers and their employees. The first characteristic is common in political delegation. Scholars typically assume that principals depend on actors exogenous to the delegation interaction for enforcement, including courts that review the validity of agency choices in light of existing statutes and strike those policies that are inconsistent with the principal’s demands (e.g., Epstein and O’Halloran 1999). Other models afford a role for citizen enforcement, at least through their decisions to litigate or through their choices to inform their representatives (e.g., McCubbins, Noll, and Weingast 1987).

The central issue therefore concerns the extent to which principals perceive a cost to noncompliance that they could manage through the strategic use of vagueness. Is noncompliance politically embarrassing? Does it undermine a leader’s authority? More to the point, do principals worry about noncompliance for any reason other than its immediate impact on whatever the principal has demanded be done? Wood (1988) finds that the Environmental Protection Agency (EPA) increased its abatement actions at the beginning of the Reagan administration, precisely during a time when the president was attempting to rein in the agency through the political appointment of leaders unsympathetic to the EPA’s
traditional mission. Szasz (1986) suggests that Reagan was forced to retreat from this effort to reform the EPA precisely because he needed to control the political fallout created by the EPA’s public resistance to his policies. Although we have focused on delegation in the context of judicial policymaking, there is thus some reason to believe that political principals generally may perceive some costs to noncompliance. If so, then it is possible that vagueness can be used by politicians as we suggest it may be used by judges.

Appendix

Given the legislature’s response policy, the decision problem confronting the court reduces to maximizing the following expression, subject to the constraint that \( a \in \{0, 1\} \).

\[
EU_C(a) = \int_{-\infty}^{\alpha} \left( \frac{L + \varepsilon}{1 + ab} - \varepsilon \right)^2 - \frac{ac(L + \varepsilon)^2}{(1 + ab)^2} \left( \frac{1}{2a} \right) \, dc
\]

Solving the first-order condition yields a unique critical value: \( a^* \equiv \frac{6cL^2 - a^2c - 3cL^2}{b^2a^2 - a^2c - 3cL^2} \).

At \( a^* \), the second-order condition equals: \( SOC \equiv -\frac{1}{2a^2} \frac{b(b - 2a^2)b^2 + a^2c + 3cL^2}{a^2c - 3cL^2} \). The SOC is negative for \( b > c \) and positive for \( b < c \). We begin by comparing the two corner solutions. For the court, \( a = 0 \) yields a higher payoff than \( a = 1 \) if and only if:

\[
(c - 2b - b^2)L^2 + \frac{\alpha^2(c + b^2)}{3} > 0
\]

**Subcase 1:** If \( c \geq 2b + b^2 \), the left-hand must be positive, implying that \( a = 0 \) always beats \( a = 1 \).

**Subcase 2:** If \( c < 2b + b^2 \), the condition will be satisfied for \( L \) that lie below the threshold:

\[
L^*_1 \equiv \frac{\alpha\sqrt{3}\sqrt{(b^2 + 2b - c)(b^2 + c)}}{3b^2 + 6b - 3c}
\]

In summary, \( a = 0 \) is preferable to \( a = 1 \) whenever (i) \( c > 2b + b^2 \), or (ii) \( c < 2b + b^2 \) and \( L < L^*_1 \), while \( a = 1 \) is preferable to \( a = 0 \) whenever (iii) \( c < 2b + b^2 \) and \( L > L^*_1 \).

Turning to the interior solution, since \( a^* \) identifies a minimum when \( b < c \) and a maximum when \( b > c \), we need to distinguish these two cases.

**Case 1 (\( b < c \))**:

\( a^* \) identifies a minimum, thus the solution to the court’s decision problem is the corner solution.

**Case 2 (\( b > c \))**:

In this case, \( a^* \) is only an eligible solution if \( a^* \in [0, 1] \).

To derive the conditions under which \( a^* \in [0, 1] \), note that for \( L \geq 0 \) (as required by the model), the denominator of \( a^* \) is positive for \( L \) less than or equal to the following cutoff:

\[
L_{pos} = \frac{\alpha\sqrt{3}\sqrt{(b^2 - c)}}{3b^2 + 6b - 3c}
\]

**Subcase 1a:** Suppose \( L > L_{pos} \). Then \( a^* \) is positive for \( L \) below the following cutoff:

\[
L^*_2 \equiv \frac{\alpha\sqrt{3}\sqrt{(b^2 - c)}}{3b^2 + 6b - 3c} \cdot \frac{6cL^2 - a^2c - 3cL^2}{b^2a^2 - a^2c - 3cL^2}.
\]

If \( L_{pos} > L^*_2 \) (for \( b > c \)), \( a^* \) must be negative.

**Subcase 1b:** Suppose \( L \leq L_{pos} \). Then \( a^* \) will be positive for \( L > L^*_2 \). Given that \( L_{pos} > L^*_2 \), this implies that \( a^* \) is positive for \( L \in [L^*_2, L_{pos}] \).

**Subcase 2a:** We now need to establish the conditions under which \( a^* \leq 1 \). Suppose \( L > L_{pos} \). Then \( a^* \leq 1 \) if and only if \( L \) is greater than the following cutoff:

\[
L^*_3 \equiv \frac{\alpha\sqrt{3}\sqrt{(b^2 - c)}(2b^2 - b^2 + c)}{3bc + 6b - 3c}
\]

Since \( L_{pos} > L^*_3 \) (for \( b > c \)), it must be that \( a^* \leq 1 \).

**Subcase 2b:** Suppose \( L < L_{pos} \). Then \( a^* \leq 1 \) if and only if \( L < L^*_3 \). Since \( L_{pos} > L^*_3 \), this implies that \( a^* \leq 1 \) for \( L \leq L^*_3 \).

To summarize, \( a_{crit} \in [0, 1] \) for \( L \in (L^*_2, L^*_3) \). When \( L \) is outside of this range, no interior solution to the court’s decision problem exists and the corner solution identified above is optimal. For \( b > c \), it is straightforward to show that the various cutoffs are ordered as follows: \( L_{pos} > L^*_3 > L^*_2 > L^*_1 \). Thus, the court’s best response function when \( b > c \) is given by: For \( L > L_{high} \), set \( a = 1 \). For \( L \in (L_{low}, L_{high}) \), set \( a = a^* \). For \( L < L_{low} \), set \( a = 0 \).

**Comparative Statics for Figures 1a and 1b**

The comparative statics discussed in the text in connection with Figures 1a and 1b focus on the impact of the various model parameters on \( a^* \) and on the three cutoffs \( L^*_1, L^*_2, L^*_3 \).

1. Impact of \( \alpha \) and \( L \) on \( L^*_1, L^*_2, L^*_3 \):

Since the figures plot \( L \) against \( c \), we need to rewrite the cutoffs, making \( c \) a function of \( L \).

\[
L^*_1 \Rightarrow c^*_{L^*_1} = \frac{b(3bL^2 + 6L^2 - b\alpha^2)}{3L^2 + \alpha^2}.
\]

Then

\[
\frac{\partial c^*_{L^*_1}}{\partial \alpha} = -\frac{12abL^2(1 + b)}{(3L^2 + \alpha^2)^2} < 0 \quad \text{and}
\]

\[
\frac{\partial c^*_{L^*_1}}{\partial L} = \frac{12ab^2L(1 + b)}{(3L^2 + \alpha^2)^2} > 0.
\]
\[ L_2^* \Rightarrow c_2^* = \frac{6bL^2}{3L^2 + \alpha^2}. \] Then
\[ \frac{\partial c_2^*}{\partial \alpha} = -\frac{12bL^2\alpha}{(3L^2 + \alpha^2)^2} < 0 \quad \text{and} \quad \frac{\partial c_2^*}{\partial L} = \frac{12\alpha^2bL}{(3L^2 + \alpha^2)^2} > 0. \]

\[ L_3^* \Rightarrow c_3^* = \frac{2b(b\alpha^2 - 3L^2)}{(b - 1)(3L^2 + \alpha^2)}. \] Then
\[ \frac{\partial c_3^*}{\partial \alpha} = \frac{12\alpha bL^2(1 + b)}{(3L^2 + \alpha^2)^2(b - 1)}. \]

This derivative is positive for \( b > 1 \) and negative for \( b < 1 \). Finally, \( \frac{\partial c_3^*}{\partial L} = -\frac{12\alpha b^2L(b + 1)}{(3L^2 + \alpha^2)^2(b - 1)} \). This derivative is negative for \( b > 1 \) and positive for \( b < 1 \).

2. Impact of \( \alpha \) and \( L \) on \( c^* \):
\[ \frac{\partial c^*}{\partial \alpha} = \frac{2\alpha^2bL(b - c)}{(3L^2 + \alpha^2 + c(3L^2 + \alpha^2)(b - c))^2}. \] This derivative is positive for \( b > c \) (the only region relevant for \( c^* \) in equilibrium).
\[ \frac{\partial c^*}{\partial L} = \frac{2\alpha(\alpha^2 + \alpha^2)(3L^2 + \alpha^2)}{(3L^2 + \alpha^2 + c(3L^2 + \alpha^2))^2}. \] This derivative is positive for \( L > \frac{\alpha}{\sqrt{3}} \) and negative for \( L < \frac{\alpha}{\sqrt{3}} \).

References
