# The Future Matters

## JUDICIAL PREFERENCES OVER LEGAL RULES AND DECISION-MAKING ON COLLEGIAL COURTS

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**ABSTRACT**

High courts such as the US Supreme Court announce legal rules that guide subsequent decisions by lower courts and other actors. Because legal rules are forward-looking in this sense, judges' expectations about the distribution of future cases are critical. Focusing on this fact, we provide microfoundations for judicial preferences over legal rules by deriving them directly from expectations about the distribution of future cases. Doing so has important consequences: in contrast to standard assumptions in models of judicial decision-making, preferences over legal rules are asymmetric rather than symmetric. We demonstrate that this has significant implications for judicial decision-making on collegial courts. Finally, we show that changes in the case distribution—for example, as a result of technological change—can lead to significant legal change, even in the absence of ideological or doctrinal change on the court.

## I. INTRODUCTION

The contemporary formal study of judicial decision-making is dominated by the "case-space" approach (Kornhauser 1992; Lax 2007, 2012; Lax and Cameron 2007; Fox and Vanberg 2014). What sets this approach apart from earlier formal models of the judiciary (which were largely imported from the study of legislative decision-making) is that it grounds models of judicial behavior in the distinctive nature of what judges and courts do: they settle disputes between specific parties by announcing and applying legal rules to the facts presented in the case before the court. As Lax (2012, 767) expresses it: "A case-space model recognizes that a judge makes policy by resolving legal disputes, that

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is, by deciding cases. These cases present themselves as bundles of 'case facts,' discovered and revealed through legal processes such as trials, and organized by legal doctrine."

For example, given a specific legal rule governing negligence standards, an individual's behavior might be regarded as negligent, implying liability for causing injury to another person. Under an alternative rule, the individual's behavior might not result in legal responsibility. Similarly, if a police search is deemed "too intrusive" under a given legal rule, the search is declared unconstitutional; a different legal rule might classify the same search as acceptable. In this context, a natural way to think about the preferences that judges have over legal rules is to think about how a legal rule classifies the set of cases to which it potentially applies: judges prefer legal rules that do a "better job" classifying case facts into dispositions that they regard as "right." Thus, in case-space models, it is assumed that judges have a legal rule they most prefer (or regard as the "right" rule) and that they prefer legal rules that more closely resemble the classifications implied by the rule they regard as ideal. Most models in judicial politics capture this idea by employing utility functions that are common in other types of spatial models, such as Euclidean distance or quadratic loss functions.

In this article, we examine these judicial preferences over legal rules more closely. In particular, we provide an explicit microfoundation for judicial preferences over legal rules. In keeping with the logic of the case-space approach, we derive judicial rule preferences from judges' underlying preferences over the disposition of cases. In doing so, we pay particular attention to the fact that the legal rules that judges announce in their decisions (particularly judges on high courts) do not only apply to the immediate case before them. They also have implications for how future cases to which the rule will be applied are resolved. As a result, judges' preferences over legal rules will depend not only on the current case or on their legal philosophy and jurisprudential preferences. Instead, judges' expectations about the empirical consequences of a rule, as reflected in the way in which it disposes of future cases, will be prominent.[1]

This "future-oriented" perspective is often evident in the decisions of high courts. Consider, for example, *Arizona v. Gant* (556 U.S. 332 [2009]), in which the US Supreme Court ruled on the constitutionality of the search of a vehicle that is incident to the arrest of a suspect. Revisiting the legal rule established in a previous ruling, the Court concluded that "the experience of 28 years since we decided *Belton* has shown that the generalization underpinning the broad reading of that decision is unfounded. We now know that articles inside the passenger compartment are rarely 'within the area into which an arrestee might reach,' and blind adherence to *Belton*'s faulty assumption would authorize myriad unconstitutional searches" (17–18). Or consider *Montejo v. Louisiana* (556 U.S. 778

1. Note that if a judge is only concerned about the disposition of the specific case before the court, all rules that imply a decision for the party the judge favors are equivalent: on mere disposition grounds, the judge would be indifferent among all these rules. From a consequentialist perspective, it is only once one takes account of future cases that the differences among rules that imply the same disposition in the current case become significant.

[2009]), in which the Court addressed a defendant's waiver of right to counsel. Reviewing the Louisiana State Supreme Court's ruling, the Court concluded that "the approach taken below would lead either to an unworkable standard, or to arbitrary and anomalous distinctions between defendants in different states. Neither would be acceptable" (3). In short, how judges evaluate legal rules depends critically on their consequences for future cases.[2]

As we show, deriving microfoundations of judicial rule preferences by focusing on their consequences for the resolution of future cases has three significant implications. The first is that judicial preferences will typically not be captured accurately by standard utility functions as are currently employed.[3] Most importantly, rather than being symmetric, judicial rule preferences are typically asymmetric, and the degree and direction of asymmetry depends crucially on the location of a judge's preferred rule relative to the distribution of future cases. Second, the fact that judicial rule preferences differ from those captured by standard utility functions has significant consequences for judicial behavior, in particular for bargaining on collegial courts. Finally, recognizing the importance of case distributions for judicial preferences opens up an avenue for understanding one source of legal change. Specifically, as we demonstrate, technological or other changes that shift the distribution of future cases can have profound consequences for coalition building on collegial courts that can usher in significant changes in legal rules.

The article is organized as follows. In the next section, we develop an explicit microfoundation for judicial rule preferences and demonstrate its implications for the nature of these preferences. We then examine the implications of the derived preferences for the conclusions of canonical models of judicial behavior. We also show that the approach we develop provides a natural way for thinking about one source of legal change. Before concluding, we provide an illustrative empirical example by drawing on recent US Supreme Court jurisprudence.

## II. DERIVING PREFERENCES OVER LEGAL RULES

The essence of the case-space approach is to focus on the distinctive nature of judicial decision-making: judges settle disputes. To do so, they consider the legally relevant facts

2. As another example, consider Justice Brennan's dissent in *DeFunis v. Odegaard* (416 U.S. 312 [1974]). Objecting to the majority's decision to declare a dispute surrounding affirmative action in university admissions as moot, Brennan pointed explicitly to the need to resolve this difficult issue in light of the fact that many more similar cases were likely to arise: "In endeavoring to dispose of this case as moot, the Court clearly disserves the public interest. The constitutional issues which are avoided today concern vast numbers of people, organizations, and colleges and universities. . . . Few constitutional questions in recent history have stirred as much debate, and they will not disappear. They must inevitably return to the federal courts, and ultimately again to this Court. . . . Although the Court should, of course, avoid unnecessary decisions of constitutional questions, we should not transform principles of avoidance of constitutional decisions into devices for sidestepping resolution of difficult cases."

3. For an exception to the standard assumption of symmetric utility functions and further discussion of the consequences of asymmetric preferences, see Ainsley (2017).

in the case before them and apply legal rules to these facts to determine which side should prevail. Moreover, within constraints, judges do not merely apply existing legal rules but are able to announce new rules in their decisions. Lower courts engage primarily in the former activity (applying rules), while the second (creation of rules) is of particular importance in high courts. Here, we are concerned with judges on such high courts (i.e., judges who can use the resolution of a case before them to announce a new legal rule).

The setup of the case-space model is simple. To develop the intuition, consider an example. In criminal cases, the intrusiveness of a police search might constitute a legally relevant fact. Moreover, potential cases can be ordered along a continuum arranged by increasing search intrusiveness, as illustrated in figure 1. This dimension represents the "case space." A legal doctrine or rule is a threshold in this continuum that separates searches that are classified as legally acceptable from those that are classified as legally unacceptable. The simplest such rules (and the ones typically assumed) are "threshold rules" that establish a cut point that separates case facts that are classified as "legal" from those that are not. Thus, in figure 1, rule $r_1$ deems searches with case facts to the left of $r_1$ as permissible, while searches with case facts to the right of $r_1$ are deemed impermissible.[4] Each judge has a preferred ("ideal") legal rule that partitions the case space in the way that the judge believes cases should be decided.[5] A standard assumption in case-space models is that the preferences of judges over legal rules can be captured by standard distance-based preferences as are common in spatial models: judges prefer rules that are closer to their ideal rule over those that are further away (these preferences are typically modeled with a Euclidean distance or quadratic loss function).

The logic underlying such distance-based preferences is intuitive. Recall that a key task for judges is to resolve the case before them. A natural assumption is that judges prefer cases to be resolved "correctly" (from their point of view). Consider a judge who believes that the threshold of intrusiveness that separates acceptable from unacceptable searches is at $x_i$ in figure 1 (i.e., $x_i$ marks the judge's ideal legal rule). From the perspective of this judge, legal rule $r_1$ misclassifies case facts that fall between $r$ and $x_i$: the rule declares searches in this area as unacceptable, while the judge regards them as legal. The key assumption behind distance-based preferences over legal rules is that judges prefer to minimize this area of misclassification (Lax 2012, 771). They prefer rules that are closer to their ideal rule because these rules get fewer cases "wrong."

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4. More generally, the case space need not be one-dimensional; one can readily imagine multidimensional case spaces where multiple facts are relevant to the outcome of a dispute. Moreover, legal rules, which partition the case space (whatever its dimensionality) into classes of facts that receive different legal treatment (Lax 2011, 135) need not be "cut-point" rules that impose a threshold that separates one disposition from the other. However, such cut-point rules are intuitive as well as tractable and are typically assumed.

5. The location of these ideal rules may "be a function of ideological preference" (Lax 2012, 767). For example, liberal judges will be more inclined to take a critical view of aggressive policing techniques (implying ideal rules toward the left), while conservative judges might be more tolerant of more intrusive search procedures (implying ideal rules toward the right).

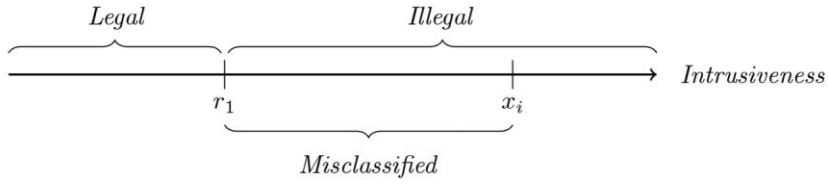


Figure 1. Case-space model

Why would judges be concerned to minimize the area of misclassification? Majority decisions by judges on high courts have precedential value and shape the resolution of similar cases by lower courts going forward. This suggests an immediate answer. A larger area of misclassification would appear to imply that a larger number of subsequent decisions by lower courts under the rule will be wrong (from the judge's perspective). Of course, "distance from the ideal" merely serves as a proxy for the number of cases that is expected to be misclassified by a rule. More accurately, the degree to which the difference between two rules matters depends on the distribution of potential cases across the case space: How many future cases are expected to fall into the area that separates the two rules? The distinction between two rules may be largely academic (if few cases are likely to fall between them), or it may be of considerable practical significance (if many cases are likely to fall between them).

The significance of the case distribution can be seen most clearly by deriving judicial rule preferences directly from judicial preferences over the disposition of cases. Consider a judge whose most preferred legal rule is $x_i$, and consider a legal rule $r_1$ that is located to the left of $x_i$ (the argument is analogous for rules located to the right). From the judge's perspective, case facts $c$ that are located between $r_1$ and $x_i$ are "misclassified" by rule $r_1$ (the zone of misclassification); all other case facts are correctly decided by both rules. Suppose that the judge's objective is to see cases—including future cases to which the rule applies—decided correctly. Thus, the judge incurs a loss, denoted by $\ell(c)$, when a case is wrongly decided. Letting $f(c)$ denote the density of the case distribution, the expected utility of rule $r_1$ is then given by

$$\mathrm{EU}_i(r_1) \;=\; \int_{r_1}^{x_i} \ell(c) \cdot f(c)\, dc. \tag{1}$$

To begin, consider the simplest case. Assume that from the perspective of our judge, cases that are misclassified by a given legal rule impose a constant loss of $\ell(c) = -1$, and future cases are distributed uniformly over the case space $c \sim U[a, b]$. As a result, a judge's expected utility from rule $r$, which is located to the left of the ideal rule $x_i$, is given by

$$\mathrm{EU}_i(r) \;=\; \int_{r}^{x_i} (-1) \cdot \frac{1}{b-a}\, dc \;=\; -\frac{x_i - r}{b-a}. \tag{2}$$

Equation (2) is a linear loss function multiplied by a scale factor that depends on the support of the uniform distribution.[6] In other words, linear loss preferences are consistent with a world in which cases are uniformly distributed and judges value getting each potential case right equally.[7]

RESULT 1A. If potential cases are distributed uniformly and judges experience constant losses for misclassified cases, judicial preferences over legal rules are described by symmetric linear loss functions.

Suppose judges do not perceive all wrongly decided cases as equally costly but are more concerned about cases they think of as "egregious" mistakes. This implies that the further a case fact is from the judge's ideal rule, the more the judge is bothered if the case is decided in a way that is inconsistent with his or her preferred rule. We can capture these increasing losses by setting $\ell(c)$ in equation (1) equal to a linear loss function:

$$\mathrm{EU}_i(r) = \int_r^{x_i} -|x_i - c| \cdot \frac{1}{b-a}\,dc = -\frac{(x_i - r)^2}{b-a}. \tag{3}$$

This specification yields the commonly employed quadratic utility function over rules. Judges' preferences are again symmetric with respect to their ideal rule, but now they experience increasing losses in the distance from their ideal rule to reflect the greater loss associated with misclassifying those cases.

RESULT 1B. If potential cases are distributed uniformly and judges experience linear losses for misclassified cases, judicial preferences over legal rules are described by symmetric quadratic loss functions.

Results 1a and 1b show that if judges' rule preferences are grounded in the way in which those rules dispose of cases, a uniform case distribution will produce two of the most commonly used utility functions employed in formal models of judicial decision-making. Moreover, while case distributions other than a uniform distribution can generate these preferences for individual judges, on collegial courts only a uniform case distribution will result in such preferences for all judges.[8] By implication, results 1a and 1b therefore

6. Because utility functions are unique up to an affine transformation, this reduces to the standard utility function $\mathrm{EU}_i(r) = -|x_i - r|$.

7. Other combinations of distributions and case valuations could also yield a linear loss function. That said, Ockham's Razor suggests a uniform distribution of cases coupled with a constant loss function as the most parsimonious approach.

8. To see this, note that in order to generate such preferences for a case distribution other than the uniform, the case distribution would have to be symmetric about its mode, and the judge's ideal rule would have to coincide with the mode of the case distribution. This condition cannot be met for all judges on a collegial court if there is any preference divergence among the judges.

demonstrate that models of collegial courts that employ these standard utility functions implicitly assume that the distribution of future cases is uniform across the case space.

While there may be limiting circumstances in which future cases are uniformly distributed across the case space, this is a strong assumption. We rarely expect all potential cases to be equally likely. Consider the example of police searches again: in their investigative work, police officers are more likely to be tempted to engage in some types of search behavior (e.g., search the trunk of a stopped car, shadow a suspect for a few days) than others (e.g., remove a car's door panels, track a suspect for months). Moreover, technological changes (and perhaps other factors) that affect the feasibility and cost of various search technologies can have profound effects on how tempted police officers are to engage in various forms of surveillance over time—this will become a key issue below. Applied to the current context, this implies that some parts of the case space are more heavily populated by potential cases than others. In other words, the distribution of future cases is not uniform. Moreover, this distribution can change over time.

What are the implications of a nonuniform distribution of potential cases for judicial preferences? Consider a single-peaked, symmetric density function—specifically, suppose that potential cases are normally distributed with mean $\mu$ and standard deviation $s$. Given this distribution, for a judge with an ideal rule to the right of the mean of this distribution (i.e., $x_i > \mu$), a rule that is more restrictive than the judge prefers (i.e., a rule to the left of the judge's ideal rule) will classify more potential cases incorrectly than a more permissive rule that is equidistant to the right (and vice versa for a judge with an ideal rule below the distribution mean). Formally, the justice's expected utility over rules is now given by

$$\mathrm{EU}_i(r) = \int_{x_i}^{r} \ell(c) \cdot \frac{e^{-(c-\mu)^2/2s^2}}{s\sqrt{2\pi}}\, dc. \tag{4}$$

To demonstrate properties of this function, assume a normalized constant loss over misclassified cases ($\ell(c) = -1$).[9] Equation (4) then reduces to

$$\mathrm{EU}_i(r) = -\frac{1}{2}\left|\mathrm{Erf}\left(\frac{x_i - \mu}{s\sqrt{2}}\right) - \mathrm{Erf}\left(\frac{r - \mu}{s\sqrt{2}}\right)\right|. \tag{5}$$

This utility is simply equal to the (negative of) the probability mass between $r$ and $x_i$.[10] This is intuitive: wrongly resolved cases impose a constant loss of $-1$, so the critical question is how often such cases arise—which depends on the probability mass between the

9. We adopt the constant loss function to improve tractability of the resulting rule utility function. As was demonstrated in the previous examples, replacing constant with linear loss does not change the basic shape of the utility functions or properties we identify.

10. The error function (Erf) that appears in this utility function is defined as $\mathrm{Erf}(x) = 2/\sqrt{\pi}\int_0^x e^{-t^2}\, dt$. It is related to the cumulative distribution function of the normal distribution; specifically, the cumulative distribution function for a normally distributed random variable $c$ is given by $F(c) = (1/2)(1 + \mathrm{Erf}((c - \mu)/s\sqrt{2}))$. This immediately implies that the probability that $c$ falls between two values $t_1 < t_2$ is given by $(1/2)(\mathrm{Erf}((t_2 - \mu)/s\sqrt{2}) - \mathrm{Erf}((t_1 - \mu)/s\sqrt{2}))$.

rule and the judge's ideal rule (the zone of misclassification). We illustrate this utility function graphically in figure 2, which plots a (standard normal) case distribution alongside the derived rule utility functions for judges with ideal rules at −1, 0, and 2. Clearly, compared to the uniform case distribution, a very different picture emerges.

Most obviously, and in contrast to standard linear or quadratic loss functions, a judge's derived rule preferences are asymmetric (unless the judge's ideal rule is located exactly at the mean of the case distribution). Utility falls off more drastically in the direction toward the mean of the case distribution, and it is more shallow in the direction away from the mean. This asymmetry makes intuitive sense. Given a normal case distribution, a rule that deviates from a judge's preferred rule toward the mean misclassifies a greater number of cases than a rule that deviates equally in the direction away from the mean because the case density is higher in the direction of the mean.

Critically, the degree and direction of these asymmetries are a function of the location of a judge's ideal rule relative to the mean of the underlying distribution. As seen in figure 2, the closer a judge's ideal point is to the mean of the case distribution, the more quickly utility falls off in the neighborhood around the ideal point. The further the ideal point is from the mean, the more shallow the utility function is in the neighborhood around the ideal point.

So far, we have derived preferences over legal rules for two symmetric case distributions: the uniform and normal. However, there is no obvious reason to think that across all issue areas, case distributions should be symmetric or single peaked. Significantly, the key features of derived rule preferences—namely, the fact that rule preferences will be single peaked but asymmetric, with greater losses in high-density regions of the case space—will result from any underlying case distribution, including those that are asymmetric and not single peaked.[11]

> Result 1c. If judicial preferences over legal rules are derived from judicial aversion to the potential that future cases are decided incorrectly from the judge's point of view, then any case distribution other than a uniform distribution will generically result in single-peaked, asymmetric rule preferences, with greater utility loss in high-density regions of the case space.[12]

## III. BARGAINING ON A COLLEGIAL COURT

The previous section provides an explicit microfoundation for rule preferences by deriving these preferences from the manner in which legal rules resolve future cases. The key result

11. The asymmetry is going to be the critical feature as we explore the consequences of derived rule preferences. However, it is also significant that any preference function derived from the manner in which rules dispose of cases must be single peaked. This is a highly desirable property.

12. As noted above, there are knife-edge cases in which a nonuniform case distribution can result in symmetric rule preferences, provided the distribution is symmetric and the judge's ideal rule is located precisely at the mode of the distribution. For collegial courts, this condition cannot be met if there is any preference divergence among the judges.

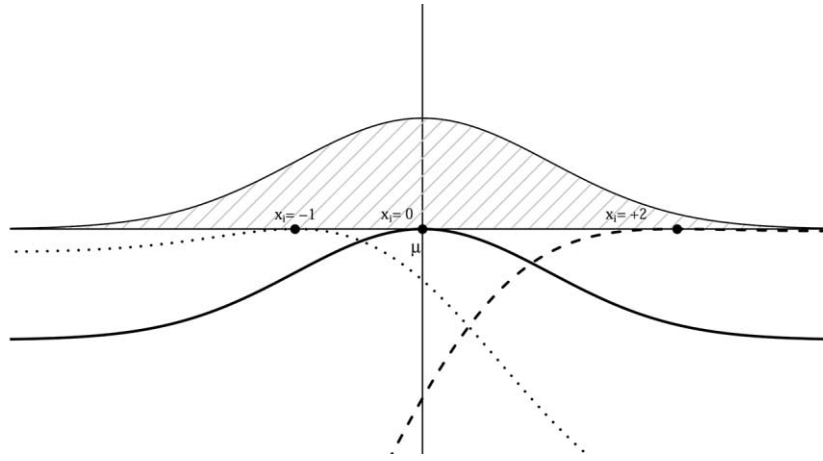


Figure 2. Derived rule preferences when the underlying case distribution is a standard normal.

is that, in contrast to standard symmetric loss functions that dominate models of judicial decision-making, judicial rule preferences on collegial courts are generically asymmetric because they depend on the distribution of future cases. But does such asymmetry and (by implication) the distribution of future cases matter? That is, is the asymmetry of judicial preferences of substantive importance in understanding judicial behavior and the output of collegial courts? In this section, we focus on this question by examining whether the conclusions reached in some of the most commonly used models of decision-making on collegial courts are affected by incorporating the distribution of future cases and the resulting asymmetry of judicial rule preferences. First, we demonstrate that in two common types of models, such preferences have either no or only marginal impact. However, these models are also the most narrow and restrictive. We then show that once we consider a recent class of models that are designed to move beyond this restrictive realm and to incorporate central features of judicial decision-making, asymmetric rule preferences begin to have significant implications.

## A. Open Rule and Opinion Writer Models

One of the earliest, and most common, models of collegial court decision-making (largely imported from the legislative setting) is the "open-rule model." The model assumes that judges on collegial courts decide by majority rule, using an open amendment procedure. One judge proposes a rule, which can then be costlessly amended through alternative proposals by the other judges. An "opinion" emerges when there is no alternative that can secure a majority against the current proposal. Assuming that the case space is one-dimensional and judges' rule preferences are single peaked, this setting is a straightforward

application of the median voter theorem (Black 1948), leading to the conclusion that the court's opinion will be written at the ideal rule of the median judge (Epstein et al. 2005; Martin, Quinn, and Epstein 2005).

Opinion writer models extend the open-rule model by noting that the opinion assignment process of the court provides a particular judge—the opinion writer—with the opportunity to make a first proposal. Other judges are free to offer counterproposals, but those proposals are costly. As a result, the opinion writer has some agenda-setting power that allows shading the court's opinion away from the median judge's ideal rule toward the writer's own preferred position. But the ability to do so is limited: the opinion writer's proposal must be sufficiently close to the median judge's preferred rule to forestall a counterproposal by another judge. This requires that for all other judges, the cost of a counterproposal $\kappa$ outweighs the potential utility gain from proposing a rule that can beat the opinion writer's proposal. As a result, the greater the cost of counterproposals, the more leeway the opinion writer has to pull the opinion away from the median judge's ideal rule.[13] In short, the general conclusion of the open-rule and opinion writer models is that the court's median judge is in a powerful position, although one that may leave some room for (constrained) influence by opinion writers (Maltzman, Spriggs, and Wahlbeck 2000; Hammond, Bonneau, and Sheehan 2005; Bonneau et al. 2007; Lax and Cameron 2007).

In these models, the asymmetric nature of derived rule preferences is (largely) irrelevant. In the open-rule model, the key feature that drives the court's opinion to the rule preferred by the median judge is the logic of the median voter theorem, which holds for all single-peaked utility functions, whether asymmetric or not. In the opinion writer model, the asymmetric nature of derived utility functions does matter—but only at the margin. In this model, the extent to which an opinion writer can shade the rule adopted in the court's opinion away from the median depends on the costs of writing a counterproposal. For any cost $\kappa > 0$ of counterproposals, there exists a convex set around the ideal rule of the median judge within which the opinion writer's proposal must fall in order not to elicit a counterproposal. Denote this set by $[r_l, r_r]$. The defining feature of this set is that the median judge must be indifferent between $r_l$ and $r_r$, that is, $U_M(r_l) = U_M(r_r)$. Given

13. To see this, consider the simplest case of three judges, with the judge on the left assigned as the opinion writer. Now consider which opinion offers will forestall a successful counterproposal by the judge on the right. Without loss of generality, suppose the judge on the left offers $r < x_M$. Let $\hat{r} > x_M$ denote the rule to the right of $x_M$ such that $U_M(r) = U_M(\hat{r})$; i.e., the set of rules preferred by the median to $r$ is given by $[r, \hat{r}]$. Suppose the judge to the right has an ideal point $x > \hat{r}$ (the argument is analogous if the ideal point is below $\hat{r}$). The best counterproposal the judge can make is $\hat{r}$. Doing this is not worth it if $U_R(\hat{r}) - \kappa < U_R(r)$, which is equivalent to saying that no counterproposal will be forthcoming if $U_R(\hat{r}) - U_R(r) < \kappa$. Note that for any $\kappa > 0$, there exists an $r$ such that the conditions are satisfied, assuming that $r$ is sufficiently close to $x_M$. Note also that if this condition is satisfied at $r$, it is immediately satisfied for all rules between $r$ and $\hat{r}$; i.e., the condition defines a convex set around the median's ideal point. Note the width of this interval increases as $\kappa$ increases and as the drop off in the right judge's utility is less steep.

asymmetric rule preferences, this immediately implies that this interval is not symmetric around the median judge's ideal rule: the edge of the interval will be closer to the median's ideal rule on the side with greater case density. Substantively, this means that with asymmetric rule preferences, opinion writers to the side of the median with greater case density are more constrained by the median's preferences than opinion writers on the more sparsely populated side of the median. Put differently, when the legal differences among the opinion writer and the median judge are likely to be consequential in a large number of potential cases, opinion writers are forced to hew more closely to the preferences of the median. Nevertheless, the central conclusion of both models does not change with asymmetric preferences: legal rules will be driven largely by the preferences of the median judge, subject to some influence by the opinion writer.

While the conclusions of these models are largely unaffected by the asymmetry of judicial preferences, note that these models strip away distinctive features of judicial decision-making and are very specific in their scope: they make predictions about the location of the court's majority opinion (which falls at, or close to, the position of the median judge), but they do not address broader features of judicial behavior. For example, these models do not speak to whether judges will choose to join an opinion or write separately, whether a court is able to issue a majority opinion or will fail to do so, and what the composition of the majority coalition is (if it exists). In other words, these models are not designed to illuminate aspects of judicial behavior that are of obvious interest and importance. In part as a reaction, scholars have recently begun to develop models of judicial decision-making that are designed to take account of the particular institutional features of the judiciary and to speak to precisely these broader aspects. Significantly, in these *concurrence models* (Carrubba et al. 2012; Cameron and Kornhauser 2016), incorporating the distribution of future cases and the resulting asymmetry of rule preferences has significant implications for judicial decision-making.

## B. Concurrence Models

Concurrence models focus on two features that distinguish judicial decision-making from ordinary policy making. The first is that judicial decisions involve two separate aspects. Judges must decide on the disposition of the case before them (which party wins), and they must articulate a rule that justifies this outcome. The second is that judges typically cannot be forced to "go along" with an opinion that adopts a legal rule with which the judge disagrees. A judge is always free to write a separate opinion. In particular, a judge who agrees with the majority's disposition of a case can write a concurrence that supports the disposition but articulates a separate legal rationale (rule) for that decision. By incorporating both of these features, concurrence models not only generate implications for the location of majority opinions but are also able to speak to the conditions under which majority opinions are possible, when plurality opinions result, which judges will join an opinion,

and who will write separately. These implications are affected in significant ways by explicit introduction of the distribution of future cases and changes in that distribution.

To show this, we generalize the concurrence model in Carrubba et al. (2012). Before we do so, we note a methodological point. The model we sketch is (intentionally) not a full-fledged bargaining model that generates specific equilibrium predictions for the existence and location of majority opinions. As Laver, de Marchi, and Mutlu (2011) have argued in the context of coalition bargaining models, one challenge for full-fledged bargaining models is that equilibrium results typically depend critically on the specific bargaining structure that is assumed (including which players can make offers and in what order). When these bargaining structures reflect "real-world" constraints, this is obviously not problematic. But when the bargaining environment under consideration is essentially unstructured, relying on specific bargaining protocols that drive outcomes is undesirable. Rather, it is advantageous to focus on general characterizations that do not depend on a specific bargaining structure.

This is the approach we take here. The concurrence model we sketch is designed to illuminate—in a very general way—two questions: For a given configuration of judicial preferences on a collegial court, is a majority opinion possible, or can the judges not reach sufficient consensus to issue a majority opinion? Second, if a majority opinion is possible, what is the range of opinions that can secure a sufficient number of votes? Put differently, the goal of the analysis is to characterize the bargaining range within which majority opinions can be located, given the preferences of the judges on the court. Where a majority opinion will emerge within that range depends on the bargaining process among the judges, which is left unspecified.[14]

Let $N$ denote the set of judges, with $|N|$ odd. Judges must resolve cases, which requires both a (binary) disposition and—in order to issue a majority opinion that creates binding precedent—articulation of a legal rule that a majority of judges support. Following Carrubba et al. (2012), we assume that judges care about two facets of the legal rules that they announce in their decisions. One aspect concerns the policy implications of a decision. If a majority opinion is issued, this opinion has precedential value and will guide the decisions of lower courts going forward. Because judges care about how cases are resolved, they receive payoffs from the legal rule that is announced in a majority decision, whether or not the judge signed on to the opinion. Second, we assume that judges care not only about the rule that is enacted; they also care about which rule they express support for (i.e., with which rule they are publicly identified). For judges who sign the majority

14. That said, the model we sketch can easily be extended by adding a specific bargaining protocol that governs how opinions can be "offered" in an attempt to secure a majority (e.g., one possibility is the "alternating offers" framework of Baron and Ferejohn [1989]; another is a monopoly proposal right by the assigned opinion writer in line with the setter model [Romer and Rosenthal 1978]). Such an addition could "pin down" where in the majority opinion range implied by the concurrence model the final opinion will emerge.

opinion, these two rules coincide. But for judges who write separately (either in a concurrence or a dissent), these two rules are not the same: they derive policy payoffs from the rule enacted in the majority opinion but receive expressive payoffs from the rule they sign on to in their separate opinion.

The rule preferences that judges have (and that feed into their policy and expressive payoffs) are derived—in keeping with the first part of this article—from the manner in which rules dispose of future cases. Recall that these preferences are single peaked, although typically asymmetric about a judge's ideal rule (result 1c). Denote the "policy utility" for judge $i$ of rule $r$ by $U_i(r)$ and the "expressive preference" for writing or signing an opinion at $\tilde{r}$ by $E_i(\tilde{r}) = \alpha U_i(\tilde{r})$, where $\alpha \geq 0$ denotes the weight placed on expressive benefits. Without loss of generality, assume that $U(x_i) = E_i(x_i) = 0$. Finally, let $\kappa > 0$ denote the cost of writing a separate opinion. Note that if a judge chooses to bear the cost of writing separately, it is a dominant strategy to write at the judge's ideal point. Given this setup, the payoffs to the alternatives confronting a judge in a particular case are outlined in table 1.

The key feature of concurrence models is that the setup we have just articulated implies that judicial behavior is characterized by a "join region." Each judge is willing to sign opinions that articulate rules that are sufficiently close to his or her ideal point. But the judge will not sign opinions establishing rules outside of this join region, preferring instead to write separately.[15] The intuition is simple: because judges prefer not to be associated with opinions that stray too far from their preferred rule (their expressive preference), they are willing to bear the cost of writing separately if a proposed rule is sufficiently far from their ideal point. For rules that are sufficiently close, they are willing to sign rather than incur the costs of concurring. Formally (focusing on the case in which the judge is pivotal to a proposed majority opinion; other cases are analogous), the judge's join region is defined as

$$\mathrm{JR}_i = \{r \in \mathbb{R} | \kappa \geq -U_i(r) - E_i(r)\}. \tag{6}$$

This join region is a convex set about the judge's ideal point (since $\kappa$ is a constant and the right-hand side increases in the distance of $r$ from the judge's ideal rule). The set of rules contained in the join region for a judge with ideal rule $x_i$ can therefore be denoted by upper and lower thresholds $\bar{x}_i$ and $\underline{x}_i$, where $x_i \in [\underline{x}_i, \bar{x}_i]$. This leads to a simple characterization of judicial behavior: judge $i$ is willing to sign majority opinions at $r \in [\underline{x}_i, \bar{x}_i]$ but will prefer to write separately if a majority opinion falls outside of this interval.

15. Formally, note that if there is a majority opinion at $r$ without the judge, he or she prefers to write separately if $\kappa < -E_i(r)$. A judge who is pivotal to a majority opinion at $r$ prefers to write separately if $\kappa < -U_i(r) - E_i(r)$. If there is only a plurality opinion at $r$, the judge prefers to write separately if $\kappa < -E_i(r)$. Note that $\kappa$ is a fixed constant, and the right-hand side of these expressions increases in the distance of $r$ from the judge's ideal point. Hence, these conditions will not be met for rules close to the judge's ideal point (and the judge will sign), but they will be met for rules that are sufficiently distant from the judge's ideal rule (and the judge will write separately).

Table 1. Possible Actions and Associated Payoffs under a Concurrence Model of Bargaining

| Action | Payoff |
|---|---|
| Sign majority opinion at $r$ | $U_i(r) + E_i(r)$ |
| Write separately at $x_i$ when there is a majority opinion at $r$ | $U_i(r) - \kappa$ |
| Sign a plurality opinion at $r$ that does not have precedential value | $E_i(r)$ |
| Write separately at $x_i$ when no majority opinion exists | $-\kappa$ |

Note that given this characterization of judicial behavior, majority opinions can emerge only if there is overlap in the join regions of a majority of judges. This overlapping region is referred to as the *majority opinion region*. Significantly, this immediately implies that concurrence models can explain plurality opinions: if no overlap exists between the join regions of a majority of judges, no majority opinion can emerge—an outcome that is not possible within open-rule and opinion writer models. Second, unlike the open-rule and opinion writer models that highlight the power of the court's median judge, concurrence models imply that the legal rule in majority opinions need not be located at, or even near, the ideal rule of the median judge. If the ideal rule of the median judge is not contained in the majority opinion region, that judge cannot hold out for a majority opinion at his or her ideal rule. At best, the judge can bargain for the rule at the boundary of the majority opinion region closest to his or her ideal point.[16] Figure 3 provides an illustration for a three-judge court. The figure plots ideal points ($x_i$'s) for three judges, as well as a join region around each judge's ideal point (to make the figure more legible, we separate the judges and their join regions vertically). We also plot the potential case distribution in the lower part of the figure (which is uniform in this figure). In figure 3*a*, there is overlap between the join regions of judges 2 and 3, allowing for a majority opinion in the overlap region. Importantly, any such majority opinion is constrained to be quite distant from the median judge's ideal point—precisely because of the need to secure judge 3's vote. Judge 1, in turn, writes a separate opinion (which, depending on whether he or she agrees or disagrees with the disposition implied by the majority opinion, will either be a concurrence or a dissent). In figure 3*b*, the median judge has shifted to the left, leading to a disappearance of the overlap in join regions. Now, no two judges can agree on an opinion they are both willing to sign, and no majority opinion is possible.

## C. Incorporating the Distribution of Future Cases

We are now in a position to consider how the introduction of a nonuniform case distribution and the resulting asymmetry of preferences over legal rules affects the conclusions of concurrence models. The central intuition behind the results we present is simple. The

16. This modeling approach thus offers a parsimonious theoretical foundation for the growing empirical evidence that Supreme Court majority opinions more closely reflect the views of the majority median than the chamber median (Clark and Lauderdale 2010, 2012; Carrubba et al. 2012; Shutte 2015; but see Lax and Rader 2015).

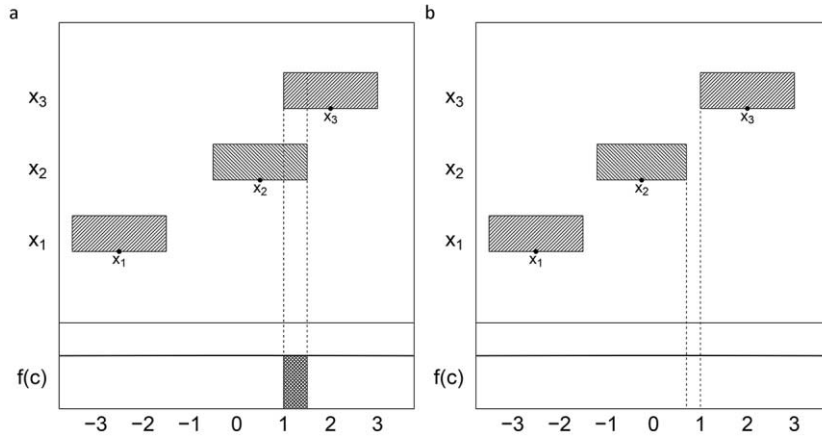


Figure 3. Majority and plurality opinions with symmetric join regions. Each panel assumes a uniform case distribution and $\kappa = 0.045$. Holding $x_1 = -2.5$ and $x_3 = 2$ constant, the ideal rule of judge 2 shifts from $x_2 = 0.5$ (*a*) to $x_2 = -0.25$ (*b*). While the join regions for judges 1 ($JI_1 = [-3.5, -1.5]$) and 3 ($JI_3 = [1, 3]$) remain unchanged, the join region for judge 2 shifts from $JI_2 = [-0.5, 1.5]$ to $JI_2 = [-1.2, 0.7]$, eliminating the coalition of judges 2 and 3.

key behavioral feature that drives collective decision-making in concurrence models is the join region of individual judges. Overlap between the join regions of judges determines whether a majority opinion can emerge and which judges join or write separately. Because overlap is central, the width and shape of join regions is of primary importance. If judges have standard symmetric rule preferences, join regions are symmetric about the ideal points of judges, and their width is determined by the cost of writing separately and the intensity of judicial preferences.

Relaxing the assumption of a uniform case distribution (and the symmetric rule preferences that result) and introducing nonuniform case distributions (and the asymmetric preferences over legal rules this implies) has significant implications for join regions and therefore decision-making by collegial courts. In particular, there are two features of join regions that are affected. The first is that unless the case density is symmetric around a judge's ideal rule, the judge's join region will be asymmetric—that is, the judge is more willing to sign on to opinions that deviate in one direction from the judge's preferred rule than in the other direction. Second, the greater the density of future cases around a judge's ideal rule, the more narrow a judge's join region will be. Put differently, judges are more reluctant to be accommodating if moving away from their ideal rule has implications for a larger number of cases.[17] Lemma 1 summarizes these properties when the distribution of future cases is single peaked (proof provided in the appendix [available online]).

17. The intuition behind these properties is straightforward. The upper and lower bounds of a judge's join region are defined by those legal rules for which the judge is indifferent between signing a

Lemma 1. For single-peaked distribution of future cases, the width of the join region $[\underline{x}_i, \bar{x}_i]$ for a judge with ideal rule $x_i$ is decreasing as $x_i$ approaches the mode of the underlying distribution. Further, the join region is shorter in the direction toward the mode of the case distribution than in the direction away from the mode.

The collective decisions that judges on a court reach—most importantly, majority opinions—depend on the overlap between the join regions of judges. Significantly, the asymmetry of join regions can have profound consequences for these decisions compared to decisions reached under symmetric join regions (derived from symmetric preferences, such as are implied by a uniform case distribution). Consider two brief examples. In figure 4, we compare join regions and their overlap for a three-judge panel, holding fixed the ideal rule of each judge. In figure 4*a*, the underlying case distribution is uniform (thus implying symmetric rule preferences), while the underlying case distribution is normal in figure 4*b*. Note that with a uniform distribution, the majority opinion region is located symmetrically between the ideal rules of the coalition members. With a normal distribution of cases (fig. 4*b*), join regions are no longer symmetric. Moreover, the join region of judge 2, whose ideal point is located close to the mean of the case distribution and in the dense region of the case distribution, has shrunk and become much more restrictive. The majority opinion region now significantly advantages this judge.

Figure 5 presents another example of the potential impact of asymmetric preferences and the underlying case distribution. In this case, figures 5*a* and 5*b* show a three-judge panel with rule preferences derived from a normal case distribution, holding fixed the ideal rules of the judges. Note that in figure 5*a*, a majority coalition between judges 2 and 3 emerges. Now suppose that as a result of some exogenous change—perhaps technological developments—the distribution of future cases has shifted to the right so that the mean of the case distribution has moved toward judges 2 and 3 as depicted in figure 5*b*. As summarized in lemma 1, the result of this shift is that the join regions of judges 2 and 3 shrink in such a way as to eliminate the overlap between them—and to create overlap between judges 1 and 2 instead. In other words, holding fixed the ideal rules of the judges, an exogenous shift in the case distribution has led to the breakdown of one majority coalition and the emergence of a new one.

These examples illustrate that if judges' rule preferences are derived from the manner in which legal rules dispose of the stream of cases to which they apply, the distribution of

majority opinion at the rule and bearing the cost of writing separately. Suppose the density of the case distribution around a judge's ideal rule increases. This implies that rules that deviate from the judge's preferred rule now misclassify a greater number of cases—thus implying that the point at which the judge is willing to write separately is reached for smaller deviations from the judge's preferred rule (i.e., the boundaries of the join region shift inward). Now suppose the case density is higher to one side of a judge's ideal rule than to the other. This implies that deviations from the judge's ideal rule in the direction toward greater case density are costlier for the judge, because these rules will misclassify a greater number of cases. As a result, the point at which the judge prefers to write separately is reached more quickly in the direction of greater case density than in the direction of lower case density.

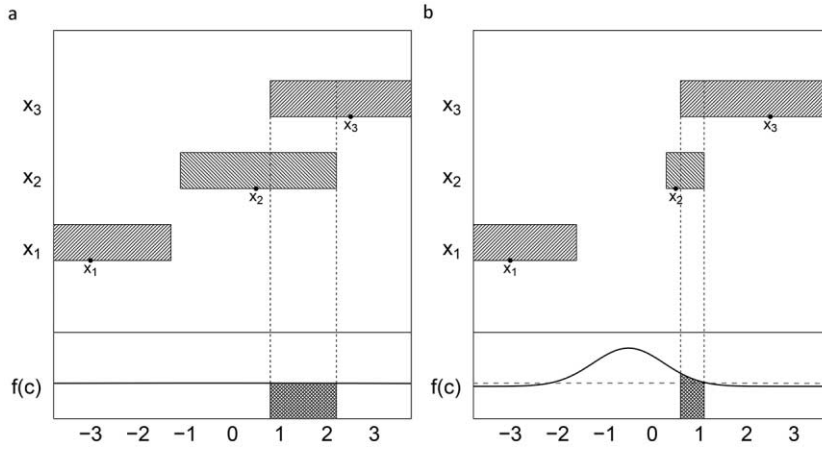


Figure 4. Symmetric and asymmetric join regions. Holding constant the ideal rules of the three judges ($x_1 = -3$, $x_2 = 0.5$, and $x_3 = 2.5$) and assuming $\kappa = 0.075$, each panel compares join regions derived from a uniform (*a*) and normal (*b*) case distribution. Under the uniform distribution, $JI_1 = [-4, -1.3]$, $JI_2 = [-1.1, 2.2]$, and $JI_3 = [0.8, 4]$. Under a normal case distribution, $f(c) = N(-0.5, .75)$, $JI_1 = [-4, -1.6]$, $JI_2 = [0.3, 1.1]$, and $JI_3 = [0.8, 4.0]$.

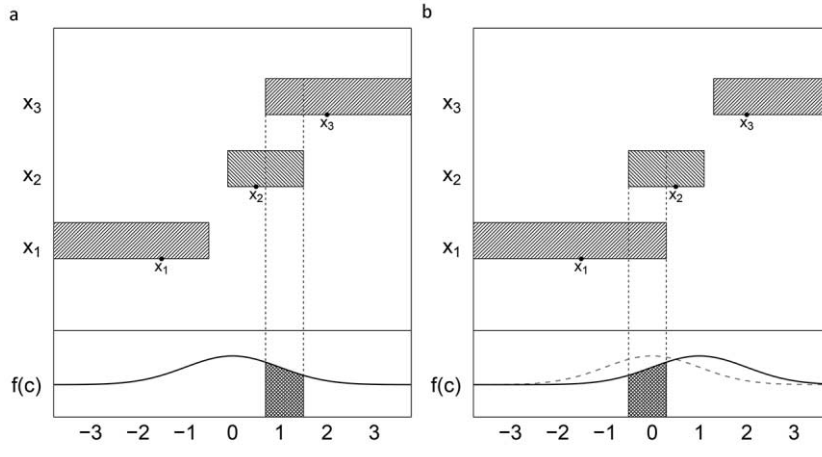


Figure 5. Holding constant the ideal rules of the three judges ($x_1 = -1.5$, $x_2 = 0.5$, and $x_3 = 2$) and assuming $\kappa = 0.25$, shifting the mean of the case distribution to the right causes the coalition between judges 2 and 3 to breakdown and a new coalition between judges 1 and 2 to emerge. *a*, Join regions derived from a case distribution $f(c) = N(0, 1)$, $JI_1 = [-4, -0.5]$, $JI_2 = [-0.1, 1.5]$, and $JI_3 = [0.7, 4]$; *b*, join regions drawn from a case distribution $f(c) = N(1, 1)$, $JI_1 = [-4, 0.3]$, $JI_2 = [-0.5, 1.1]$, and $JI_3 = [1.3, 4]$.

future cases and changes in this distribution have potentially significant impacts because they affect—through the asymmetry of judges' rule preferences—the potential for majority opinions. But how general are these lessons? Can we identify systematic impacts of the asymmetric rule preferences that are implied by nonuniform case distributions? In the next section, we turn to this issue.

## D. Coalition Composition

In this section, we examine how incorporating the underlying distribution of cases (and changes to it) affects the existence and size of majority opinion coalitions in concurrence models. Before turning to those results, an additional lemma is useful to establish the relationship between feasible majority opinion coalitions and changes in the distribution of future cases. Consider two judges with ideal rules $x_i < x_{i+1}$. Now suppose that there is a change in the distribution of future cases that increases the case density between the two judges in a "smooth" way (i.e., along the entire interval).[18] We then have the following lemma:

> Lemma 2. For two judges with ideal rules $x_i < x_{i+1}$, if there exists overlap in their join regions, an increase in the density of the case distribution between their ideal rules decreases the size of the overlap region. For sufficiently large increases in the case density, the overlap disappears.

While we reserve the formal proof for the appendix, the intuition behind this lemma is straightforward. Lemma 1 establishes that as the density of cases surrounding a judge's ideal rules increases, the join region of the judge narrows. This implies that a density increase between the ideal rules of any two judges with $x_i < x_{i+1}$ will cause the upper boundary of the join region for $x_i$ to decrease ($\bar{x}_i \rightarrow x_i$) and the lower boundary of the join region for $x_{i+1}$ to increase ($\underline{x}_{i+1} \rightarrow x_{i+1}$). As a result, if the join regions overlapped initially, they may no longer do so. Consider the implications.

### 1. Size of Majority Coalitions

The size of majority coalitions has long been a focus of scholars and commentators on judicial decision-making. One reason for this is a belief that decisions supported by larger majorities (especially unanimous decisions) are more likely to find acceptance among lower courts and citizens and to be long-lasting (Hansford and Spriggs 2006; Benjamin and Desmarais 2012). While the open-rule and opinion writer models do not speak to the size of majority coalitions, concurrence models imply that the size of majority coalitions is

18. Specifically, letting $f(c)$ denote the initial density and $\tilde{f}(c)$ denote the changed density, by an "increase in density" we mean that for all $k, \tilde{k} \in [x_i, x_{i+1}]$ where $k < \tilde{k}$, it is the case that $\int_k^{\tilde{k}} \tilde{f}(c)dc > \int_k^{\tilde{k}} f(c)dc$.

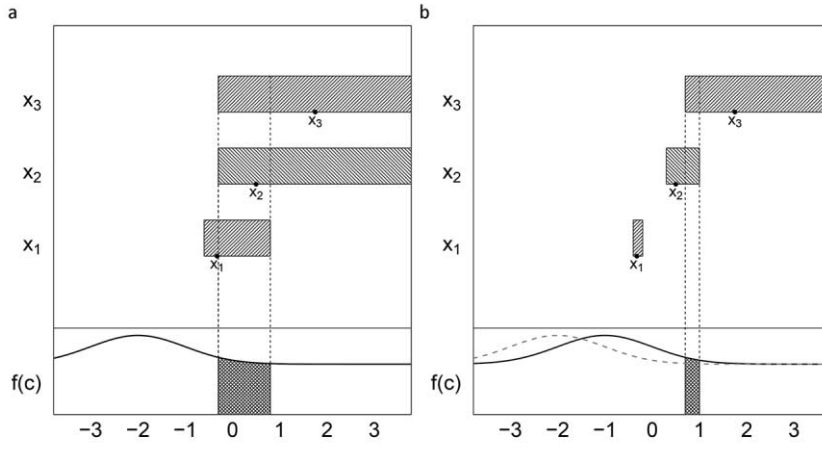


Figure 6. Holding constant the ideal rules ($x_1 = -0.325$, $x_2 = 0.5$, and $x_3 = 1.75$), the coalition between judges 1, 2, and 3 breaks down and a new coalition between judges 2 and 3 emerges when the density of the case distribution increases between the ideal rules of judges 1, 2, and 3. *a*, Join regions are derived given a distribution of cases $f(c) = N(-2, 1)$, $JI_1 = [-0.6, 0.8]$, $JI_2 = [-0.3, 4.0]$, and $JI_3 = [-0.3, 4.0]$; *b*, join regions are derived given a distribution of cases $f(c) = N(-1, 1)$, $JI_1 = [-0.4, -0.2]$, $JI_2 = [0.3, 1.0]$, and $JI_3 = [0.7, 4.0]$.

determined by the overlap in judges' join regions. As a result, the size of majority coalitions also depends on the underlying case distribution.

> Result 2. An increase in the density of cases within the Pareto set of the judges on a collegial court weakly decreases the size of majority coalitions, provided that the cost of writing separately is sufficiently low.[19]

Result 2 states that as the case density increases between the judges on a given panel, majority coalitions (weakly) decrease in size. Figure 6 provides an illustration. Consider figure 6*a* first. All judges have ideal rules to the right of the mode of the case distribution, implying that there is general agreement among the judges on how the majority of cases should be treated. Because there are relatively few cases that divide the judges, join regions are wide, and majority coalitions are likely to be large. Now consider what happens if—holding ideal rules constant—the distribution of potential cases shifts to the right (depicted in fig. 6*b*). The result of such a shift is that majority coalitions are now smaller than they were before, despite the fact that the ideal rules judges prefer remain unchanged. What is

19. The condition that the costs of writing separately must be sufficiently low is a technical constraint to ensure that judicial join regions are not so wide that judges would join any proposed rule.

the intuition behind this result? Substantively, an increase in case density between the judges implies that even if judges' intrinsic legal preferences have not changed, existing disagreements among them have become more relevant for a greater number of real-world cases, thereby destroying possibilities for compromise that existed previously. There are a number of avenues that might produce such increasing case density. For example, as a result of changes in social norms or technology, certain types of behavior—by citizens or law enforcement officers—might become more prevalent over time, increasing the potential number of cases that will be affected by differences among the legal rules that judges prefer.

### 2. *Plurality Decisions*

A key consideration for the justices of the US Supreme Court is that the Court's decision only establishes binding precedent for lower courts if it secures the agreement of a majority of justices. Plurality decisions dispose of the case at hand but have no binding authority. This implies that the conditions under which a majority of justices are able to agree on an opinion, and the conditions under which they will fail to do so, are of obvious importance. Ironically, neither the open-rule nor the opinion writer models speak to this question: these models predict majority opinions close to the ideal rule of the median judge but provide no account of plurality opinions. The concurrence model, in contrast, provides a direct account of majority and plurality opinions: if there is no overlap between the join regions of a majority of judges, no majority opinion can be written. Intuitively, this can happen if judges' preferences diverge sufficiently: if the ideal rules that judges favor are sufficiently dispersed across the case space, there will be no overlap between the join regions of a majority of judges. More interestingly, changes in the distribution of future cases also affect whether such bargaining failure occurs:

> Result 3. For a sufficiently large increase of the density of the case distribution between the ideal rule of the median judge and the judges adjacent to the median, existing majority coalitions will break down, and no majority opinion can emerge, provided that the cost of writing separately is sufficiently low.

A less technical, and more colloquial, way of stating this result is to say that majority opinions are less likely to emerge when the ideal rule of the median judge is located in a region of the case space with a high density of cases. The intuition behind this result is not difficult to see. Increased density between the median judge and the adjacent judges reduces the size of the median's join region (lemma 1) and may eliminate overlap between the join regions of the median and those of other judges (lemma 2). Since any majority opinion coalition must include the median judge, this implies that majority coalitions may become impossible as case density increases around the ideal rule of the median, leading to the emergence of a plurality opinion.

Figure 7 provides an example. Figure 7*a* illustrates a majority coalition comprising judges 1 and 2. In figure 7*b*, we hold the ideal rules of all judges constant but increase

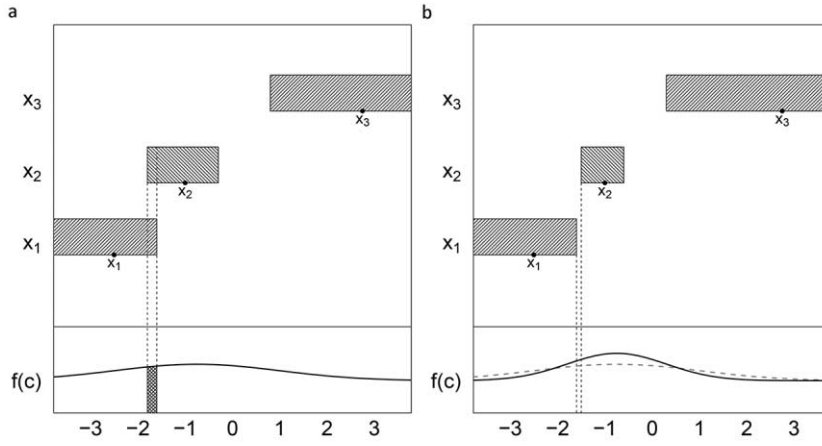


Figure 7. Holding constant the ideal rules ($x_1 = -2.5$, $x_2 = -1$, and $x_3 = 2.75$) and mean of the underlying distribution ($\mu = -0.75$), increasing case density around the median judge destroys the majority coalition and leads to plurality opinion. *a*, Join regions are derived given a distribution of cases $f(c) = N(-0.75, 1.75)$, $JI_1 = [-4.0, 1.6]$, $JI_2 = [-1.8, -0.3]$, and $JI_3 = [0.8, 4.0]$; *b*, join regions are derived given a distribution of cases $f(c) = N(-0.75, 1.05)$, $JI_1 = [-4,0, -1.6]$, $JI_2 = [-1.5, -0.6]$, and $JI_3 = [0.3, 4.0]$.

the density of the case distribution around the median judge as shown by the new case distribution displayed at the bottom of the figure. As figure 7*b* shows, the consequence is that the overlap between the join regions of the median and judge 1 disappears, and no majority opinion is possible.

## IV. AN EXAMPLE

The central implication of the microfoundations for judicial rule preferences we develop above is that the distribution of future cases and changes in this distribution have significant implications for bargaining on collegial courts. Most importantly, our results suggest that changes in the case distribution can serve as a catalyst for significant legal change. As the density of future cases shifts, the join regions of judges—even if their ideological views have remained unaltered—can change in ways that lead to the breakdown of existing coalitions and the emergence of new ones, ushering a revision of the legal rules adopted by the court. In this section, we provide a brief empirical example, drawing on a recent US Supreme Court decision, that illustrates these dynamics.

In 2007, Antoine Jones was convicted in federal court of conspiracy to distribute cocaine and sentenced to life imprisonment. The central evidence against him had been gathered over four weeks with the help of a GPS device installed without a valid warrant underneath Jones's car: by tracking his movements for such an extended period, the police were able to establish that Jones was, in fact, engaging in drug trafficking. Jones challenged his conviction, contending that the installation of the device and collection of data on his

whereabouts over weeks constituted a violation of his Fourth Amendment protection against "unreasonable searches and seizures." In 2012, a unanimous Supreme Court agreed (*United States v. Jones*, 132 S. Ct. 945).

While all nine justices voted to overturn Jones's conviction, they disagreed profoundly on the legal rule that ought to justify this conclusion. Justice Scalia, writing for the five-member, largely conservative majority, relied on a long-established established line of jurisprudence.[20] The legal doctrine on which Scalia based his opinion holds that if officers commit a trespass upon a constitutionally protected space (in this case, the car), the officers have engaged in a "search." Because the officers in this specific case lacked a valid warrant for such a search, the evidence against Jones had been gathered in an unconstitutional manner—implying that his conviction should be overturned.

Justice Alito—typically a reliable member of the Court's conservative bloc—authored a concurring opinion.[21] While he agreed with the majority's disposition, Alito vehemently criticized the "trespass approach" as an inappropriate legal rule for justifying this disposition. Importantly, Alito's disagreement with the majority was not rooted in principled differences over legal theory or philosophy; the reason for the disagreement was practical and empirical. As Alito pointed out, "if long-term monitoring can be accomplished without committing a technical trespass . . . the Court's theory would provide no protection." For Alito, this constituted a critical factor precisely because, as he emphasized, recent technological changes have made observation less costly and intrusive, leading precisely to a situation in which a trespass rule has little bite: "Traditional surveillance for any extended period of time was difficult and costly and therefore rarely undertaken. . . . Only an investigation of unusual importance could have justified such an expenditure of law enforcement resources. Devices like the one used in the present case, however, make long-term monitoring relatively easy and cheap."

Arguably, this decision provides a powerful illustration of the central dynamics we have identified: one way to read Justice Alito's concurrence, and his refusal to join the majority opinion, is that it is driven by a concern over technological changes that have resulted in a significant shift of the distribution of future cases. The clear implication of Alito's concurrence is that if "surveillance for any extended period of time" were still "difficult and costly," he would have been happy to sign on to a trespass rule. But given that technological changes have increased the ability of police to engage in such surveillance at low cost (leading to an expected increase in the number of cases in which they do so), Alito has been "split off" from the "trespass coalition."

## V. CONCLUSION

The work of judges and courts revolves around the application and creation of legal rules. Judges' preferences over these rules are therefore central, particularly to the process of

20. Scalia's majority opinion was joined by Justices Kennedy, Roberts, Thomas, and Sotomayor.

21. Alito's concurring opinion was joined by Justices Breyer, Ginsburg, and Kagan.

finding sufficient agreement for a majority opinion. In this article, we have considered the microfoundations of judicial preferences over legal rules from a particular vantage point. One reason why the legal rules that judges announce in their decisions matter is that they affect how similar cases will be resolved in the future. Therefore, if judges care about the resolution of potential future cases, then the distribution of these cases becomes critical. How often will the difference between two rules matter for how cases "come out"? Judicial distaste for rules should be more intense for rules that dispose of a larger number of future cases in the "wrong" way.

The simple model we employ to derive judicial rule preferences from the way in which rules dispose of future cases yields three important insights. First, judges' rule preferences will typically not be symmetric as assumed in standard models of judicial decision-making. Instead, judges' preferences will be asymmetric, declining more sharply where greater case density implies that the differences between rules are consequential for a larger number of future cases. Second, the asymmetry of rule preferences has significant implications for the output of collegial courts. This is easiest to see in the context of concurrence models (Carrubba et al. 2012; Cameron and Kornhauser 2016), which incorporate the institutional peculiarities of the judiciary (most importantly, the ability of judges to write separately). In these models, the asymmetry of judicial preferences affects the prevalence of majority and plurality decisions, the size of majority coalitions (if they exist), and the range within which a majority opinion can emerge. In particular, as case density increases within the Pareto set of the judges, opinion coalitions will become smaller. And as case density increases in the center of the court—around the position of the median—the likelihood of bargaining breakdown (resulting in plurality decisions) increases.

Finally, paying attention to the manner in which judicial rule preferences are shaped by the distribution of future cases has implications for understanding legal change. The distribution of future cases is not static. Among other factors, technological change or evolution of cultural norms can affect the likelihood that particular kinds of cases will arise. For example, the development of thermal imaging technology enables law enforcement to more easily "search" the interior of a home without having to enter—raising the question whether a warrant is required to do so (see *Kyllo v. United States*, 533 U.S. 27 [2001]). Because such changes have consequences for how judges evaluate alternative legal rules, they have the potential to break up traditional coalitions among the judges on a collegial court and to give rise to new ones—thus ushering in legal change even if the composition of a court, as well as the "jurisprudential" preferences of its judges, have not changed.

In closing, we should note that our analysis represents only a beginning in endogenizing preferences over legal rules and examining the consequences of doing so. Most obviously, we have assumed that the distribution of future cases, while subject to change, is exogenous to the legal rules that judges announce. This is a useful starting point, which has allowed us to highlight the central importance of the case distribution for rule preferences. At the same time, it is clear that the distribution of future cases is itself likely to be partially endogenous to the opinions that courts issue as outside actors adjust their behavior to the

legal landscape. Explicitly modeling the relationship between legal rules and the distribution of future cases is of obvious importance. In short, we view the current article as only a first step in explicitly incorporating the empirical consequences of rules into judicial preferences and understanding the implications for collegial court bargaining.

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