12-12-2008

Modeling Collegial Courts (3): Judicial Objectives, Opinion Content, Voting and Adjudication Equilibria

Charles Cameron
NYU School of Law, charles.cameron@nyu.edu

Lewis Kornhauser
NYU School of Law, KORNHAUL@juris.law.nyu.edu

MODELING COLLEGIAL COURTS (3):

JUDICIAL OBJECTIVES, OPINION CONTENT, VOTING AND ADJUDICATION EQUILIBRIA

Charles M. Cameron & Lewis A. Kornhauser
Version 5.11
Friday, 10 October 2008
Preliminary and Incomplete
Comments Welcome

Abstract

We present a formal game theoretic model of adjudication by a collegial court. Distinctively, the model incorporates dispute resolution as well as judicial policy making and indicates the relationship between the two. It explicitly addresses joins, concurrences and dissents, and assumes "judicial" rather than legislative or electoral objectives by the actors. The model makes clear predictions about the plurality opinion's location in "policy" space; the case's disposition; and the size and composition of the disposition-coalition, the join-coalition, and the concurrence-coalition. These elements of adjudication equilibrium vary with the identity of the opinion writer and with the location of the case. In general, the opinion is not located at the ideal policy of the median judge. The model suggests new directions for empirical work on judicial politics.

1. INTRODUCTION

Twenty years ago, positive political theorists began to adapt models developed for the study of legislatures and elections to the study of courts and adjudication. These models, though they have provided great insight into adjudication, largely transfer to courts the assumptions about agenda setting, voting protocols, and objectives used in the study of legislatures. Courts, however, are not legislatures and judges are not legislators. We believe that further progress requires more attention to the institutional features that actually distinguish courts in general and collegial courts in particular from legislatures and that are likely to be consequential for adjudication.

In this essay, we focus on three distinctive features of adjudication on collegial courts. We offer a simple model of these institutional structures and contrast it with the structure of typical models of legislation and elections. First, any court, whether collegial or not, jointly announces a disposition of the case – whether plaintiff prevails or not – and a policy or legal rule. The announced legal rule, when applied to the facts of the case, must dictate the actual disposition of the case. The joint production of dispositions and rules requires that a model of adjudication be grounded in a case space.

Second, the majority disposition of a case need not attract a majority opinion. Though a majority of judges may agree that plaintiff should prevail, this majority may disagree about the rule that should govern this class of cases. Phrased differently, courts – at least US courts – do not always have majority opinions, and even when they do, they also may have concurrences and dissents.[1] In the language of electoral politics and legislative enactment, we might say that the voting judges may abstain from endorsing an opinion by writing their own opinion.

Third, the objectives of judges who write opinions differ from the objectives usually attributed to contending candidates in electoral politics. Judges do not aim at winning per se; rather, they care about the disposition of the case and the rule announced by the court. Obviously, the most appropriate specification of the judicial objective function will be controversial. We take a first cut at particularly "judicial" objectives by assuming that the justice who writes an opinion cares about the policy expressed in the opinion and the extent of support her opinion attracts.

The introduction of these three features of adjudication[2] points to the importance of several phenomena not generally addressed in the prior literature. In particular, the model presented

[1] Courts in other countries have different practices that require different strategies of modeling. In France, for example, opinions of the Cour de cassation are unanimous (and unsigned). In the British House of Lords, by contrast, each judge announces her own opinion.

[2] We ignore a fourth important difference between legislation and adjudication. Courts have limited control over their agenda. Litigants decide whether to bring and prosecute a case and any appeal. Judicial rulings

below makes predictions about the case disposition, the content of the opinion, and the structure of the "winning" coalition including joins and concurrences. Dispositions, case content, and the structure of the winning coalition vary with the ideal policy of the opinion writer and with the location and importance of the case.

The discussion proceeds as follows. Section 2 elaborates on the distinctive features of adjudicatory as opposed to legislative or electoral institutions. Section 3 presents the model. Section 4 details equilibria. Section 5 investigates the behavior of the model utilizing monotone comparative statics and the calculation of equilibria in benchmark examples. Section 6 concludes. An appendex contains the basic results in monotone comparative statics that underlie the propositions set out in section five. As many of the issues raised in this paper are novel, we strive for simplicity throughout.

2 JUDICIAL DECISION MAKING

2.1 OVERVIEW

Decision making in appellate courts involves both dispute resolution and policy making. Critically, the latter takes place within the context of the former. This aspect of judicial decision making sharply differentiates adjudication from legislative decision making or electoral contestation. Indeed, most of the distinctive features of adjudication result from yoking together policy making and dispute resolution.

More specifically, contending litigants (plaintiffs and defendants) bring a *case* before a group of judges. Each case is distinguished by *facts* relevant to the legal dispute. The judges are obliged to dispose of the case in light of the facts: the judges must indicate which of the contending litigants prevails given the situation that occurred. For example, the judges may hold the defendant liable (so plaintiff prevails) or not liable (so defendant prevails). Critically, *a case disposition is obligatory in every case heard by a court.* [3]

A further hallmark of adjudication is that judges must give *reasons* for case dispositions. It is this requirement that gives rise to policy making. In particular, the reason for a disposition typically takes the form of a legal *rule* or legal doctrine applicable to the instant case and all similar cases. Thus, the rule indicates how to dispose of the case before the Court in light of the facts in the case. It also provides guidance to potential litigants on what to expect in the future from the deciding court, and to lower court judges on how to dispose of similar cases. On American collegial courts, legal rules are specified in *opinions* written by individual judges. Although courts issue summary dispositions without opinion in some cases, more typically, high court decision making iincludes

---

on policy are thus constrained to policies connected to the cases before them Legislators do not face any corresponding constraint.

[3] Even dismissals for want of jurisdiction or on grounds that certirorai was improvidently granted imply a disposition of the case: that determined by the court below. Such dispositions, of course, are silent on the policy issues raised by the case.

voting over one or more opinions, each of which offers a rule that support one or the other case disposition, or opinions each of which supports the same disposition in the instant case but offers different guidance about somewhat different situations.

The voting procedure is also distinctive (we focus on the procedures of the U.S. Supreme Court and simplify considerably). First, one justice is selected as the designated opinion author. This justice is obliged to produce an opinion that will support a case disposition favored by a majority on the Court.[4] In addition, any justice is free to write an opinion if she chooses, supporting whichever disposition she chooses. Thus, there is free entry in opinions.[5] Second, no amendments may be offered to the opinions submitted for the final consideration of the members of the Court. Third, if more than one opinion has been authored, all contending opinions are considered simultaneously rather than through binary comparisons in an agenda tree.

Fourth, a judge's vote on an opinion may take one of three forms. First, he may *join* an opinion, meaning he supports both the rule indicated in the opinion and the case disposition that follows from the application of the rule to the instant case. In essence, he endorses the rule and therefore agrees with the implied disposition in the instant case. A judge may join at most one opinion. However, a judge may withhold his support from all the rules under consideration; but if so, he *must* explicitly indicate his position on the case's disposition. The name of this type of vote depends on whether the justice favors the majority or minority disposition. In the former case, a vote of this kind is called a *concurrence*: the judge "concurs" with the majority disposition but does not endorse any of the rules announced in the opinions favoring the majority disposition. If the disposition he favors is the minority choice, a vote of this kind is called a *dissent:* the judge disagrees with the majority disposition but again withholds his endorsement of any rule in the opinions (if any) yielding the minority disposition in the case. [6]

If a given opinion is joined by an absolute majority of the Court, it is announced as the *opinion of the Court* and it yields both a disposition of the instant case and a definitive legal rule applicable in similar cases. If there are multiple opinions but none receives a majority of joins, there is no opinion of the Court. In such an instance the pattern of joins, concurrences and dissents necessarily implies

---

[4] On the US Supreme Court, if the assigned justice fails to produce an opinion supporting the majority disposition, he loses the assignment which is then given to another justice.

[5] In this version of the paper, we do not model free entry of competing opinions, though we do model dissents, joins, and concurrences.

[6] In fact, voting is more complicated. A justice may concur in part and dissent in part with a given opinion. Or a dissenting justice may join the dissenting opinion of another justice. Recently, there has been an increase in the number of "Chinese menu" votes in which Justice A joins in part I of Justice B's opinion, in Part II of Justice C's opinion and in Part III of Justice D's opinion. Often these cases lead to a judgment of the court but no majority opinion.

In addition, the aggregation procedure of votes on opinions and dispositions remains, after over 200 years, unsettled. The votes might be aggregated case-by-case or issue-by-issue but these two procedures do not always yield the same outcome. On the doctrinal paradox see Kornhauser and Sager (1986) and Kornhauser (1992). On the unsettled nature of voting protocols in the U.S. Supreme Court, see Kornhauser and Sager (1993).

a particular case disposition. In that situation, the Court announces a "judgment of the Court," indicating the case disposition favored by the majority. The situation with respect to legal doctrine is somewhat complex. Despite the absence of an absolute majority winner, one or more opinions will be plurality winners. But a plurality opinion on the minority side is of no immediate legal consequence as it cannot rationalize the case disposition – only an opinion on the winning side can do so. A single plurality opinion on the majority side obviously merits special attention. But multiple opinions on the majority side may be plurality winners (they may tie in the number of joins). Interpretation of such a situation is controversial.[7]

It is illuminating to compare judicial procedures with electoral and legislative ones. In some ways, the opinions considered by the Court are analogous to candidates in an election, with an opinion's rule analogous to a candidate's platform. This perspective implies content competition among opinions. From this perspective, (to use Myerson's terminology [1999]), the "election" over the candidate opinions involves single-positive voting in "joins," with a majority quota requirement for achieving an "opinion of the Court." However, in the event no opinion obtains an absolute majority there is no runoff between the leading plurality opinions. Moreover, plurality opinions on the losing side of the disposition are never potential winners. If a single opinion on the winning side of the disposition achieves a plurality in joins, it should probably be considered the "winner" of the election. But it is somewhat unclear how to score multiple plurality opinions on the majority side of the disposition – are they all electoral winners?

Alternatively, the opinions may be analogized to bills considered by a legislature. In this case, the opinions' rules are analogous to the bills' policy content. From this perspective, multiple "bills" are presented to the "floor" (the Court) under a closed rule. A "join" is similar to a "yea" on a final passage vote. However, in contravention to standard Anglo-American legislative procedure, all submitted bills are voted on simultaneously. If an opinion/bill achieves an absolute majority in joins from the justices participating, it is "enacted". If no opinion achieves a majority in joins, the outcome is again complex. A plurality winner on the losing side of the disposition cannot be considered as "enacted." If a single opinion accrues a plurality of votes from the disposition majority it probably should be considered "enacted." If multiple opinions on the winning side of the disposition achieve a plurality of joins, one might argue all are enacted.

It is worth noting the role of the "status quo" or "reversion" policy in light of these procedures. For many cases considered by high courts, no definite legal rule has been announced previously. So no status quo rule may exist at all. But even if there is a standing rule applicable to the instant case, the Court can consider only the rules contained in the opinions before it. If the pre-existing rule is not offered in an opinion, the members of Court have no mechanism for endorsing that rule. Moreover, one or more of the opinions supporting the majority disposition inevitably achieves at least a plurality of the majority side joins. The doctrinal guidance that ensues may be clear or muddled, but it is what it is: once the Court takes up a case, doctrine *never* reverts to the status quo ante.

In light of these complex and somewhat confusing procedures, some analysts focus on the case disposition as the "outcome" of adjudication, since dispositions are clear. This approach then conflates majority side joins and concurrences as equivalent votes for the majority disposition, and

---

[7] Cite to literature on this -- "narrowest rule" vs. Lax's in essence de facto rule vs most popular rule.

minority side joins and dissents as equivalent votes for the other disposition. Although clear, this approach ignores legal doctrine and the content competition among the opinions. By ignoring the policy-making component of adjudication, this approach does considerable violence to the intent and consequences of judicial decision making, particularly in appellate courts.[8]

A subject of long-standing controversy is the judicial utility function (Baum 1998, Posner 1993). In light of the above discussion, three elements seem plausible as arguments: 1) preferences about rules (policy making), 2) preferences about case dispositions and, arguably, 3) preferences for clarity in the law (so that, ceterus paribus, a larger majority joining a rule is better than a smaller majority). To the extent the first motivation weighs heavily, justices are single-minded seekers of legal policy; to the extent the second is pre-eminent, they are piece-meal dispensers of justice; and to the extent the third holds sway, they are maximizers of legal clarity.

A further complication, however, involves the extent to which judges are consequentialist or non-consequentialist, that is outcome-oriented versus act-oriented. [citations] For example, should a judge endorse a relatively poor rule rather than a better one, because a vote for the latter will just be "wasted" while a vote for the former will create a plurality winner? In crafting a rule for the consideration of her colleagues, should a judge deviate dramatically from what she sees as the best rule simply to garner votes? Should she offer a rule yielding the wrong disposition in the instant case, if that is the only way to secure a winning opinion? As sophisticated players of adjudication games, judges are certainly capable of outcome-oriented *calculations*; but it is not at all clear that judges (in contrast with voters, candidates, and legislators) view such calculations as proper or appropriate.

2.2 ADJUDICATION GAMES IN THE EXISTING LITERATURE

As noted in the introduction, the positive political theory of adjudication generally conflates the vote on the disposition of the case and the decision to join an opinion. This confusion is clearest in the empirical methodology which estimates the ideal *policy* points of justices from data on the justices' votes on *dispositions* and then use the estimated ideal points to discuss the location of policy. In the theoretical literature, the parallel phenomenon simply ignores the disposition of the case as the judges are presumed to have preferences over policies and simply to choose policies.[9]

---

[8] Some empirical scaling techniques applied to collegial courts implicitly take this approach, using votes on case dispositions to estimate justices' "ideal points." In this approach, the uncovered space is necessarily a dispositional space, not a doctrinal one. The meaning of a dispositional "ideal point" is unclear, aside from a general tendency to favor liberal or conservative litigants.

[9] A small but growing literature begins in "case" space and then defines policy space in terms of this underlying case space. The use of case space permits a distinction between announcing policy and disposing of the case. Some models remain purely in case space – see e.g. Cameron and Kornhauser [2006, 2007] – and hence deal solely with case dispositions. Much of this literature, however, focuses solely on the announcement of policy and largely ignores case disposition.

With the exception of two papers discussed below, the literature ignores case disposition and focuses on the location of judicial policy. Indeed, the empirical and theoretical literature identifies, often informally, four possibilities for opinion location: 1) at the ideal policy of the median justice (the "median justice model"), 2) at the ideal policy of the median justice in the majority (the "majority median model", 3) at the policy position of the author of the opinion (the "author monopoly model"); and 4) at a policy position somewhere between the ideal policy of the median justice and the ideal policy of the author (the "author influence model"). We compare our results with these heuristic benchmarks.

Even if one accepts the restriction of analysis to the announcement of policy, however, the literature still ignores the institutional peculiarities of policy announcement by courts. Hammond et al (2005) consider several models of Supreme Court adjudication but each simply transfers some aspect of legislative practice to the judicial context. An "open-bidding" model of bargaining and a "median hold-out" model of bargaining are consonant with standard models of legislative bargaining; each implies that policies are announced at the ideal policy of the median justice. A third model adapts models of legislative agenda-setting to the judiciary. In legislative models, the agenda-setter is sometimes a monopolist as Hammond et al assume. In this model, the agenda setter influences the location of judicial policy.

Fischman (2008) models the votes on *disposition* and ignores policy. In many ways, his model is closest in spirit to the one offered here. In his model as in ours, there is a one-dimensional case space and a corresponding one-dimensional policy space defined by a cut-point. The location of the case relative to the judge's cut point determines her sincere view of the correct disposition of the case. As in our model, endorsing a disposition different from one's sincere view of the disposition imposes a cost on the judge. In our model this loss is a constant,; in Fischman's model it is linear in the distance between the case location and the judge's ideal point. Dissent imposes a cost both on the dissenting judge (as it does in our model) and on the two majority judges. This latter cost does not appear in our model. In Fischman's model as in ours, a judge may vote strategically on the disposition of the case.

Carrubba et al (2008) offer a majority median model in the first model to encompass both a vote on the disposition and a vote on policy. The model there, though similar, is in some respects more ambitious and in other respects less ambitious than ours. Their model, unlike ours, acknowledges the importance of opinions that are joined by at least a majority of judges; the majority opinion is thus a public good, a fact which presents problems, not fully dealt with in the paper, of free riding. On the other hand, to focus on the median of the majority outcome the model makes two less ambitious assumptions. First it restricts attention to situations in which each justice sufficiently values dispositions to insure that each judge votes for the disposition she most favors. Second, the model transplants essentially legislative institutions for voting to the judicial context; it is these assumptions that lead to the median of the majority outcomes that do not arise in our model.s

3 THE MODEL WITH A SINGLE OPINION WRITER

3.1 THE SEQUENCE OF PLAY

The sequence of play is as follows:

1. A case arrives.

2. A writer j is designated who then writes an opinion at location x_j.[10]

3. Justices simultaneously vote on the disposition of the case and decide whether to join the announced opinion or, if their dispositional vote agrees with the disposition dictated by the opinion, to concur, or, if their dispositional vote disagrees with the disposition dictated by the opinion, to dissent.

4. The players receive payoffs based on the case disposition and the effect of the opinion upon legal doctrine.

Play of the game determines an *adjudication equilibrium*, which in the monopoly case is characterized by 1) an opinion written by the opinion writer indicating a legal rule applicable to the case, 2) a join, concur or dissent decision relative to the opinion by each of the non-writing justices, and 3) a case disposition determined by the case, the opinion, and the decisions by the justices.

3.2 CASES, RULES, AND OPINIONS

The fact or case space is the unit interval $X = [0,1]$. A case $\hat{x}$ is a distinguished element of the case space *X*. A rule is a function that maps cases into dispositions – given the facts in the case, a rule produces a "correct" disposition. In our simplified model, we assume rules take the following form

$$r(x;\hat{x}) = \begin{cases} 0 \text{ if } \hat{x} < x \\ 1 \text{ if } \hat{x} \geq x \end{cases}$$

In words, a rule employs a cut-point *x* establishing two equivalence classes in the case space with respect to dispositions. For instance, a rule may establish a minimal standard of care, a maximum level of acceptable intrusiveness in a government search, a speed limit, a maximum level of entanglement of state operations with religion, and so on. Using the rule, all cases in which (for instance) the actual level of care $\hat{x}$ is less than the standard *x* are to receive one disposition, while all cases in which the actual level of care meets or exceeds the standard are to receive the other. Although we simplify considerably, legal rules often take this form (see, e.g., Twining and Miers 1999).

Given this simple structure for rules, each rule can be summarized by its cut-point; policy space is isomorphic to case space.[11] And, the content of each opinion can be summarized by the cut-point of

---

[10] The author is required to write an opinion that gains a majority with respect to the dispositional vote. This may be rationalized by assumed the writer receives a large utility loss if his opinion cannot garner a disposition majority.

[11] More generally, policy space is a set of allowable partitions of case space. Not all understandings of allowable partitions yields an isomorphism between case space and policy space. Consider a set of policies governing allowable speeds on limited access highways. Case space consists of the speed at which the

the rule it proposes. Hence, the content of an opinion can be treated as an element of the case space $x \in X$.

3.3 PLAYERS, ACTIONS, AND STRATEGIES

The set of potential writers is the same as the set of voters, a finite set $\{1,2,\ldots 9\}$. When referring to a justice as writer we employ subscript j; when referring to a justice as voter we employ subscript i. We assume an environment of complete and perfect information.

Opinion Writing Strategy. Each justice who writes an opinion has an opinion-writing strategy, which is a function from cases into a cut-point (a proposed rule). That is, $x_j : X \to X$. Thus, a justice's writing strategy specifies the spatial location of his candidate rule's cut-point. In this paper, we consider the monopoly case in which one justice is designated as the opinion writer; consequently only that justice has an opinion writing strategy. A companion paper will consider a second case which competition among opinions is possible as at least one additional justice is able to write an opinion that competes for joins.

Voting Strategy (disposition and join). Each non-writing justice must indicate a preferred disposition of the case and may join the opinion if it is compatible with this disposition. Or, she may indicate a disposition and abstain from all opinions (a concur or a dissent). A justice's voting strategy is thus defined by two components, a dispositional statement $d_i \in D = \{0,1\}$ and the join vector $\sigma_i = (\sigma_{i1}, \sigma_{i2}, \ldots \sigma_{i9})$ only one element of which may be 1. In the monopoly case, the join vector is, in effect, a singleton; the justice may join or not join the sole opinion available.

More correctly, a disposition strategy in a game in which many opinions may compete for joins is a function from case space and the opinion spaces into D: $d : X \times X^8 \to D$. In the monopoly case, this function is much simpler with $d : X \times X \to D$.

Similarly, join decisions are made in the light of the case and the content of the written opinions. The justice's vote on the disposition of the case must be consistent with her join decision. She cannot join an opinion that dictates a disposition different from the one for which she votes. Hence, each element of the join vector is a function such that $\sigma_{ij} : X \times X^8 \to \{0,1\}^9$. By convention $\sigma_{ij} = 0$ if $x_j \geq \hat{x}$ and $d_i = 0$ or if $x_j < \hat{x}$ and $d_i = 1$. In words, if a justice votes in favor of the "low" disposition she can join only a "low" opinion; and if she votes in favor of the "high" disposition she can join only a "high" opinion.

---

individual drives; we may normalize this to the interval [0,1]. We might consider policies characterized by two numbers: a minimum speed and a maximum speed. Policy space then consists of all partitions of [0,1] with this structure that identifies an interval within [0,1] of allowable speeds. Policy space is now two-dimensional though case space remains one-dimensional.

It is convenient to define the 9-tuple of join strategies as $\sigma = (\sigma_1, \sigma_2, \ldots \sigma_9)$ and the 9-tuple of disposition statements as $d = (d_1, d_2, \ldots d_9)$. We require the opinion writer to join her own opinion.[12]

3.4 CASE OUTCOMES

The strategy selections of the justices determine the outcome of the adjudication game.

With respect to the disposition, denote the number of "high" disposition votes as $\delta(d) = \sum_i d_i$ so that the majority case disposition $\tilde{d}$ = 1 iff $\delta(d) \geq 5$, and otherwise equals 0. We can thus speak of the minority and majority side opinions in the natural way, given a majority disposition. In other words, majority-side opinions are those with $x_i \geq \hat{x}$ if the majority disposition is 1, and those with $x_i < \hat{x}$ if the disposition is 0.

The number of joins received by the opinion is $n(\sigma(x_j; \boldsymbol{\theta})) = \sum_{i \neq j} \sigma_i(x_j) + 1$. This function plays a critical role in the analysis and discussed in detail in Section 4.

3.5 UTILITY

In furtherance of our goal of simplicity and of some continuity across models, we explore the possibility that judges are somewhat less than fully consequentialist and may be somewhat expressive in their actions. This approach has the advantage of simplifying the strategic environment considerably while still capturing important aspects of adjudication games. Our treatment of justices-as-voters resembles that of voters in some prominent models of electoral competition (e.g., Callender & Wilson 2007, Hinich, Ledyard & Ordeshook 1972, Osborne and Slivinski 1993, Palfrey 1984).[13] Our treatment of justices-as-writers is more distinctive: we view them as also primarily expressive yet somewhat more outcome-oriented. This simplified environment may approximate the correct one, to the extent justices wish to "do the right thing" when crafting law.

3.5.1 NON-WRITING JUSTICES

[12] In some, but not all instances, the opinion writer would rationally join her own opinion.

[13] A distinction between expressive ("sincere") voting and outcome-oriented ("strategic") voting does not arise in two-candidate elections with no abstentions (see the studies reviewed in Duggan 2007). But it does arise with more than two candidates (Myerson and Weber 1993), in two candidate elections with costly voting and abstention (Ledyard 1984), or even in one candidate elections with costly voting and abstention and vote thresholds (Palfrey and Rosenthal). We are not aware of any electoral model studying multiple policy-oriented candidates who can commit to platforms, a finite number of strategic voters, and costly voting and abstention; this setting would somewhat resemble opinion competition during adjudication by fully consequentialist justices.

We define the utility of a non-writing justice as a function over her actions, given the case and the opinion. That is, $u_i : X \times D \times X \rightarrow \Re$. More specifically, we assume

$$u_i(d_i, \sigma_i; x, \hat{x}) = \begin{cases} v(x_j; \bar{x}_i) \text{ if } \sigma_{ij} = 1 \text{ and } I(d_i, \hat{x}) = 1 \\ v(x_j; \bar{x}_i) - \gamma \text{ if } \sigma_{ij} = 1 \text{ and } I(d_i, \hat{x}) = 0 \\ -k \text{ if } \sigma_{ij} = 0 \text{ and } I(d_i, \hat{x}) = 1 \\ -k - \gamma \text{ if } \sigma_{ij} = 0 \text{ and } I(d_i, \hat{x}) = 0 \end{cases} \tag{1}$$

The function $v(x_j; \bar{x}_i)$ is a policy loss function to justice *i* with ideal point $\bar{x}_i$ from opinion x_j. We assume this function is symmetric and displays the single crossing property, as is standard in the spatial theory of voting. An example of such a loss function is a quadratic loss function. The function $I(d_i, \hat{x})$ is an indicator function that takes the value 1 if the justice makes a dispositional statement in favor of the case disposition she views as correct in the case and 0 if she does not. More specifically,

$$I(d_i, \hat{x}, \bar{x}_i) = \begin{cases} 1 \text{ if } d_i = 0 \,\&\, \hat{x} < \bar{x}_i \text{ or if } d_i = 1 \,\&\, \hat{x} > \bar{x}_i \\ 0 \text{ if } d_i = 0 \,\&\, \hat{x} > \bar{x}_i \text{ or if } d_i = 1 \,\&\, \hat{x} < \bar{x}_i \end{cases}$$

Thus, a non-writing justice's utility has three elements. First, she has spatial preferences over policies; she prefers policies that are closer to her ideal policy than ones further away. Second, she values the correct disposition of the case. The parameter γ reflects the value the justice attaches to the correct disposition. We require $\gamma \geq 0$; hence , when the inequality is strict, if the justice endorses an opinion that supports a disposition of the case that differs from the disposition under her ideal policy, deviations from her ideal policy are more costly to her. Finally, she incurs a cost *k* if she does not join the opinion. We interpret this cost as the cost of writing a concurrence or a dissent which, under the norm that requires a justice to state the reasons for her disposition of the case, she must do. If she writes a concurrence or dissent, she does not incur the loss of voting for a non-ideal rule or an incorrect case disposition.

The structure of the utility function insures the existence of an interval around the justice's ideal policy such that she joins the opinion of the opinion writer if and only if the opinion lies within this interval which we call the acceptance region.

It is worth noting that the utility of non-writing justices is defined over all possible combinations of joining actions and dispositional statements, but the restrictions on action sets imposed in Section 3.3 make some combinations of joins and disposition statements unreachable. In particular, a justice cannot make a dispositional statement that is incompatible with the rule she joins. This restriction can lead to a tension between dispensing justice in the instant case and endorsing a relatively attractive opinion among those available to the justice, a point discussed in more detail below.

3.5.2 OPINION AUTHORS

We assume that the opinion writer has preferences identical to the preferences of the non-writing justices in all respects save one. The opinion writer cares not only about the dispositional value (i.e. $\gamma \geq 0$) and policy but also about the "clarity of the law"; that is, we assume that the opinion writer prefers an opinion that attracts more joins to one that attracts fewer. We introduce this aspect of her preferences in the simplest possible way: her preference for joins is separable from the other aspects of her preferences. We thus have:

$$u_j(d_j,\sigma_j;x,\hat{x}) = \begin{cases} \beta n(x_j) + v(x_j;\bar{x}_j) \text{ if } I(dj,\hat{x}) = 1 \\ \beta n(x_j) + v(x_j;\bar{x}_j) - \gamma \text{ if } I(dj,\hat{x}) = 0 \end{cases} \tag{2}$$

Where $n(x_j)$ is the number of justices joining the opinion. We assume beta less than one. Note that we require a justice to join her own opinion. Second, we suppress the cost of writing for the opinion author as she is required to produce an opinion.

4 EQUILIBRIUM

We now indicate sub-game perfect equilibria to the adjudication game with a monopoly opinion writer. We proceed by backwards induction. Hence, we begin with the dispositional vote and join decision of the non-writing justices. We then turn to the opinion writer's location strategy. As the opinion writer's utility depends on the number of joins, we must first calculate the aggregate join function. To do this, we use the individual voting strategies to define $n(x_j)$, the aggregate join function for an arbitrary opinion content and case location. We then combine this with aggregate join function with the policy loss function and dispositional value to determine the location of the opinion.

The voting strategies of each non-writer and the writer's choice of the location of the opinion define an adjudication equilibrium.

4.1 JOINS, CONCURRENCES, AND DISSENTS BY NON-WRITING JUSTICES

Given (1), non-writing justices have a simple strategy in any equilibrium profile of the adjudication game: Join the opinion if it lies within a critical distance of the justice's ideal rule but concur or dissent if it lies outside this critical distance. In the latter case, the justice should indicate the disposition she believes correct in the case.

These points are stated formally in Proposition One but first we define the critical distance Δ_i. In the case of quadratic loss function this is:

$$\Delta_i = \begin{cases} \sqrt{k} \text{ if } \operatorname{sgn}(\bar{x}_i - \hat{x}) = \operatorname{sgn}(x_j - \hat{x}) \text{(same side opinion)} \\ \sqrt{k-\gamma} \text{ otherwise (opposite side opinion)} \end{cases}$$

As this example makes clear, a greater cost of writing separately – a higher value of *k* -- always expands a justice's critical distance. Note that the critical distance is smaller if joining the opinion commits the justice to a case disposition she opposes in the instant case. Joining such an opinion means joining an opposite side opinion (an opinion located on the opposite same side of the case as the justice's ideal rule). Consequently, we call these "cross-over joins."

Proposition 1. Part 1) If $\sigma_i = \mathbf{0}$ then $d_i = \begin{cases} 1 \text{ iff } (\bar{x}_i - \hat{x}) \leq 0 \\ 0 \text{ otherwise} \end{cases}$; Part 2) $\sigma_i = \mathbf{0}$ iff $\left|\bar{x}_i - x_j\right| > \Delta$; Part 3) $\sigma_{ij} = 1$ if $\left|\bar{x}_i - x_j\right| \leq \Delta$.

Proof. Part 1: When $\sigma_i = \mathbf{0}$, the justice prefers to vote for the disposition dictated by her own ideal cut-point. She votes 1 when the case is located to the right of her cut-point and 0 when it is located to the left, as indicated by the inequality in part 1.

Parts 2 and 3: Justice i joins no opinion if and only if the policy loss and any dispositional loss she suffers from joining exceeds the cost of writing k.

Figure 1 illustrates an individual join function.

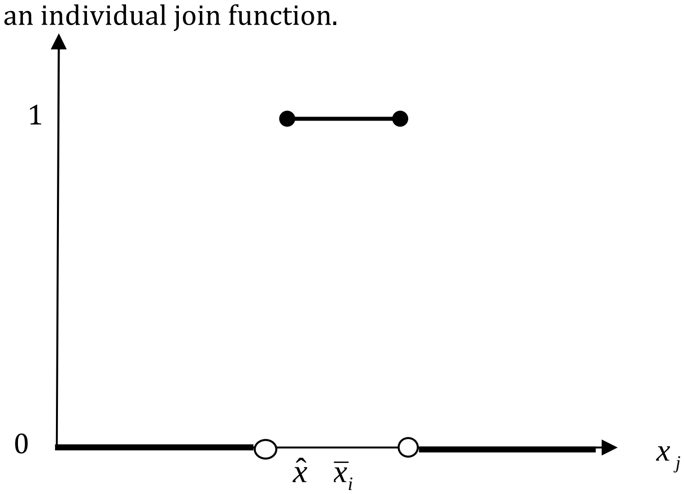

Figure 1. An individual join function. Shown is the probability of joining an opinion with content x_j. For opinions outside the join region $[\bar{x}_i - \Delta, \bar{x}_i + \Delta]$, the justice writes a concurrence or dissent expressing her preferred case disposition. Note the possibility of a strategic join: the justice will join some opinions to the left

of the case location $\hat{x}$ – implying an incorrect disposition from her perspective – because the content of the opinion is so attractive.

It is worth noting that even "expressive" justices display a degree of strategic calculation in their behavior, because they may engage in a strategic or cross-over join: *endorsing a rule whose disposition they do not favor in the instant case.* This is illustrated in Figure 1, when Justice *i* joins some opinions below $\hat{x}$ even though they yield the "incorrect" case disposition. If $\gamma = 0$ a justice views a cross-over join similarly to a same-side join, and consequently is more likely to engage in one. As γ become larger, a cross-over join becomes less attractive. In that case, a justice would strongly prefer to join a same-side opinion. When $\gamma \geq k$, a judge will never join an opinion that dictates a disposition different from her ideal disposition. Accordingly, she may be unwilling to join a highly proximate opinion if it yields the "incorrect" case disposition.

4.2 THE PLURALITY OPINION

Recall the opinion writer's objective function (2):

$$u_j(x_j, d_j, \sigma; \boldsymbol{\theta}) = \beta n(\sigma(x_j; \boldsymbol{\theta})) + v(x_j; \bar{x}_j) - \gamma(1 - I(d_j)) \quad (2)$$

Where $n(\sigma(x_j; \boldsymbol{\theta}))$ is the aggregate join function (the number of joins received by an opinion offering rule x_j), $v(x_j; \bar{x}_j)$ is the writer's policy loss from rule x_j, γ is the dispositional loss incurred from supporting an "incorrect" case disposition, and the indicator function $I(d_j)$ indicates whether the opinion writer supports an incorrect case disposition. We employ $\boldsymbol{\theta}$ to denote the vector of exogenous variables affecting the aggregate join function. These include the ideal rule for each justice other than the opinion writer, the cost of writing, and (if the justices are sensitive to case dispositions) the case location and the size of dispositional losses.

Equation (2) asserts that the author wishes to maximize the net gain from joins, that is, the utility of joins less the policy loss of departing from her most-preferred rule. In order to characterize the solution to this problem, we must consider in more detail the aggregate join function.

4.2.1 THE AGGREGATE JOIN FUNCTION

The aggregate join function consists of the join from the opinion author *j*, plus the sum of the join decisions of the non-writing justices:

$$n(x_j; \bar{x}_1, \ldots. x_{j-1}, x_{j+1}, \ldots. \bar{x}_9, \hat{x}, k, \gamma) = 1 + \sum_{i \neq j} \sigma_{ij}(x_j; \bar{x}_i, \hat{x}, k, \gamma)$$

Illustrative aggregate join functions are shown in Figures 2 and 3.

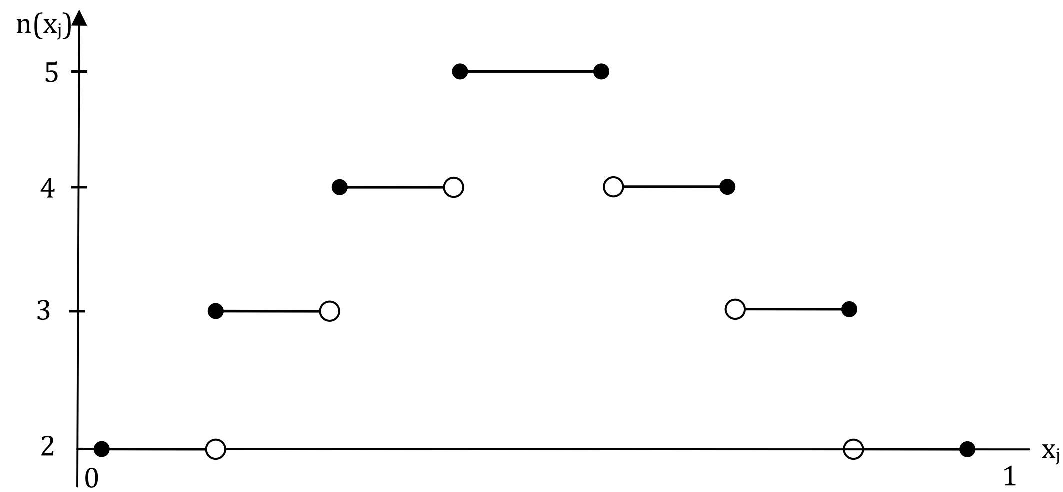

Figure 2. An illustrative aggregate join function: non-polarized Court. The aggregate join function consists of the sum of the individual join functions. In a non-polarized Court, a typical aggregate join function increases in "steps," from the edges of the policy space to the middle of the justices' ideal points.

The join decisions of the non-writers depend on their preferred rule, the case location, the size of the dispositional loss from joining an "incorrect" opinion, and the cost of writing their own opinion. Not surprisingly, then, the aggregate join function's exact shape is quite sensitive to the distribution of ideal points, the cost of writing concurrences and dissents and – when the justices are value correct case dispositions -- the case location. However, the aggregate join function takes the form of "steps" each indicating a specific number of joins in a segment of the case space. As shown in Figures 2 and 3, the aggregate join function is not continuous but (given the definition of the individual join functions) it is upper semi-continuous, a fact of some importance subsequently.

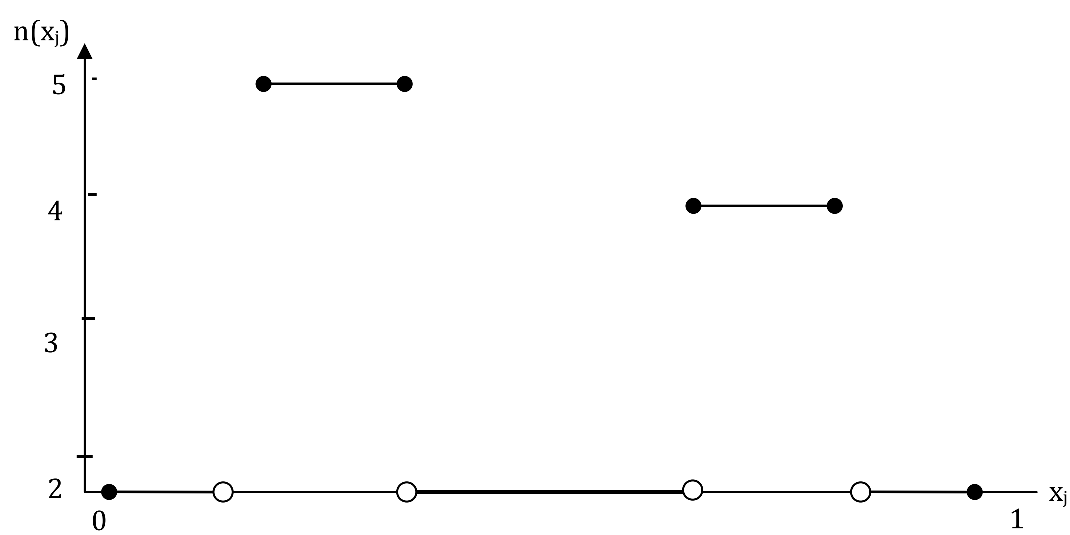

Figure 3. An illustrative aggregate join function: polarized Court. If the justices' join region is sufficiently broad, a polarized court results in a few distinct blocks of justices.

It can be more illuminating to express the aggregate join function in terms of the distribution of the non-writers' ideal points, especially in the absence of dispositional losses. Let f(x) be the probability density function of the non-writers' ideal points, with cumulative distribution function F(x). Recall that Δ indicates the critical distance for a justice to join an opinion. Then the aggregate join function may be written as:

$$n(x_j) = 1 + \begin{cases} 0 \text{ if } x_j < -\Delta \\ 8\big(F(x_j + \Delta)\big) \text{ if } -\Delta \leq x_j < \Delta \\ 8\big(F(x_j + \Delta) - F(x_j - \Delta)\big) \text{ if } \Delta \leq x_j < 1 - \Delta \\ 8\big(1 - F(x_j - \Delta)\big) \text{ if } 1 - \Delta \leq x_j < 1 \\ 0 \text{ if } x_j \geq 1 \end{cases} \tag{3}$$

//need to get the inequalities just right//

4.2.2 EQUILIBRIUM OPINION

Proposition Two (existence). There exists an opinion $x_j^* \in X$ that maximizes (2).

Proof. The aggregate join function is upper semi-continuous and the policy loss function is continuous, so their sum is upper semi-continuous. The case space X is a convex and compact set. Accordingly, from an extension to the extreme value theorem, (2) must achieve a maximum on X (see Theorem 2.43 in Alipranthis and Border 2005 (p. 44)). QED

In fact, it is easy to characterize x_j^*, at least in broad terms. Consider the step (or steps) of the aggregate join function whose range contains an argmax of (2). If the opinion writer's ideal rule is also an element of that step's domain, the writer offers her ideal policy as x_j^*. If her ideal rule is not in the domain of that step, she offers the element of the step's domain closest to her ideal rule, the element on the edge step's support in the direction of her ideal rule. Note that x_j^* is always well defined, as every point that is a member of an open set for one step is a member of a closed set for a higher step.

It is possible for more than one point to maximize (2), although this situation is clearly somewhat special. In such a case, a writer would be free to offer either the maximizing opinion that is closer to her ideal rule, or the maximizing opinion that attracts more joins.

The following section explores in more detail x_j^* and voting behavior in a variety of "extreme" cases.

5 EXPLORING THE MODEL

The model creates a framework for studying many aspects of adjudication. Important parameters include β, a measure of the opinion writer's commitment to clarity in the law, *k*, the cost of writing separately, γ, a measure of the importance of the case disposition to the justice, $\hat{x}$, the case location, and the distribution of judicial ideal points. In this section, we illustrate some of the model's implications through a close examination of an example, focusing on equilibrium opinions and the justices' voting behavior. We then explore key parameters by considering important limiting cases and, whenever possible, general results based on monotone comparative statics. The latter rest on a comparative static proposition detailed in the Appendix.

5.1 BASELINE EXAMPLE

We begin with an example that explores the model's implications. In the example, we assume policy losses are quadratic, the case does not present justices with a dispositional value ($\gamma = 0$), and the writing cost $k = .05$, so that a justice will join an opinion if and only if it lies within $\sqrt{k} = .22$ of her ideal policy.

<u>Aggregate Join Functions in a Non-polarized Court.</u> Suppose the nine justices are quite non-polarized, so that justice 1 has an ideal point at .1, justice 2 at .2, and so on. Figure 4 shows the aggregate join functions facing Justices 1-5 (the functions for Justices 9-6 are symmetric to those for Justices 1-4). The "baseline" aggregate join function does not assume an author who definitely joins his own opinion. To aid visualization, we draw the aggregate join functions as continuous; in fact, they are only upper semi-continuous.

The aggregate join function facing each justice is slightly different from those facing the other justices because the opinion author always joins her own opinion since she is obliged to pay *k* in any event, a sunk cost. Parts of the aggregate join function far from an opinion author shift upward by a single join (compare the aggregate join function facing Justice 1 with the baseline aggregate join function – the left-hand portions are the same but the right-hand portions differ). Thus, the preference for joins pulls the opinion writer away from her ideal point.

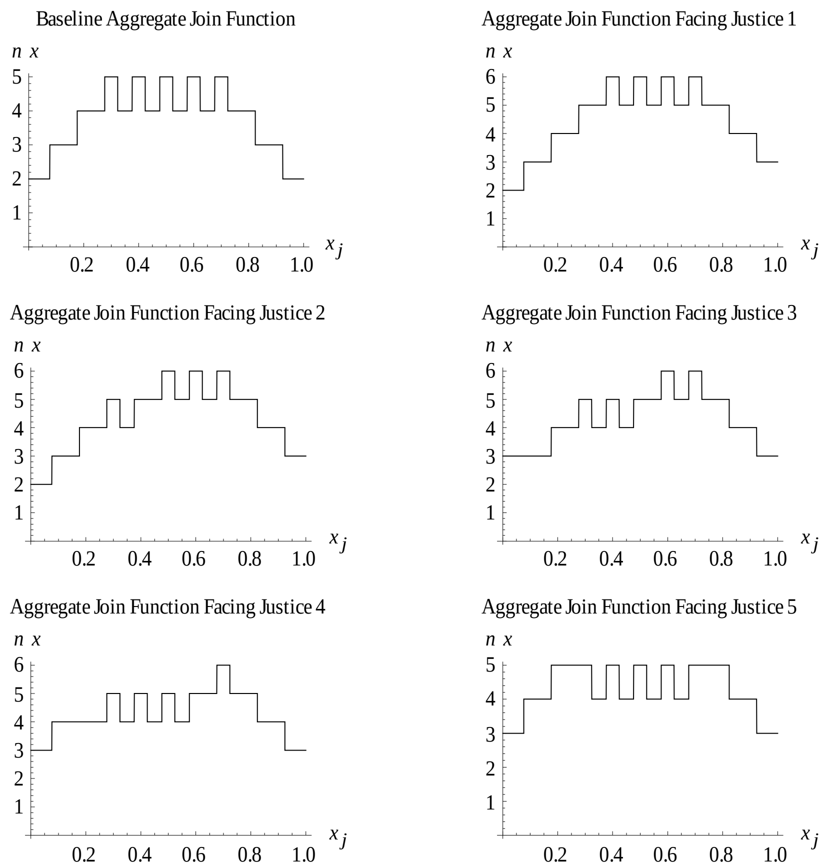

Figure 4. Aggregate Join Functions Facing Different Members of a Non-polarized Court. ($k = .05, \gamma = 0$)

Opinion Locations. The policy loss function and aggregate join function facing an opinion author are key components in her decision where to locate her opinion. But also important is the case location even when the dispositional value is negligible. This is because the opinion author is constrained to write an opinion for which the number of joins plus the number of concurrences in greater than five (or equivalently, the number of dissents is no greater than four): her opinion must generate a majority case disposition. For the moment, we assume an extreme case location (greater than .9 or less than .1) to avoid this complication. For such an extreme case, there are no dissents (all non-joins are concurrences) so the "majority disposition constraint" is immediately satisfied. We examine the implications of a non-extreme case shortly.

In the baseline example, assume Justice 2 is the opinion author. As shown in Figure 5.1.1, a policy at Justice 2's ideal policy would garner four joins (including her own). Policy at several more central locations would gain six joins; of these locations, the one closest to Justice 2 is the location that receives endorsements from Justices 3-7, plus Justice 2. This location occurs at $.7 - \sqrt{.05} = .48$.

Suppose Justice 2 values joins at $\beta = .06$. Justice 2's utility function is shown in Figure 5. The left-hand panel shows the actual utility function; to ease visualization, the right-hand panel shows the function drawn as a continuous function. Although the utility function is only upper semi-continuous, it attains a clear maximum, as indicated by Proposition 2.

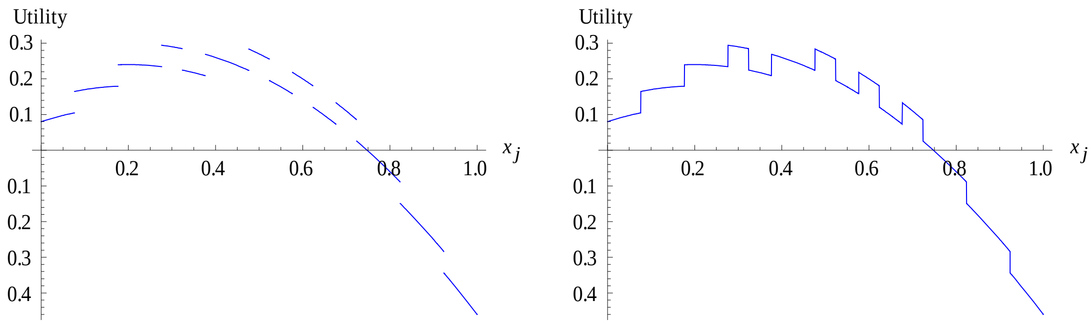

Figure 5. Justice 2's Utility Function ($k = .05, \gamma = 0, \beta = .06$). The left-hand panel presents the actual function, which is drawn as continuous in the right-hand panel to ease visualization.

In fact, it will be seen that the utility-maximizing opinion for Justice 2 is the closest opinion that gains five joins, that is, joins from a coalition of Justices 1-5. As Justice 5 is the most distant member of this coalition, the optimum opinion is located at the nearer edge of Justice 5's acceptance region: $.5 - \sqrt{.05} = .28$. If Justice 2 valued joins somewhat more highly, she would location her opinion at the nearest join maximizing location, .48, thereby receiving six joins. If she valued joins somewhat less, she would offer a policy at her ideal point, .2, gaining four joins (those from Justices 1-4). In the latter case, the case location must also be such that at least one additional justice concurs with the disposition implied by the opinion, if the case location lay at or above Justice 5's ideal policy.

<u>Effect of Opinion Assignment on Opinion Location</u>. As the previous example suggests, in the adjudication model opinion assignment can be extremely consequential. Figure 6 indicates the optimum opinion for each justice in the non-polarized Court with extreme case location.

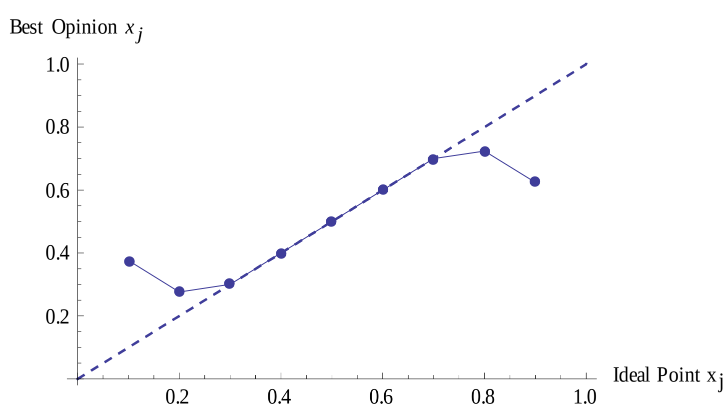

Figure 6. Different justices author quite different opinions. The dashed line is the 45-degree line. ($k = .05, \gamma = 0, \beta = .06$, extreme case location)

As shown, Justices 3-7 author at their ideal policy. Because they are centrally located in the non-polarized court, they need not deviate from their most preferred rule to garner joins. Justices 1,2, 8 and 9, however, locate opinions more centrally than their ideal policy, seeking joins. Notably, the most extreme justices, 1 and 9, locate their opinions more centrally than their slightly less extreme neighbors, Justices 2 and 8. This results from the "gravitational pull" of Justices 1 and 9 on Justices 2 and 8. Figure 6 underscores the irrelevance of the median voter theorem for opinion location in the model, though of course the preferences of the median voter are extremely consequential for case dispositions.

The Majority Disposition Constraint. Suppose the case location were not extreme but in fact rather central, say, $\hat{x} = .55$, so the ideal policies of justices 1-5 lie to the left of the case location and those of justices 6-9 lie to the right. Non-joins may be either concurrences or dissents, depending on whether the voting justice's ideal policy is on the same side or the opposite side of the case as the opinion. As a result, the opinion writer may be constrained in locating her opinion by the need to hold dissents below five.

Figure 7 shows the aggregate join functions and aggregate dissent functions facing Justices 7-9 as well as a "baseline" case that assumes no opinion author who necessarily joins her own opinion. The functions indicate the number of joins and the number of dissents at each case location for cases authored by those justices. As an example, suppose Justice 7 were a join-maximizer so that she writes at $x_7 = .42$. Justices 2-7 join this opinion so there are 6 joins; Justices 8 and 9 dissent; and Justice 1 concurs (the omitted category in the Figure).

As the panels in Figure 7 indicate, opinions located far to the right (above .72) would provoke 5 dissents. Hence, the majority opinion constraint precludes an author like Justice 8 or Justice 9 from locating opinions on the far right of the policy space, above .72.. In fact, though, under the assumed parameter values ($\beta = .06$) Justices 8 and 9 prefer to located somewhat more centrally in order to gain more joins, so that the majority disposition constraint does not bind.

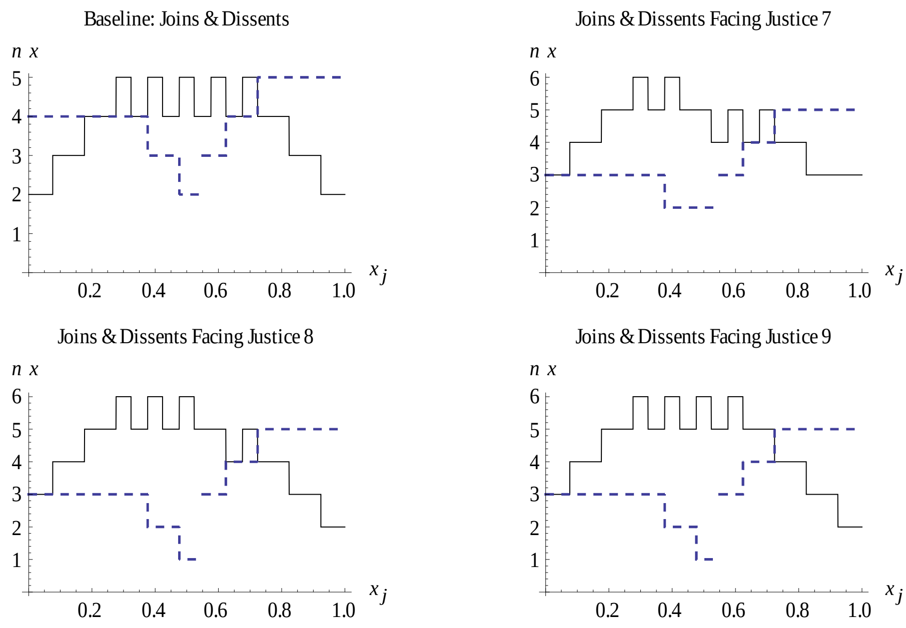

Figure 7. The Aggregate Join and Dissent Functions facing Justices 7-9. Joins are shown via the solid line, dissents by the dashed line. The omitted category is concurrences. The case is located at $\hat{x} = .55$, the cost of writing $k = .05$, and the dispositional value $\gamma = 0$. Justices 7, 8, and 9 cannot locate opinions to the right of .72 as doing so would fail to gain enough joins and concurrences to support the required case disposition.

Figure 8 shows the dispositional vote associated with each justice's optimal policy under the assumed parameters, that is, the dispositional votes generated by the opinions indicated in Figure 6. The dispositional votes range from 7-2 to 5-4.

A striking feature of the adjudication model is that not only do opinion locations vary with the opinion author; so can case dispositions. Given a central case location, opinion authors on the left side of the Court craft opinions that draw support from a center-left coalition in favor of one disposition; authors on the right side of the Court craft opinions that draw support from a center-right coalition in favor of the other disposition. This feature of the model underscores the importance of opinion assignment, and suggests the importance for case dispositions of the Chief Justice's assignments.

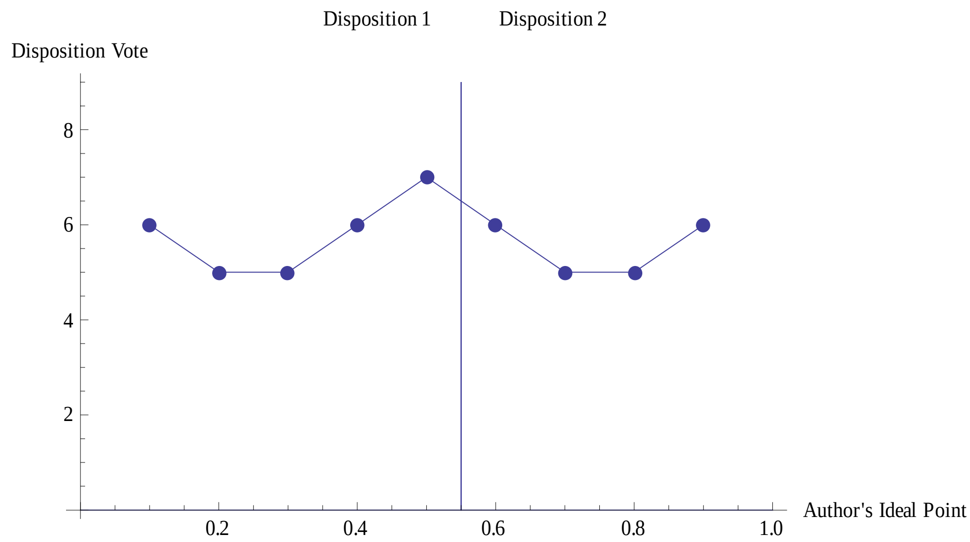

Figure 8. Disposition Votes for the Justices' Optimal Opinions. The case location is shown by the vertical line. Given the parameters, justices to the left of the case write opinions yielding one disposition, those to the right write opinions yielding the other disposition. For example, Justice 1's opinion generates a 6-3 vote for Disposition One; Justice 8's opinion generates a 5-4 vote for the other disposition. ($k = .05, \gamma = 0, \beta = .06, \hat{x} = .55$)

<u>Connected Join-Coalitions</u>. In the baseline example, the join-coalitions are "connected" but they need not be. More specifically, let x_L be the leftmost member of a join-coalition and x_R the right most member of a join-coalition. Call the coalition that joins an opinion *connected* if every justice with ideal point in the interval $[x_L, x_R]$ is also in the coalition. In the model, join-coalitions need not be connected because the opinion author may be somewhat separated from the other justices who join the author's opinion. Excluding the opinion author, however, join-coalitions should be connected. Of course, depending on the opinion location, the same number of joins may occur with quite different join-coalitions. And, the coalition concurring with the disposition supported by the opinion – the concurrence-coalition – need not be connected.

5.2 VALUE OF JOINS (LEGAL CLARITY) TO THE OPINION WRITER (β)

Because the ultimate impact of a legal rule depends on the actions of other players such as potential litigants and lower court judges, it can be important for the Court to speak with a unified, powerful voice. In such circumstances the opinion writer will particularly value joins and, conceivably, may alter the content of his opinion in order to gain them. In the model, increased value of legal clarity corresponds to a larger value of the parameter β. The following result addresses changes in the value of joins.

Proposition 3 (Value of Joins). When the opinion writer places a greater value on attracting joins, the opinion's content moves (weakly) in the direction of gaining additional joins.

Proof. In this case, the parameter of interest, β, affects only the aggregate join function. Consequently equation (A1) becomes

$$\beta^H n(x_j^H) - \beta^H n(x_j^L) > \beta^L n(x_j^H) - \beta^L n(x_j^L; y^L)$$

$$\Rightarrow \beta^H \left[n(x_j^H) - n(x_j^L)\right] > \beta^L \left[n(x_j^H) - n(x_j^L; y^L)\right]$$

Which is true provided $n(x_j^H) > n(x_j^L)$. In other words, x_j^* weakly increases if doing so brings additional joins. QED.

This result stands in stark contrast with median voter and majority median approaches, which predict that every case has the same content irrespective of the importance to the opinion writer of the Court speaking with a unified voice.

<u>Join Maximizing</u> β. For β sufficiently large, the importance of joins to the writer outweighs the loss from announcing a policy far from her ideal policy. Thus, for β sufficiently large, the opinion writer seeks to maximize the number of joins.

The join-maximizing condition for β is: $\beta n(\tilde{x}_j) - v(\tilde{x}_j) - \gamma I(\tilde{x}_j) \geq \beta n(x_j) - v(x_j) - \gamma I(x_j)$ $\forall \tilde{x}_j \neq x_j \in X$ which implies

$$\beta \geq \frac{v(\tilde{x}_j) - v(x_j) + \gamma\left(I(\tilde{x}_j) - I(x_j)\right)}{n(\tilde{x}_j) - n(x_j)} \quad \forall \tilde{x}_j \neq x_j \in X$$

Where $\tilde{x}_j$ denotes the join maximizing opinion closest to the writer's ideal rule. In words, β must equal or exceed the incremental policy and dispositional losses per incremental join, at the best join-maximizing location.

If this condition is met and the join maximizing location is unique, the opinion writer, regardless of her own ideal point, writes at this unique point of maximal joins. In most cases, however, the maximum number of joins occurs over some interval or intervals. If the opinion author's ideal point lies within this interval or intervals, she writes at her ideal point. If her ideal point lies outside the intervals, she writes at the edge of the maximizing interval closest to her ideal point.[14]

Example. Consider again the baseline case, when Justice 2 is the author. The nearest join maximizing location for Justice 2 is .476, which brings 6 joins. The utility maximizing location at $\beta = .06$ was .276, with 5 joins. The above condition for β is $\frac{(.2-.476)^2 - (.2-276)^2}{1} = .071$. Thus, for β of this magnitude or larger, Justice 2 writes at .476.

---

[14] Consequently, the opinion will lie at the ideal point of the median justice only if the median justice is the opinion writer and her ideal point lies in the range of maxima of the aggregate join function.

Small value of joins. Consider now the converse case when β is very small. Here clarity in the law has little value to the opinion writer. When β is sufficiently small, an author will write at her ideal point so that an "author monopoly" result occurs. Using the same logic as above, this condition is

$$\beta \leq \frac{v(\bar{x}_j) + \gamma\left(I(x_j) - I(\bar{x}_j)\right)}{n(x_j) - n(\bar{x}_j)} \quad \forall x_j \neq \bar{x}_j \in X$$

5.3 NOMINATIONS AND THE OPINION WRITER

Consider a Court in which Justice *i* is an opinion author. What happens when Justice *i* is replaced by a new Justice *j* with different preferences? Does the content of the opinions written by *j* differ from those written by *i*? The median voter framework predicts they do not, unless the change alters the location of the median. Similarly, the majority median framework predicts no change, conditional on the same disposition-majority median. The following result verifies that the adjudication game is an author-influence model when the writer's policy loss function displays increasing differences, as is commonly assumed in the spatial theory of voting.

Proposition 4 (Nominations). Fixing the remainder of the Court, as the ideal rule of the opinion writer becomes more conservative but the writer's preferences about the case disposition remain unchanged, the opinion's content moves (weakly) in a conservative fashion if and only if the policy loss function displays increasing differences in the writer's ideal rule.

Proof. The parameter of interest $\bar{x}_j$ enters the policy loss function and the "correct disposition" indicator function. But we stipulate that the I(d) function remains fixed. Using Proposition A1, in this case increasing differences for (2) requires $\frac{\partial^2}{\partial x_j \partial \bar{x}_j} v(x_j; \bar{x}_j) > 0$, that is, the policy loss function must display increasing differences. QED

Example. Suppose the policy loss function is the quadratic loss function $-\left(x_j - \bar{x}_j\right)^2$. Then $\frac{\partial^2}{\partial x_j \partial \bar{x}_j} v(x_j; \bar{x}_j) = 2$ and opinion content weakly increases when the writer becomes more conservative (but does not thereby alter his preference about the case disposition).

Proposition 4 indicates that, if the adjudication model is reasonable representation of the operation of the Supreme Court, nominations are not a "move-the-median" game as is often assumed in formal models of nomination politics (Krehbiel, Moraski and Shipan, Shepsle, Rohde). Rather, each nominee is potentially consequential for the Court's policy, which is often not true in move-the-median games.

5.4 COST OF WRITING *K* (WITH $\gamma = 0$)

We interpret *k* as the cost of writing separately. The cost of writing is likely to be high for cases in areas of the law that present extremely complex and arcane problems, e.g., tax law. Conversely, k is likely to be low for cases in areas that present few technical issues but are primarily ideological in nature e.g., freedom of expression such as flag-burning.

For the moment, assume that the justices do not separately value the disposition, so they care only about the location of the opinion.

"All join" value of *k*. As *k* increases, each non-writing justice is willing to suffer an increasingly large loss from endorsing an opinion far from her ideal point. For sufficiently large *k*, then, a justice would join *any* given opinion. More specifically, if all justices are to join a given opinion, the acceptance region for the most distant justice relative to the opinion must extend to the opinion. For example, when policy losses are quadratic the "all join" value of *k* for a given opinion x_j is $\max\{(x_j - \bar{x}_1)^2, (x_j - \bar{x}_9)^2\}$.

Note that the non-writing justices' voting strategy and the opinion writer's authoring strategy jointly imply that equilibrium opinions lie in the region $[\bar{x}_1, \bar{x}_9]$. Consequently, the "all join" value of *k* is bounded. For example, when policy losses are quadratic the bound on the "all join" value of *k* is $(\bar{x}_9 - \bar{x}_1)^2$ -- for *k* at or above this value, all non-writing justices will join *all* opinions in the interval $[\bar{x}_1, \bar{x}_9]$.

If *k* meets or exceeds the "all join" value for an opinion written at the author's ideal policy, the opinion writer will choose to write at her own ideal point. This situation corresponds to an "author monopoly" result. Somewhat remarkably, in this circumstance the case disposition depends on which justice is assigned the case, if the case location $\hat{x} \in (\bar{x}_1, \bar{x}_9)$. For example, suppose the case were located between $\bar{x}_3$ and $\bar{x}_4$. If the case is assigned to Justices 1-3, it will receive one disposition, but if it is assigned to justices 4-9, the other. Of course, if the case is quite extreme – at or below the ideal point of Justice 1 or at or above that of Justice 9 – the case disposition will be the same irrespective of the assignee.

Example of "all join." To illustrate these points, consider the baseline example of Section 5.1. In this case, from Justice 2's perspective the critical "all join" threshold for *k* is $(.9 - .2)^2 = .49$. If *k* equals or exceeds this value, all non-writers will join an opinion offering Justice 2's ideal policy. Therefore, Justice 2 will write an opinion at her ideal policy, force the case disposition to that she favors, and all justices will join the opinion. If the opinion were assigned to Justice 5, the critical "all join" value would be lower, $(.9 - .5)^2 = .16$. The bound on the "all join" threshold is $(.9 - .1)^2 = .64$, so that if *k* met or exceeded this value, even the most extreme justices could write opinions at their ideal point and receive unanimous joins.

"At most one non-writer joins" value of *k*. When *k* is very small, a non-writing justice will join only an opinion that is close to her own ideal point. Joins will thus be rare and, if *k* is sufficiently small, the aggregate number will be either one (solely the writer) or two (the writer plus at most one non-writer). More specifically, let Justices A and B (A < B) be the justices whose ideal points are closer than those of any other pair of justices. The "at most one non-writer joins" condition requires the upper edge of the acceptance region of Justice A to lie below the lower edge of Justice B's

acceptance region. For example, if policy losses are quadratic, this condition is:
$\bar{x}_A + \sqrt{k} < \bar{x}_B - \sqrt{k} \Rightarrow k < \frac{1}{4}(\bar{x}_B - \bar{x}_A)^2$.

When k is less than the "at most one non-writer joins" threshold, the writer's behavior depends crucially on the case location, as non-writers will wish to craft opinions supporting their favored case disposition. Given this, an opinion writer whose ideal policy endorses the majority disposition will write either at her own ideal point or, if she sufficiently values joins, as the edge of the acceptance region of the nearest justice. This is a "near-author monopoly" result. However, an opinion author who favors the minority disposition cannot behave in this fashion. This author must write at the nearest location compatible with the majority-favored disposition, in order to offer an opinion that will support the majority disposition. The nearest location compatible with the majority-favored case disposition will be either the case location itself, or a point near the case location that can attract a single cross-over joins which also secures a majority. Obviously, the latter is an extremely special case.

Example of "at most one join" condition. As an example, consider again the baseline case of Section 5.1. Let the "at most one non-writer joins" condition hold i.e.,
$k < \frac{1}{4}(\bar{x}_B - \bar{x}_A)^2 = \frac{1}{4}(.1)^2 = .0025$, and let the case location lie slightly below Justice 4 (e.g., $\hat{x} = .38$). Figure 9 shows the utility of Justices 7 and 3 as opinion authors.

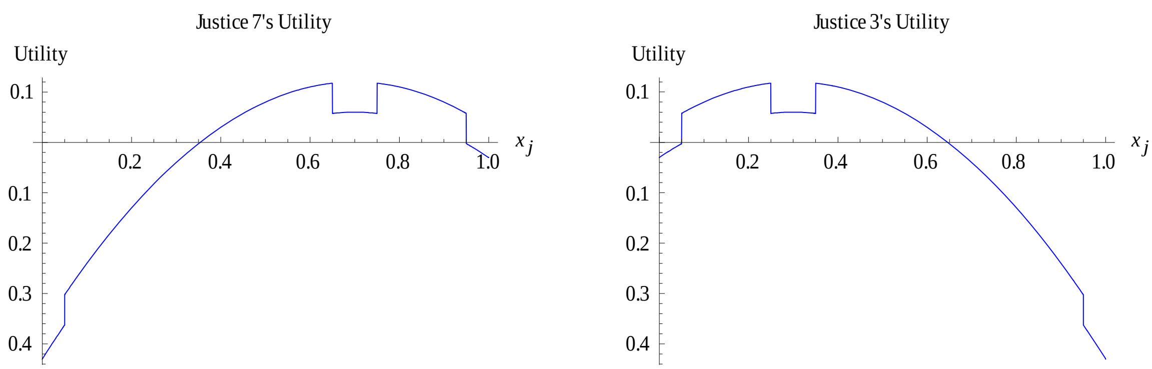

Figure 9. Example of Writer's Utility When k is Very Low.

As shown in the Figure, Justice 7 is indifferent between writing an opinion slightly to the left and slightly to the right of her ideal policy;with opinion gains one join. Suppose she opts for the opinion slightly to her left (that is, at $.6 + \sqrt{.0025} = .65$). In that case, Justices 1-3 dissent; Justice 6 joins Justice 7's opinion (a connected join coalition), and Justices 4, 5, 8, and 9 concur. Suppose, however, the opinion author is Justice 3. Justice 3 would prefer, like Justice 7, to write an opinion slightly away from her ideal point and gain one join. But such an opinion would not support majority on the dispositional vote. The nearest location that would do so is the case location itself, and it is there at $\hat{x} = .38$ that Justice 3 will locate her opinion.

The "all join" and "at most one join" results generally do not hold for moderate values of *k*. Our subsequent discussion in this section assumes these moderate values of *k*.

5.5 DISPOSITIONAL VALUE γ

Suppose a case presents the justices with dispositional value so that voting for an "incorrect" disposition is somewhat, or even very, unpleasant. In the model, this situation corresponds to $\gamma > 0$.

First, consider behavior when $\gamma > k$. In this case, for a non-writing justice, the critical acceptance distance Δ_i is zero for a cross-join (one necessitating a vote on the case disposition different from that dictated by her ideal opinion). Therefore, a non-writer prefers to dissent rather than cross-join or concur. This parameter value thus yields a situation similar to that in Carruba et al 2008, in which no judge votes strategically on the disposition. This situation emerges as a limit case in the model considered here.

What happens to opinion locations as dispositional values change? To answer this question, we must first consider how aggregate join functions change as dispositional values change.

As γ decreases ($0 \le \gamma < k$), justices on the "far" side of the case are increasingly willing to join a "near" side opinion if its location is proximate, even though it yields the incorrect disposition from their perspective. Consequently, for a justice on the "near" side of the case a portion of the aggregate join function shifts upward near the case location. More specifically, let the near side lie to the left of the case, and let $\bar{x}_l$ be the ideal point of the left-most justice on the far (right-hand) side of the case. The left side of Justice *l*'s acceptance region is $\bar{x}_l - \Delta_l(\gamma)$. If $\gamma < k$, this point may extend below the case location. However, the farthest to the left it can extend is $\bar{x}_l - \Delta_l(0)$, and the left-hand side of the acceptance region of each justice *i* > *l* must lie to the right of this point (weakly, if several justices share the same ideal point).

Example. Consider the non-polarized court with case location $\hat{x} = .55$ and cost of writing $k = .05$. In this case, the left-most justice above the case is Justice 6 with $\bar{x}_6 = .6$. Given quadratic policy loss, the left-most edge of Justice 6's acceptance region extends below the case as far as $.6 - \sqrt{k - \gamma} = .376$ when $\gamma = 0$ but only to the case itself when $\gamma \ge .0475$. Figure 10 shows the baseline aggregate join function at $\gamma = 0$ (solid line), $\gamma = .03$ (small dashing), and $\gamma = .05$. This join function is the same below .376 for all three dispositional value; this part of the join function is shown as a heavy solid line. Above .376 the join function for $\gamma = .05$ is show with a thin solid line. When $\gamma = .03$ the join function shifts up by one above $.6 - \sqrt{.k - \gamma} = .46$ as Justice 6 will cross-join such opinions (shown with small dashing). But the function shifts up by no more than one join since

$.7-\sqrt{.k-\gamma}=.56$, that is, Justice 7 does not cross-join opinions below the case location. When $\gamma=0$ the function shifts up by one (relative to $\gamma=.05$)in the region .376 - .476 as Justice 6 cross-joins such opinions, but by two joins in the region .476 - .55 as both Justice 6 and Justice 7 cross-join such opinions.

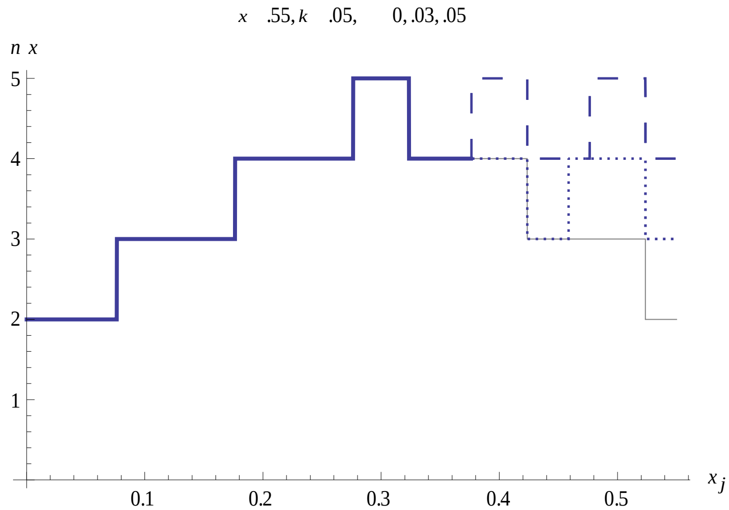

Figure 10. Changing Join Function as Dispositional Value Changes.

The monotonicity of additional joins in the example is not an accident; it is necessarily implied by the geometry of the acceptance regions. That is, not only is no mass added to the join function farther than the edge of the acceptance region of the most proximate justice on the opposite side of the case; the number of new joins added to the join function on the "near" side must weakly increase with proximity to the case location. This monotonicity allows the derivation of a comparative static result.

Let $k\geq\gamma_H>\gamma_L\geq 0$ and denote the equilibrium opinion location associated with γ_H as $x_j(\gamma_H)$ and that associated with γ_L as $x_j(\gamma_L)$.

Proposition 5 (Change in Dispositional Value). A) If the opinion writer is a join maximizer and the maximum lies on the same side of the case as his ideal point, then if γ_H decreases to γ_L, $x_j(\gamma_L)$ moves weakly in the direction of the case location (relative to $x_j(\gamma_H)$). B) If $x_j(\gamma_H)$ lies farther from the case than the region in which the join function increases when γ_H decreases to γ_L, then $x_j(\gamma_L)$ moves weakly in the direction of the case (relative to $x_j(\gamma_H)$).

Proof. Part A is a consequence of the monotonicity of change in the join function discussed above. By assumption, $x_j(\gamma_H)$ is associated with a maximum in the join function. As dispositional value decreases, more mass cannot be added to the join function at any location farther from the case location than $x_j(\gamma_H)$ than is added to all locations closer to the case than $x_j(\gamma_H)$. Consequently, a new join maximum cannot be created farther away from the case than $x_j(\gamma_H)$ (although a new maximum can be created closer to the case location). Hence, the new equilibrium opinion location must remain in the same location or shift in the direction of the case location; it cannot shift farther away from the case location. B) By assumption $x_j(\gamma_H)$ lies in a region such than no new mass is added to the join function farther from the case location than $x_j(\gamma_H)$; consequently, $x_j(\gamma_L)$ cannot move farther from the case location than $x_j(\gamma_H)$. Q.E.D.

Proposition 5 is silent about the situation when a non-join maximizer writes an opinion $x_j(\gamma_H)$ that lies in the region in which the join function increases when γ_H decreases to γ_L. In this situation, additional mass is added to the join function on both sides of the original opinion location and the writer may, under different circumstances, move the opinion in either direction.

5.6 CASE LOCATION $\hat{x}$

If the case location $\hat{x}$ lies either to the right of the ideal point of the most conservative justice or to the left of the ideal point of the most liberal justice, it induces unanimity with respect to the disposition of the case. Of course, the court, though unanimous about the case disposition, may display extreme disagreement about the best location of the opinion. Cases more interior may induce disagreement about the case disposition as well.

Example. Consider again the baseline example, with $k = .05$ and $\gamma > k$. In this situation there are no cross-over joins. What happens to the aggregate join function as the case location shifts? This is shown in Figure 11, in which the case location increases gradually from $\hat{x} = .55$ to $\hat{x} = .95$.

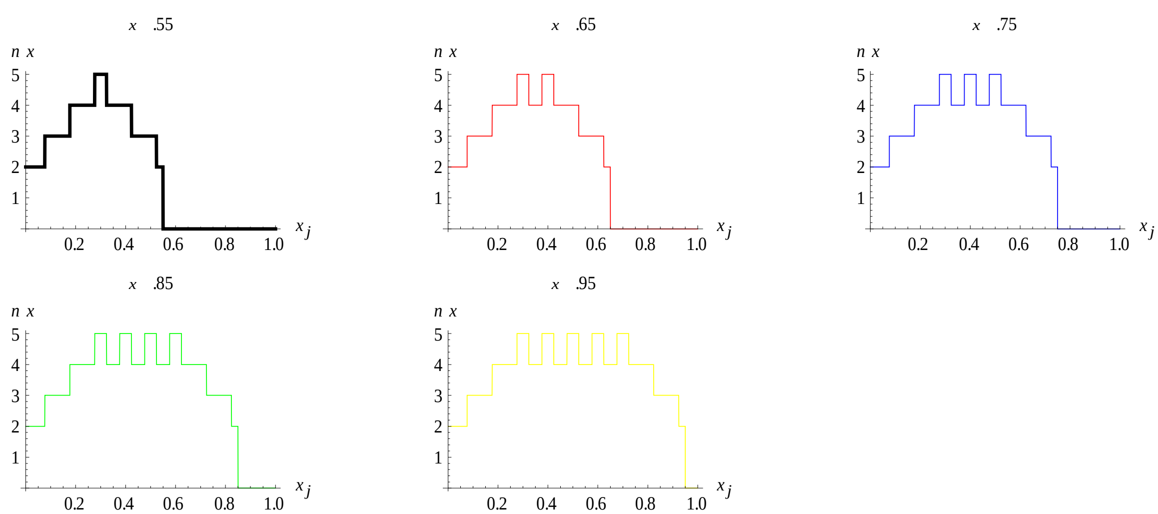

Figure 11. Shifts in the aggregate join function as the case location shifts.

As the case moves from left to right, some justices may continue to join the higher case. In addition, some justices formerly to the right of the case may join those already on the left of the case. These "uncovered" justices will join an opinion to the left of the case location, if the opinion is sufficiently proximate. As a consequence, the effect of the shift is to 1) extend the upper edge of the aggregate join functions for justices to the left of the case and 2) add mass to the aggregate join functions for justices to the left of the case. This mass must lie above the lower edge of the acceptance region of the most leftward of the newly "uncovered" justices. For instance, in the example suppose the case moves from .55 to .75. The upper edge of the acceptance region of Justice 4 now extends not to .55 (the old case location) but to .624 and that of Justice 5 extends not to .55 but to .724. So the base of joins from the old justices to the left of the case shifts upward from zero to two in the region [.55, .624] and one in the region [.624, .724]. In addition, Justices 6 and 7 are "uncovered." The acceptance region of Justice 6 for opinions to the left of the case location is $.6-\sqrt{.05}=.376$ while that of Justice 7 is $.7-\sqrt{.05}=.476$. Hence, the indicated aggregate join function further shifts upward by one cross-join in the region [.376, .476] and by two cross-joins in the region [.476, .75].

Consider $\hat{x}_1 < \hat{x}_2$. A critical feature of a change in case location from $\hat{x}_1$ to $\hat{x}_2$ is that aggregate join functions for justices below $\hat{x}_1$ take on additional mass only above $\hat{x}_1 - \Delta(\gamma)$, for example, above $\hat{x}_1 - \sqrt{k-\gamma}$ in the baseline example.

Proposition 6 (Change in Case Location). If $x_j(\hat{x}_1)$ lies below $\hat{x}_1 - \Delta(\gamma)$, then as $\hat{x}_1$ increases to $\hat{x}_2$, $x_j(\hat{x}_2)$ moves weakly upward. Conversely, if $x_j(\hat{x}_1)$ lies above $\hat{x}_1 + \Delta(\gamma)$, then as $\hat{x}_1$ decreases to $\hat{x}_2$, $x_j(\hat{x}_2)$ moves weakly downward.

Proof. The condition assures that, relative to the original opinion location, mass of the justice's aggregate join function increases in one direction while remaining unchanged in the other. The policy loss function and dispositional value remain unchanged. Accordingly, the new opinion location cannot shift in the direction away from the mass gain. QED.

The proposition indicates that an opinion written by a relatively extreme justice (relative to the case location) moves weakly in the direction of the case location. The proposition is silent about what happens when a moderate justice is the author.

6 CONCLUSION

Models of collegial courts should take adjudication seriously. By this we mean, models of collegial courts should reflect the institutional features that distinguish adjudication from legislative and electoral contests, especially if those features seem likely to shape adjudicatory outcomes in a profound way. We have highlighted three features of adjudication in particular:

- First, *adjudication jointly determines a case disposition and "policy" or opinion content.* Although case dispositions must be compatible with opinion content, the linkage between the two is complex. For example, a majority, indeed a unanimous, view on case disposition does not imply majority (or unanimous) agreement on policy. In fact, in the United States, adjudicatory institutions do not require that any opinion receive majority support. Moreover, the joint production of case dispositions and policy outcomes may present a judge with difficult tradeoffs between the better case disposition and the best rule on offer.

- Second, *the rules used to choose policies are radically different from those used in legislatures or elections.* There is no amendment agenda. There is no paired comparison of alternatives. There is no vote pitting alternatives against the status quo. There is no run-off between tied alternatives. There is free entry of opinions. Voters may abstain from endorsing any opinion, and doing so is consequential for the clarity of the Court's voice.

- Third, in light of the procedures employed to determine outcomes, *judicial motivations are apt to be critical in determining case dispositions and policy.* Doing the right thing, announcing the best rule, and achieving clarity in the law may be as or more important than triumphing over competitors.

We have taken some tentative steps towards incorporating these features in a formal, game theoretic model of adjudication. First, the model incorporates joint production of case dispositions and policy outcomes and links the two. Second, the model incorporates some of the distinctive procedures used to choose policy. For example, we model joins, dissents, and concurrences. Third, we posit distinctively judicial preferences, including preferences for case dispositions and preferences for policy, and desires by opinion writers to achieve clarity in the law. We have not considered free entry of opinions nor competition between potential majority opinions, though we believe the model can be extended to address them. We believe most of the reported results will remain.

The model predicts behavior that is clearly at odds with the median justice model and the "median of the majority" model. For many parameter values, the location of an opinion depends critically on the *entire* distribution of ideal points, not simply on the location of the median justice. Dense clusters of ideal points tend to exert a "gravitational pull" on opinions. In courts with a strong center, outcomes may resemble median outcomes. In general, though, the model is an "author influence" model and for some parameter values is a "monopoly author" model. As such, the model suggests the importance of opinion assignment and strategic calculations by the Chief Justice. Other critical parameters affecting opinion locations and join decisions include the costs of writing separately and judicial valuations of a correct disposition and legal "clarity."

Theory that takes adjudication seriously has significant implications for empirical work. One obvious example is the central role of the aggregate join function. We are aware of no empirical work that attempts to estimate such functions. More generally, insufficient attention has been paid to decisions to join opinions rather than concur. Yet these decisions seem likely to be more revealing of opinion content, and consequential for opinion author's calculations, than dispositional votes. A second implication is the need to consider policy or case spaces that actually reflect the policy alternatives facing justices. Although the literature on fact-patterns takes a step toward actual policy spaces, much more can be done in this area. Finally, the introduction of dispositional value implies the possibility of strategic voting on case dispositions. Conditions for strategic voting probably arise infrequently but their existence undercuts the "sincere voting" tenet underlying current methods of ideal point estimation. The problem will be most grave in estimating the ideal point of the Chief Justice who has the greatest incentive to vote strategically on case dispositions.

APPENDIX:

MONOTONE COMPARATIVE STATICS IN THE ADJUDICATION MODEL

The following proposition provides the basic result governing comparative statics in the adjudication game.

Proposition A-1. (monotone comparative statics). x_j^* is non-decreasing in a parameter if and only if (2) has increasing differences in the parameter. If the parameter enters only one of the components of (2) (e.g., the weighted aggregate join function or the policy loss function), x_j^* is non-decreasing in the parameter if and only if that component of (2) has increasing differences in the parameter.

Proof. Follows from Theorem 2.3 in Vives (2000); see also Athey et al Theorem 2.3. QED

The comparative statics of the model thus turn on demonstrating increasing differences in the parameter of interest. More precisely, where $x_j^H > x_j^L$ and parameter $y^H > y^L$, we require

$$u(x_j^H; y^H) - u(x_j^L; y^H) > u(x_j^H; y^L) - u(x_j^L; y^L) \tag{A1}$$

This condition must often be checked directly rather than through the relevant cross-partial derivative $\partial^2 u(x_j; y) / \partial x_j \partial y$, which may not exist since the aggregate join function is not differentiable.

REFERENCES

Aliprantis, Charalamos and Kim Border. 2005. *Infinite Dimensional Analysis: A Hitchhiker's Guide*. Springer, 3rd edition.

Athey, Susan, Paul Milgrom and John Roberts. 1998. *Robust Comparative Statics*. Unpublished manuscript. http://kuznets.harvard.edu/~athey/draftmonograph98.pdf

Baum, Lawrence. 1998. *The Puzzle of Judicial Behavior*. Ann Arbor: The University of Michigan Press.

Callander, Steven and Cathine H. Wilson. 2007. "Turnout, Polarization, and Duverger's Law," *Journal of Politics* 69(4): 1047-1056.

Cameron and Kornhauser. 2006. “Appeals Mechanisms, Litigant Selection, and the Structure of Judicial Hierarchies,” in Bond, Flemming and Rogers (eds) *Institutional Games and the U.S. Supreme Court*, University of Virginia Press.

Cameron and Kornhauser 2005. “Decision Rules in a Judicial Hierarchy,” *Journal of Institutional and Theoretical Economics* 161(2):264-292.

Carrubba, Clifford, Barry Friedman, Geog VanBerg, and Andrew Martin. 2008. “Does the Median Justice Control the Content of Supreme Court Opinions?” Working paper, Washington University. http://adm.wustl.edu/media/working/mjt1-5.pdf

Duggan, John. 2005. “A Survey of Equilibrium Analysis in Spatial Models of Elections,” typescript, Departments of Political Science and Economics, University of Rochester.

Feddersen, Itai Sened, and Stephen G. Wright. 1990. “Rational Voting and Candidate Entry Under Plurality Rule,” *American Journal of Political Science* 34(4): 1005-1016.

Fischman, Joshua B. 2008.   “Decision Making Under a Norm of Consensus: A Structural Analysis of Three-Judge Panels,” Paper Presented at the First Annual Conference on Empirical Legal Studies, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=912299

Hammond, Thomas, Chris Bonneau and Reginald Sheehan. 2005. *Strategic Behavior and Policy Choice on the U.S. Supreme Court.* Palo Alto: Stanford University Press.

Kornhauser, Lewis. 1992. “Modeling Collegial Courts II. Legal Doctrine,” *Journal of Law, Economics, and Organization* 8(3): 441-470.

Kornhauser, Lewis A. and Lawrence G. Sager. 1986. “Unpacking the Court,” *Yale Law Journal* 96:82-117.

Kornhauser, Lewis A. and Lawrence G. Sager. 1993. “The One and the Many: Adjudication in Collegial Courts,” *California Law Review* 81:1-59.

Ledyard , John. 1984. “The Pure Theory of Large Two Candidate Elections,” *Public Choice* 44:7-41.

Myerson, Roger. 1999. “Theoretical Comparisons of Electoral Systems,” *European Economic Review* 43: 671-697.

Myerson, Roger and Robert J. Weber. 1993. “A Theory of Voting Equilibria,” *American Political Science Review* 87: 102-114.

Palfrey, Thomas and Howard Rosenthal. 1984. “Participation and the Provision of Discrete Public Goods: A Strategic Analysis,” *Journal of Public Economics* 24(2):171-193.

Posner, Richard A. 1993. “What Do Judges Maximize? (The Same Thing Everyone Else Does),” *Supreme Court Economic Review*, Volume 3: 1-41.

Twining, William and David Miers. 1999. *How to Do Things with Rules: A Primer of Interpretation*. Butterworths (4th edition).

Vives, Xavier. 2001. *Oligopoly Pricing: Old Ideas and New Tools*. Cambridge: MIT Press.