Precedent, Policy, Indeterminacy
Using Doctrine Space to Bridge Across Circuits

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Abstract

Empirically oriented legal scholars often struggle with measuring ideology and policy throughout the judiciary. While theories of judicial decisionmaking make predictions about whether the horizontal application of precedent influences the expression of attitudes and preferences, empirical tests of these theories have been limited by a lack of direct measures of appellate judge ideology and opinion location. This paper extends a citation-scaled item response model to an original dataset of all published circuit and Supreme Court opinions from 1953-2003. By using citations between cases as a theoretical bridge between legal doctrine and judicial policy, this method enables comparable preference and policy estimates across time and institutions. The estimates of judge ideology and opinion content are used to evaluate whether the expression of an appellate judge's policy preference is contextualized by existing case law.

1 Introduction

One of the founding debates in the social scientific study of judicial politics has been whether judicial behavior can be explained by policy preferences or law. While most scholars recognize that that judges are motivated by both of these considerations (Baum, 1997; Spriggs and Hansford, 2002; Clark and Lauderdale, 2010), the literature nevertheless presents these motivations as competing. Studies from Prichett (1948) to Segal and Spaeth (2002) consistently find that justices' policy preferences determine their votes on the merits. In contrast, studies from Levi (1949) to Richards and Kritzer (2002) emphasize the role of case factors in structuring judicial decision making.

The attitudinal and doctrinal explanations of judicial behavior, instead of being incompatible, are complimentary. Attitudinal explanations do best in explaining the creation of judicial policy. Common law is the iterative resolution of legal uncertainty generated by the limited scope of prior opinions inherent in the nature of case law rulemaking as an incomplete contract. Policy-minded judges are unable to clearly articulate the desired disposition of all possible future applications of their announced rule. This leaves discretion for judges to use their judgement and refine judicial policy in accord with their policy preferences on future rulings where there are conflicting applications of existing precedent. Similarly, legal explanations do best on the application of judicial policy. Absent doctrinal conflict, attitudes do little to explain the behavior of judges.

This paper generates an original dataset of all published Circuit and Supreme Court cases from 1953-2003, collecting data on votes, citations, and treatments between opinions. These data are used to locate both judges and their opinions on a common scale. The resulting estimates are used to test whether attitudinal behavior is contingent upon the presence of a particular form of legal indeterminacy, doctrinal conflict. I find that a judge voting ideologically is contingent upon the presence of doctrinal conflict. Absent such conflict, ideology is a poor predictor of a judge's vote on the merits.

Section 3 presents a conceptual model for the common-law as an iteratively refined incomplete contract mapping factual states of the world to judicial policies. Section 4 presents an empirical model derived from this conceptual sketch. Section 5 describes the data on voting, citations between opinions, and their treatments. Section 6 validates the estimates derived from this model against existing measures and intuitions. Section 6 uses these estimates to evaluate whether judges constrain the application of ideology to cases whose outcome is not predetermined by existing case law. Section 8 concludes the paper.

1.1 Law's Incomplete Contract

Incompleteness and legal uncertainty have long been recognized as pervasive features of common law legal systems. Blackstone argued that uncertainty is inherent to the process of common law decision making since no court could anticipate all possible future applications of its decisions (Blackstone, 1769). Limits of human foresight (Landes and Posner, 1975), the ambiguities inherent in language (Hart, 1995), and the high cost of judicial deliberation (Cameron and Kornhauser, 2010) all combine to ensure that most judicial decisions will be enacted in an incomplete form, which uncertainty left to be resolved by future courts.

Yet in the empirical study of the process that generates legal rulings, judicial politics scholars typically overlook the implications of incompleteness. Segal and Spaeth (2002) argue that *stare decisis* is an inexorable command, binding on all future progeny cases. Other models

Accounting for the incompleteness of law enables the integration of altitudinal and strategic models of judicial decision making into a legal framework. When law is incomplete it cannot be applied to cases unambiguously. Posner (2003) observes that the application of judge-made law developed in relation to accidents with carriages and horse-drawn wagons was ill-suited to handle the industrialized production of automobiles leaving judges to adapt contract law in accord with their own preferences. Thus incompleteness of law leaves residual

lawmaking rights to future courts as they fill in the 'gaps' left by prior decisions (Pistor and Xu, 2002).

Incompleteness has profound consequences for the study of judicial decision making in a legal hierarchy. Where the application of law is uncertain, both parties have grounds to prevail, and incentives to appeal the case (Xu and Pistor, 2003). Strategic appeals in a judicial hierarchy thus generate a selection bias toward resolving gaps in the law on the docket composition of superior courts. As a result, the docket of the Supreme Court and the published opinions of the US Appellate Courts, are biased toward cases where ideology has a legally-grounded application.

2 Legal Reasoning in Fact and Doctrine Space

I make use of a 'case-space' model to provide structure when thinking about cases, opinions, citations and treatments between cases in the formation of legal rules and articulation of judicial preferences.[1]

2.1 Fact Space

Suppose that each case is reducible to a set of facts. A case can therefore be described as a point in some high-dimensional space, capturing the case's position on each factual dimension. Formally, a **case** is a point c in a D-dimensional fact space, $\boldsymbol{C^D}$, where $c = (c^1, ..., c^D)$, and c_i^s is the location of case c_i on dimension s.

Figure 1 shows two two-dimensional slices of this higher-dimensional fact space, and the

[1] The model presented here is best considered as an amalgamation of existing theoretical approaches to the study of courts in order to generate a coherent framework for the estimates of judicial policy presented in Section 5. The case / fact space model draws heavily from Kornhauser (1992) (an initial foundation of legal rules via equivalence categories of dispositions) and Lax (2007) (formalizes the construction of legal rules in fact space on appellate courts, and elsewhere). The policy space approach generalizes Cameron et al. (2000) (one formulation of legal rules as cut points in the intrusiveness of searches). The spatial modeling of citations and treatments is theoretically grounded in Spriggs and Hansford (2002) and empirically inspired by Clark and Lauderdale (2010).

location of four sample case points along these four dimensions.

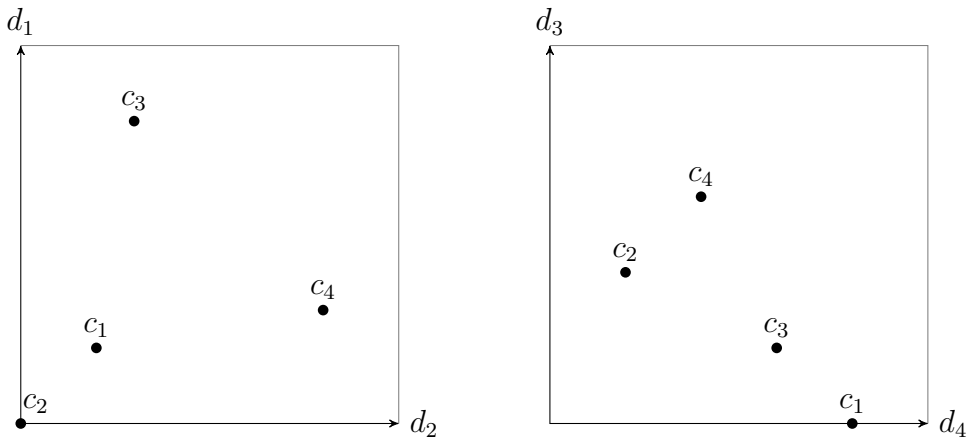

Figure 1: Cases in Fact Space.

Judges determine the disposition of cases based on the facts present in the case. This disposition can be modeled as a dichotomous judgment in favor of either party, a 'yes' (Y) or a 'no' (N). Judicial policy is the proscription of dispositions for a range of cases via legal rules (Kornhauser, 1992). In fact space, legal rules define dispositions for sets of cases based on the set of facts present in the case. Effectively, these rules define equivalence classes of cases; proscriptions for the same disposition across a range of facts.

These rules may be incomplete in two noteworthy respects. First, legal rules may be minimalist in their breadth - proscribing dispositions for only some factual situations. The court may declare a 3.1% population variance from equality (*Kirkpatrick v Preisler* 1969) unconstitutional while leaving a 2.4% deviation undefined (*White v Weiser* 1973).[2] The Supreme Court may rule the death penalty constitutional under some sentencing criteria (*Gregg v Georgia* 1976), while leaving its application to the mentally handicapped (*Atkins v Virginia* 2002) or juvenile murderers (*Roper v Simmons* 2005) beyond the scope of the rule.

[2] Segal and Spaeth (1996a) rightly note that existing theoretical approaches to precedent are unable to rigorously differentiate this form of incompleteness from attitudinal behavior - provided that the empirical focus is on voting behavior or legal rules in policy space. As a result, this paper instead empirically focuses on doctrinal conflict. However, incorporating information on the subsets of fact space generated by a legal rule would enable a more rigorous examination of this hypothesis.

Secondly, legal rules may be incomplete in their factual depth, proscribing case dispositions with respect to only some factual elements. This incompleteness is inherent to judicial policymaking. As with language Bix (1995), congressionally-crafted legislation (Huber and Shipan, 2002), and rules announced by bureaucracies (Krause, 2003), law is neither complete nor fully precise, and the system of legal rules is therefore necessarily incomplete. Legal rules are often written with respect to a single doctrine (and often only a small portion of that doctrine), and therefore do not require a description of the effects of facts generally associated with distinct doctrines.

Formally, a *legal rule in fact space*, $f(x_k)$ defines two sets $f(x_{kY})$ and $f(x_{kN})$ such that the disposition of the case is similarly proscribed for all cases within each set. In order to capture the incompleteness of judicial legal rules described above, these sets take the form:

$$c \in \begin{cases} f(x_{kN}) & \text{if } \forall s \in d_x, c^s \in f(x^s_{kN}) \\ f(x_{kY}) & \text{if } \forall s \in d_x, c^s \in f(x^s_{kY}) \end{cases}$$

Where $d_x \subset D$, and for all factual dimensions on which the rule is defined ($\forall s \in d_x$), the rule partitions the dimension into three sets based on the disposition of the case (Y, N, and no disposition defined).

Figure 2 shows an example legal rule in fact space defined on three of the four example factual dimensions from Figure 1. This legal rule is incomplete with respect to both its breadth - there is no proscriptive disposition of case c_3 - and depth - the rule is undefined on d_4.

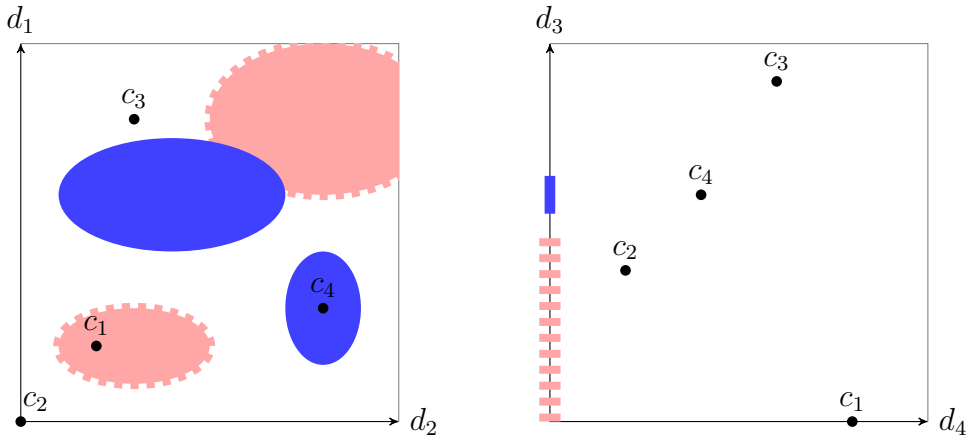

Figure 2: Legal Rules in Fact Space

Unfortunately, the operationalization of legal rules as the presence of - and interaction between - case facts is empirically inestimable due to the sheer quantity of possible facts - and combinations thereof - present in any set of cases. For any given set of victors on a set of cases, it would be possible to construct a legal rule in fact space that makes the outcome of these cases consistent with the implied underlying legal rule (cf Kritzer and Richards, 2003). This would yield the potentially unwarranted inference that the facts of the case serve to constrain the expression of the attitudes of justices. Similarly, any rule that implied inconsistent outcomes by the courts could be criticized as being under-inclusive by omitting a latent and critical fact. To overcome these difficulties, it is necessary to abstract from the particulars of the case to the breadth of judicial policy.

2.2 Doctrine Space

While legal rules may be defined with respect to particular constellations of facts, they are often understood and interpreted with respect to legal policy. In order to capture this intuition, I assume that there exists a weighted projection from this multidimensional factual space $\boldsymbol{C^D}$ to a uni-dimensional doctrine space P such that cases can be ordered in terms of their ideological content. In this re-ordered space, suppose that for any pair of cases, the

case further to the left has a litigant weakly less appealing to an extreme conservative judge and weakly more appealing to an extreme liberal judge.

While legal rules in fact space can articulate arbitrary mappings between facts and dispositions, this ideological projection suggests a simplification. Suppose that rules can be articulated as cut-points in doctrine space, $x_k \in P$, such that each rule defines two equivalence classes of cases $(-\infty, x_k)$ and $[x_k, \infty)$ to be decided similarly. Moreover, in this simplified model, suppose that opinions are reducible to the rule they articulate, such that each opinion establishes only a single rule, the holding of the case. Therefore, a legal rule in doctrine space can be represented as:

$$x_k : \begin{cases} N & \text{if } c \in (-\infty, x_k) \\ Y & \text{if } c \in [x_k, \infty) \end{cases}$$

Figure 3 shows an example legal rule in doctrine space. Here, the cut-point x_k captures the policy announced in an opinion. However, while the rule defines a disposition for the entirety of doctrine space, the incompleteness of legal rules in fact space still applies to legal rules in doctrine space. This rule may be incomplete in both its depth and breadth - applying to only some facts and a limited set of factual dimensions.

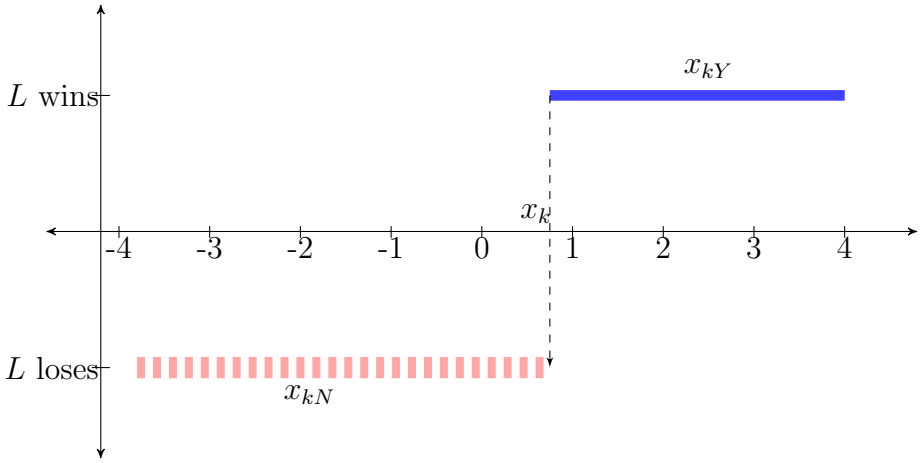

Figure 3: Legal rules in doctrine space

This preserves the intuition that legal rules can incorporate a complex partition of the factual space, while retaining an observable policy component because of that partitioning.

This operationalization of legal rules as cut-points in doctrine space has the further advantage of placing judicial ideology into a common framework with legal holdings. While a policy preference in fact space was some arbitrary partition of all possible facts of the case, ideology in doctrine space can be modeled as a judge's ideal cut-point of the reduced space.

2.3 Articulating Legal Policy

While it is possible to capture judicial policy in doctrine space with mathematical precision, it is no trivial feat for judges to articulate legal rules. Legal rules may invoke general phrases or principles - "dangerous articles,"[3] "compelling interest," "community standards" - whose meaning must be developed across a series of cases (Mesquita and Stephenson, 2002). Even if an opinion author can precisely formulate a legal rule, appellate judges must communicate the relationship between their preferred legal rules and existing case law to lower courts. Absent guidance on the relationship between the current case and prior precedents, lower court judges may be uncertain which rule to apply, limiting the scope of the opinion.

Judges use the mechanisms of legal discourse to articulate and communicate their preferred policies. One mechanism of particular importance is citation to and treatment of existing precedent. These citations to prior opinions serve several roles in judicial decision making. One role of citations is to reason by analogy to previous cases, noting similarities to prior cases with shared facts and dispositions, or dissimilarities with existing precedents. This creates judicial policy by example, inductively generating equivalence classes of cases to be treated similarly or dissimilarly (Kornhauser, 1992). Citations effectively serving as the legal language that maps between particular sets of facts facts and legal doctrine to be established.

[3] Levi (1949)

Citations can also overcome some of the informational difficulties in the communication of legal rules. While the meaning of an ambiguous phrase can be clarified in future cases, it can also be disambiguated via citation. The opinion author can approvingly cite similar interpretations of legal concepts, while negatively citing dissimilar interpretations, to provide guidance on subsequent interpretations of the case's holding. This communicates several cases worth of information about appellate court preferences to the lower courts in a single case. These citations also serve to clarify the relationship between these precedents, providing guidance to lower courts on the interpretation of existing precedents.

Finally, a variety of work has documented that citations to existing precedent shape the value of that precedent. Litigants use subsequent treatments of a case to determine if it is still "good law." In particular, litigants are advised to avoid precedents that have been negatively interpreted by subsequent courts. Similarly, positive interpretations can revitalize existing precedents (Hansford and Spriggs 2006). In this respect, judges care about citations to precedent because they care about the communication of policy.

As suggested above, a citation is not simply a reference to an existing case, but also an interpretation of it, called the treatment. These interpretations can be modeled as either positive, negative, or lacking policy content. One commonly referenced example of a negative treatment is when the current opinion overturns an existing precedent, as when *Brown v Board of Education* overturned *Plessy v Ferguson.*

Figures 4 shows the operation of citations and treatments in doctrine space. Here, opinion x_0 communicates its holding (preferred legal rule) by positively citing similar opinions - those that with cut-points that are close in doctrine space - and negatively citing dissimilar opinions - those with cut-points that are distant in doctrine space.

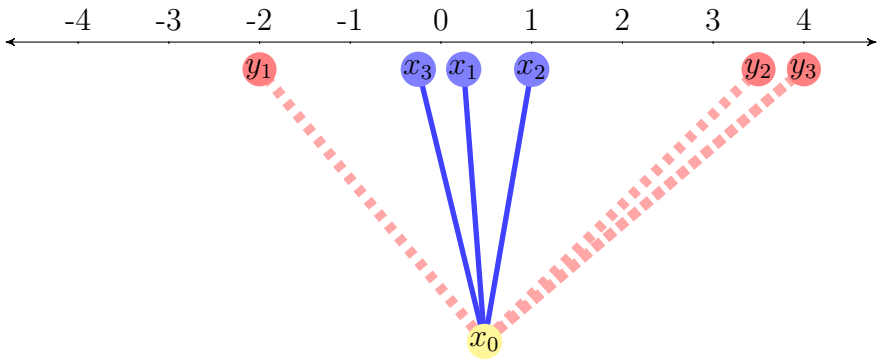

Figure 4: Citations and Treatments in Doctrine Space

Since each of the opinions cited by the current opinion also cites and treats existing precedent, the set of opinions, citations, and treatments can be conceptualized as a network extending across time. Figure 5 shows an example of a small portion of the network underlying the spacial approximation in Figure 4.

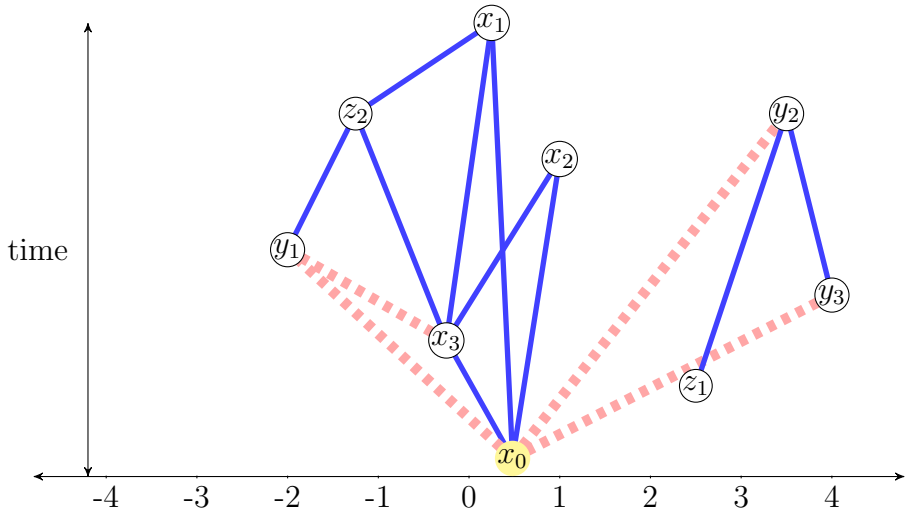

Figure 5: Networked policy citations

The networked understanding of case law provides a conceptual framework to reintroduce the incompleteness of law obfuscated by moving from fact to doctrine space. Some cases may present novel factual configurations previously unaddressed in case law. Judges respond to legal uncertainty by increasing their reliance of citations on precedent (Lupu and Fowler, 2013). In particular, judges will seek to embed the decision in precedent by referencing

otherwise-disparate areas of law that cover the set facts presented in the case. For example, in Figure 5, case x_0 cites into two such doctrines. For some of these cases, however, the decisions required by the two doctrines may yield contradictory outcomes in the case under consideration, generating uncertainty over the legally-required judgement in the case.

This networked understanding of citations between opinions, each weighted by the treatment of the prior opinion, serves as the basis of the measurement model outlined in the section below.

3 Measurement

3.1 Prior Empirical Approaches

Measures of appellate court ideology have expanded in their scope and theoretical basis over the past twenty years, moving from the ideology of the appointing president (Tate and Handberg, 1991; Brudney and Ditslear, 2001), to appointee characteristics (Songer and Davis, 1990), pre-confirmation newspaper coverage (Epstein and Segal, 2005; Cameron et al., 1990), and towards the cumulative percentage of liberal votes on cases (Songer and Ginn, 2002) or a weighted sum of several different measures (Songer et al., 1994b).

For the purposes of this study, these measures present several significant limitations. Measures based on the appointments process rely on the Common Space score of the appointing president to generate measures of judge ideology, assuming that judges have the same ideology as the appointing president. Even the state-of-the-art measure for the preferences of US Court of Appeals judges, (Giles, Hettinger, and Peppers, 2001), assigns judges the Common Space score of the appointing president where senatorial courtesy is not in effect (hereafter GHP). However, since the common space estimates of presidential ideology are extreme (Trier 2010), many federal judges are estimated to be extreme by assumption, effectively assuming that the judiciary is both polarized and partisan. Existing measures based

on the voting behavior of judges (for example, the percentage of liberal votes on cases) are not comparable across circuits, since differences in docket composition across circuits (cases arising from California courts are likely distinct from those arising in Oklahoma courts) can influence these measures.

Moreover, most measures of judicial decision making have examined legal outcomes by focusing exclusively on the disposition adopted in the case. However, theoretical models of the courts have increasingly turned toward examining the holding of a case - the policies generated by opinions meant to govern all similarly-situated parties in subsequent cases (Schwarts 1992, Hammond et al 2005, Lax and Cameron 2007, Carrubba et al 2007). The holding is the primary policy instrument of the court, setting judicial policy by binding the disposition of cases on lower courts. As observed by Tiller and Cross, (2006),

> The case outcome is obviously important for the immediate parties to the action but carries no particular significance for others. The language of the opinion at least purports to establish the rules that govern future cases, but political science researchers have generally disregarded the significance of this language (523).

Empirical approaches to the study of Supreme Court cases have therefore begun to focus on the content of court opinions (Clark and Lauderdale, 2010). As yet, these studies have not been extended to the appellate courts. This paper seeks to fill this gap within the literature by extending the empirical models used for the study of the Supreme Court to the US Circuit Courts of Appeal.

3.2 Empirical Model

Following similar models for locating the ideology of individuals based on their votes, I apply the standard Bayesian ideal point estimator to judges' votes on the judgment in a case (Clinton, Jackman, Rivers 2004). Judges are measured within institutions, such that

a judge promoted from a circuit court to the Supreme Court would have two entries in the data. Therefore, denote the judges within institutions $i = 1, ..., n$. I measure cases within courts, such that a case appealed from a circuit court to the Supreme Court would have two distinct entries. Let the set of cases be $j = 1, ..., m$. From this, let $\boldsymbol{Y}$ be a n by m matrix of judge votes on cases such that each judge votes either "Yea" ($y_{ij} = 1$) or "Nay" ($y_{ij} = 0$).

Consistent with Clark and Lauderdale (2010), I estimate opinion location using citations and treatments between opinions. Let Z be a $k \times k$ matrix of citations between opinions. A citation from opinion k to opinion $k^{'}$ is represented as $Z_{kk'}$. These citations are assumed to be either positive $Z_{kk'} = 1$ or negative $Z_{kk'} = 0$. The proximity citation model has two main parameters. First, let the rate that discrepancies in citation reduce the probability of a positive citation be λ. Second, denote the probit scaled probability of a positive citation as γ. This yields the following likelihood:

$$L(\boldsymbol{\beta}, \boldsymbol{\alpha}, \gamma, \lambda, \boldsymbol{X} | \boldsymbol{Y}, \boldsymbol{Z}) = \overbrace{\prod_{i=1}^{n} \prod_{j=1}^{m} \Phi(x_i^{'}\beta_j - \alpha_j)^{Y_{ij}} (1 - \Phi(x_i^{'}\beta_j - \alpha_j))^{1-Y_{ij}}}^{\text{votes}}$$
$$\times \overbrace{\prod_{k=1}^{K} \prod_{k'=1}^{K} \Phi(\gamma - \underbrace{\lambda}_{\text{shape parameter}}(x_k - x_k^{'})^2)^{Y_{ij}} (1 - \Phi(\underbrace{\gamma}_{P(Z_{kk'}=1)} - \lambda(x_k - x_k^{'})^2))^{1-Y_{ij}}}^{\text{citations}}$$

Following Clark and Lauderdale (2010), I assume that dissents are sincerely authored articulations of the judge's preferred policy, and therefore constrain dissents to be authored at dissenter's ideal point.

The opinions, however, form an additional bridge. Not only can citations be used to estimate opinion locations, but these citations can be used to bridge between Appellate Courts and the Supreme Courts, as well as across the appellate courts. Appellate Court opinions frequently cite Supreme Court precedents (and occasionally cite opinions from other

circuits), effectively generating a common space to estimate the preferences of circuit court judges.[4]

4 Data

The data collected for this study encompass an original dataset of all 723,570 published cases decided by the US Courts of Appeals and the Supreme Court from 1950-2003.[5] Where possible, these cases were obtained electronically. If electronic copies were unavailable, these documents were digitally scanned and processed into plain text via OCR.[6] Each case was split into its constituent opinions, generating approximately 723,570 majority opinions, 274,380 concurring opinions, and 58,770 dissenting opinions.

4.1 Voting Data

The data on votes cover all district, appeals court, and senior status judges voting on each of the Circuit Court of Appeals cases (excluding bankruptcy and claims court judges from the analysis) as well as the justices of the Supreme Court.[7] Votes are recorded with respect to disposition of the case recorded by the court reporter. Judges moving across circuits are modeled as distinct individuals. For example, the paper treats Sotomayor as a district judge, appellate judge, and Supreme Court justice as though each appointment was a distinct individual, enabling subsequent research on the differences in behavior as judges move through the judicial hierarchy.

[4] There is a second difference between this and existing ideal point models. In this application both $\boldsymbol{Z}$ and $\boldsymbol{Y}$ are sparse - only three judges are present on most panels, and each opinion cites only a small number of other opinions. As such, I treat most missing data as logically impossible.

[5] For all the results that follow, the results are limited to the Federal Reporter Second Series after volume 178 and all cases reported in the Third Series until 2003.

[6] In order to ensure that the collection process does not effect the results, 100 cases were collected both electronically and OCR'd. On these cases, there was no disagreement between the OCR'd and electronic copies on the votes, citations, or treatments of cases.

[7] On some cases, a district court or senior status judge may sit on the panel, generating observations of district court judges' preferences (Brudney and Ditslear, 2001).

There is one significant difference between Supreme Court and Circuit Court voting of relevance to this coding procedure. While the majority opinion author on the Supreme Court implicitly votes in favor of the disposition of the case adopted in the opinion, this need not be the case on the Circuit Courts. Given the higher workload of the Appellate Courts, justices are constrained in the number of opinions they can write. If a particular judge feels particularly strongly about the case, they have the option to write the majority opinion while including, as dicta, their own dissent.

For example, in Walton v Arabain American Oil Company 233 F.2d 541, while writing for the majority, Judge Frank wrote:

> The majority of the court thinks that, for the following reasons, it is inappropriate to remand the case so that the plaintiff may have another chance... The writer of the opinion thinks we should remand.

Thus, when the opinion is cited in subsequent cases (for example, in 274 F.2d 747), Judge Frank is listed as dissenting in the case, even though he is the author of the majority opinion. This practice is widespread - of the cases included in the Songer Appeals Court database, approximately 10% of dissenting votes fall into this category.

Thus, in order to code the votes on the Circuit Courts, it is necessary to identify those cases where the majority opinion author dissents from her own opinion. These cases were identified using subsequent citations to opinions. The author is coded as dissenting if any subsequent case cites the majority opinion author as a dissenter. For example, Judge Frank's dissent in 233 F.2d 541 is noted as a dissent in one of the thirteen citations to the case. Using this procedure, approximately 92% of cases collected were identified as unanimous, 7% of cases had one or more explicitly noted dissents, and 1% of cases were identified with a majority opinion author dissenting. In order to assess the validity of this coding procedure, the results were compared to voting data collected by Songer for 18,000 cases decided on the US Circuit Courts. The two sources agree on 99.8% of all votes.

4.2 Citation Data

There are several conflicting views within the judicial politics literature on the appropriate number of treatment classes between citations. Studies directly using Shepard's Citations, a well-known legal citator, can use all nine possible ways Shepard's codes the legal treatment of the cited case: Overrule, Question, Limit, Criticize, Distinguish, Follow, Parallel, Explain, or Harmonize. While previous studies of Shepard's Citations have found the coding to be reliable (Spriggs and Hansford, 2001, 2002) and the use of Shepard's to derive measures of legal change and treatment is longstanding (Benesh and Reddick, 2002; Spriggs and Hansford, 2001), most studies of citations between opinions focus on a reduced set of treatment values. Clarke and Lauderdale (2010) focus on the polarity of citations (either positive or negative) and exclude 'procedural' citations from their analysis. Hansford and Spriggs (2006) include a neutral category of citations, covering citations that do not substantively interpret existing precedent.

For this paper, three treatment classification schemes were generated, corresponding to each of the above formats (Shepard's, positive/negative, and positive/neutral/negative). For each scheme, a training set was generated using the Shepard's treatment data on citations between Supreme Court cases from 1948-2000 collected by Hansford and Spriggs, covering 9,300 treatments. The positive/negative and positive/neutral/negative schemes were inferred by grouping the corresponding Shepard's codes.

For the appellate courts, the data on citations and their treatment was collected via text parsing and document classification. For each opinion, citations to precedent were first identified by parsing the text for citations conforming to the legal citation formats used in either the Bluebook or ALWD Citation manual. As conventions for citation formats have adapted over time, citations to older cases following antiquated reporter formats (ie, 1 How 10) were included during the appropriate time periods. Citations to a single case using multiple reporters were identified and grouped by both proximity and cross-referencing

volume / page identifications. While citations to a variety of sources were collected (including law journals, popular publications, and statutes), only citations to federal court opinions were used in this analysis. This yielded 6,762,000 citations included in the analysis.[8] Citations identifying extended quotations of earlier opinions were associated with the text analyzing the citation, rather than the quotation itself.

The treatment of these citations was then coded via machine learning, using support vector machines for document classification. Support vector machines (SVM) was chosen for its ability to outperform a variety of other document classification methods and ability to support multiclass classification.[9] Each classification technique was run for 100 divisions of the data into test and training datasets and then extrapolated over all citations. The modal coding within each classifier was used to determine the treatment of each citation.

5 Data Validation

The mean posterior estimates are based on 1,000,000 iteration simulations thinned by 250 (excluding a 500,000 iteration burn-in period) implemented in C and CUDA. Trace plots of model parameters suggest that the model converges. There were no differences between the estimates based on shorter runs of 100,000 and the longer simulation presented here.

5.1 Ideal Point Estimates

Figure 6 compares the distribution of Appellate Judge ideology as estimated via the citation-scaled IRT method and the Giles, Hettinger, and Peppers (2001) appointment-based measures. Both distributions are clearly bimodal and a function of two distinct unimodal distri-

[8] While in practice an opinion may reference a precedent multiple times, as noted in the Model section above, I assume that there is only a single treatment across these references. Moreover, the model currently assumes that an opinion cited only once is of equal importance to an opinion cited multiple times over the course of the opinion. Incorporation these - and over - permutations into the model can serve as fruitful extensions for future research.

[9] (Juola and Sofko, 2005; Koppel and Schler, 2004)

butions corresponding to the party of the appointing president.

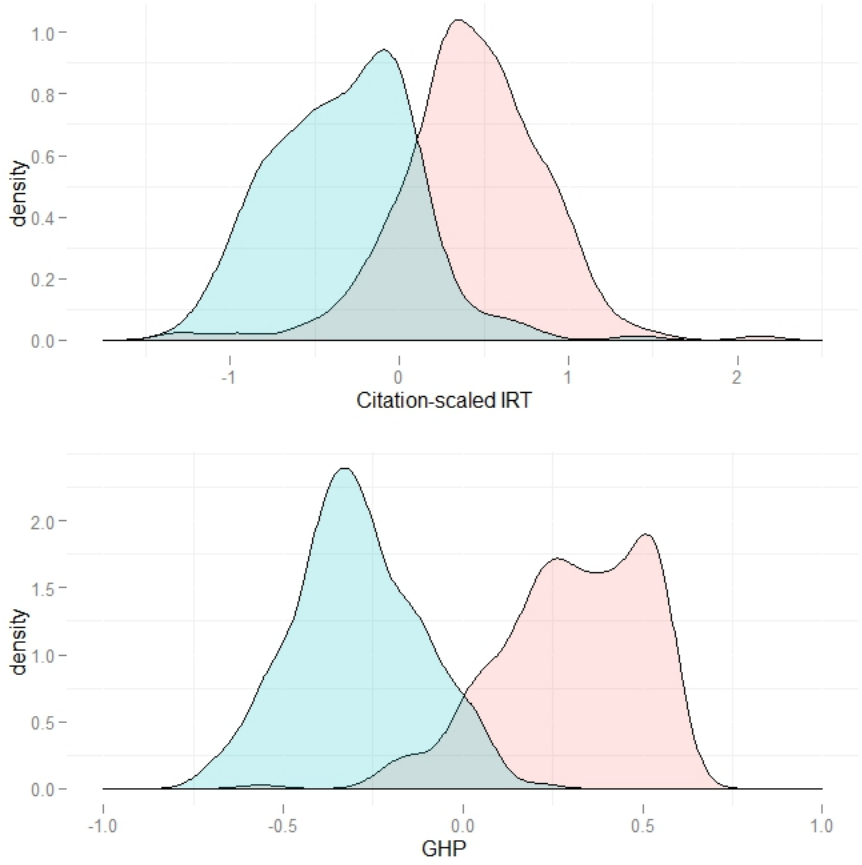

Figure 6: Comparison of IRT and GHP Ideal Point Estimates.

While the coding based on appointment captures some variation in judicial ideology, there are several advantages to the citation-scaled IRT measure. First, while appointment based measures show relatively little overlap between nominees from either party, this is a function of using the relatively extreme Common Space scores of presidents as the basis of their measure. Since the GHP scores vary only where senatorial courtesy is in effect, the distributions of appointments by each party are skewed to the extremes. Appointment-based measures thus suggest a more partisan judiciary than is supported by the voting behavior of judges.

Secondly, the IRT estimates have greater ability to distinguish between judges appointed

relatively contemporaneously. This pattern is clearest when examining the circuit court behavior of the eight justices of the current Supreme Court in Figure 7 (no data is available for Justice Kagan, as she never served on the Circuit Courts of Appeal).

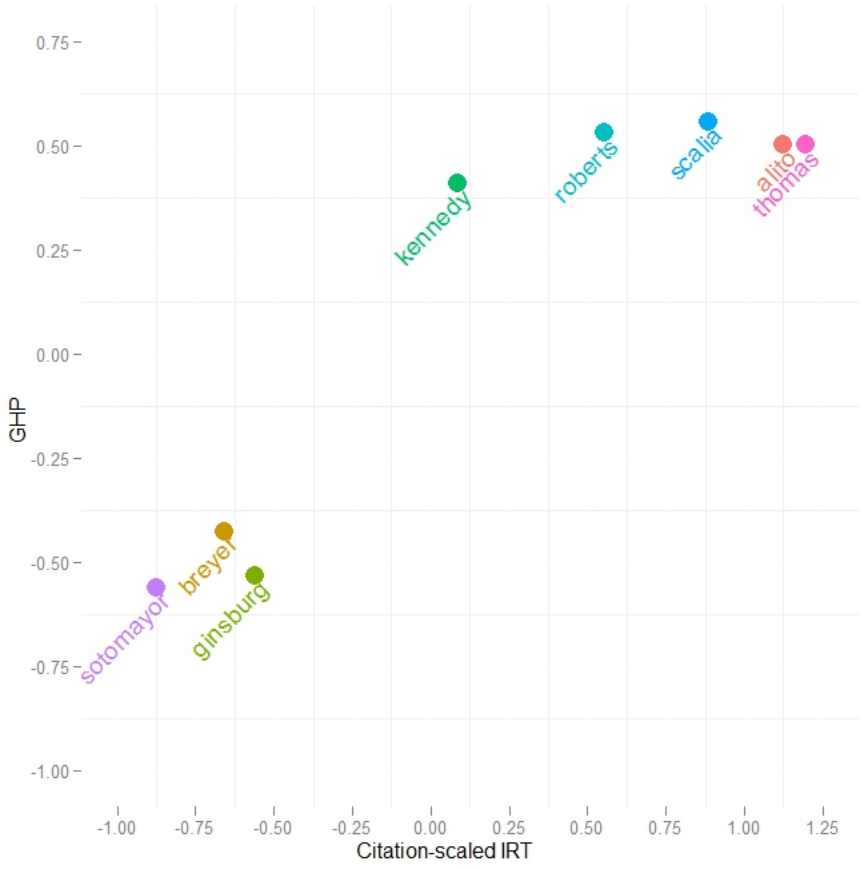

Figure 7: Circuit Court Behavior of Current Supreme Court.

While the GHP measure is able to effectively group the liberal and conservative wings of the court, it has little ability to distinguish between the judges on each side of the court. Roberts, Scalia, Alito, and Thomas are all estimated to have approximately the same ideal point in the GHP data. In contrast, the citation-scaled IRT estimates suggest that there are significant differences within each wing of the court. It is interesting to note that while the IRT estimates are of the circuit court behavior of the judges, the ordering of the judges is

consistent with their behavior as justices.[10]

In Figure 8 these findings are extended to prominent judges currently on the Circuit Courts of Appeals, as an additional check on the validity of these results. Conservative Bush nominees filibustered by the senate (like William Pryor on the 11th) are on the right, while relatively moderate and unassuming Republican nominees (like Emilio Garza on the 5th) are more centrally located.

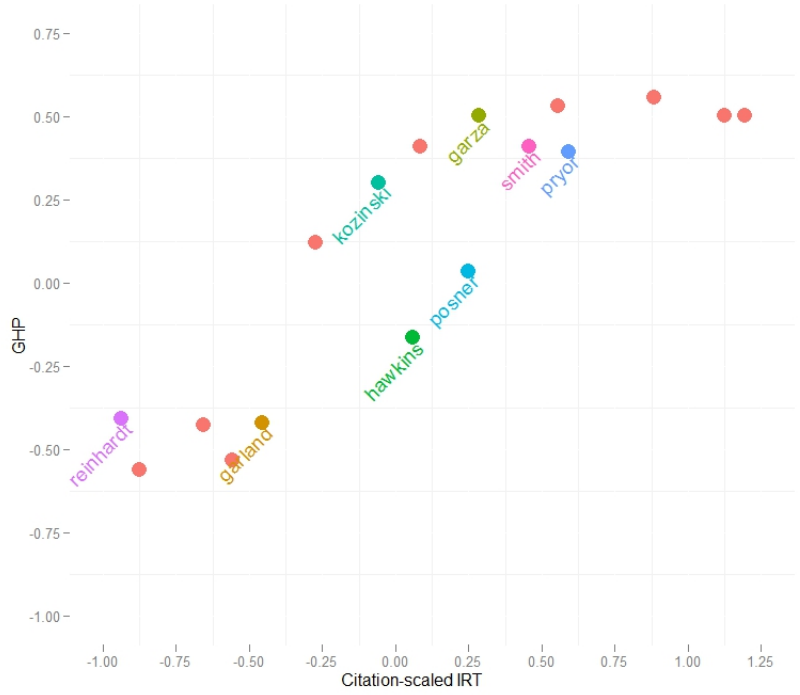

Figure 8: Comparison of Prominent Appeals Court Judges.

One interesting set of comparisons is between Judge Merrick Garland (DC circuit) and Justice (then judge) Sotomayor. During the nomination of both Justices Kagan and Sotomayor, Republican commentators framed Garland as "the best nominee that Republicans could hope for." Consistent with this intuition, Garland is estimated as more conservative

[10] Curiously, both Justices Alito and Sotomayor showed relatively more extreme behavior as Circuit Court judges than as Supreme Court justices, using the rank-order of each from the Martin-Quinn measure. Another notable example of a difference between Circuit and Supreme Court behavior is former Justice Stevens, who as a Circuit Court judge was relatively liberal (IRT estimate -0.27), only to moderate during his early years on the court, before on the liberal wing of the court.

than Sotomayor. Similarly, examining the judges of the Proposition 8 panel (Reinhardt, Hawkins, Smith) yields the intuitive ordering of Reinhardt as the leftmost and Smith as the rightmost judge on the panel. The results, however, are not without surprises. Alex Kozinski, despite being a Reagan nominee to the Ninth and a GW Bush nominee to the chief judge of the Ninth Circuit, is estimated to be relatively left-leaning. This suggests that Kozinski's libertarian ideology may be inappropriately conflated with conservatism by some court-watchers.

Given that comparisons of ideology across circuits are of particular interest to legal scholars, examining the differences in estimated average ideology across circuits serves as a unique opportunity to validate these estimates of judicial ideology. For example, the Ninth Circuit is generally considered to be liberal compared to the rest of the country, while the Fourth is assumed to be conservative. To examine this relationship, Figure 9 plots the average of the ideology of the judges for each circuit, for the period before and after 1980, the midpoint of the years included in this study.

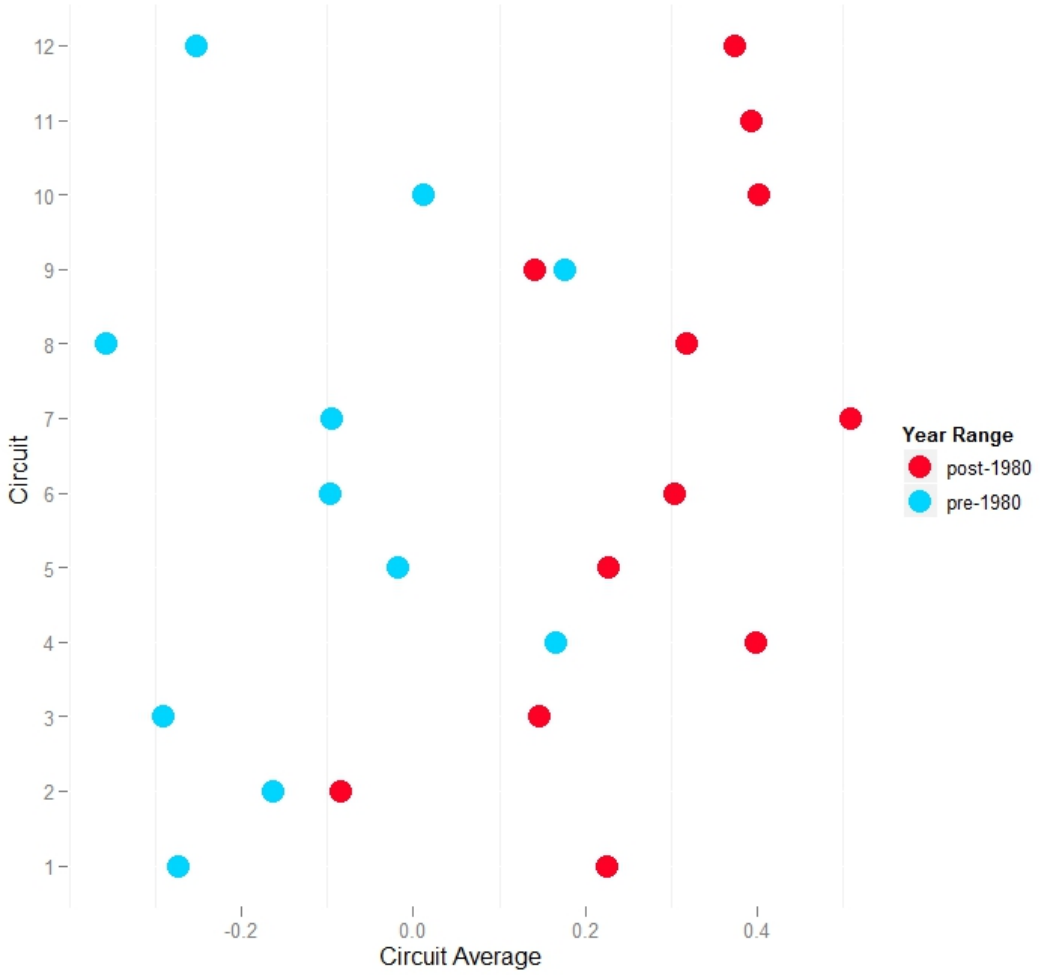

Figure 9: Ideology by Circuit.

While the Ninth is relatively liberal in the period after 1980, this is largely a function of a broader rightward shift in the Federal judiciary. This result is consistent with broader findings in the legal literature suggesting a rightward shift in legal doctrine with Regan's nominees to the courts (Law, 2004). In line with earlier results by Epstein et al (2007), the Second Circuit is currently the most liberal circuit, while the Seventh and Fourth are relatively more conservative.

5.2 Opinion Estimates

The three panels in Figure 10 show the distribution of estimated opinion locations, by opinion type and party of the president appointing the opinion author. While the majority and concurring opinions are unconstrained, dissents are fixed at their author's ideal points, and so the distribution of dissenting opinions is more properly the distribution of the ideology of dissenting authors, weighted by dissent.

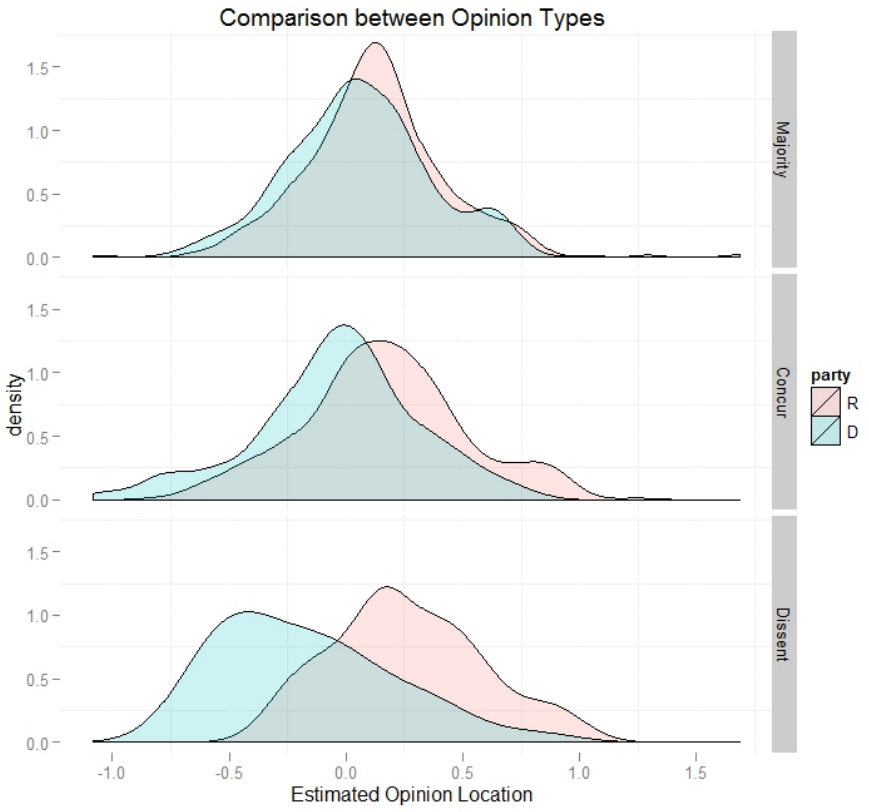

Figure 10: Estimated Opinion Location by Opinion Type.

While the distribution of concurrences shows a difference between the policy advocated by concurrences authored by judges appointed by Democrats and those appointed by Republicans, there is little, if any, difference in the distribution of majority opinions overall. According to these estimates, the distribution of majority opinion location is no different

between Democratically appointed and Republican appointed judges.

Moreover, while considerable differences exist in the voting behavior of judges across circuits and time, as shown in Figure 11, the differences in the majority opinions authored on these circuits are slight. Retaining the scale from the earlier estimates of judicial ideology, the Ninth is no longer distinguishable from the Fourth (even leaning slightly further right) or the Second.

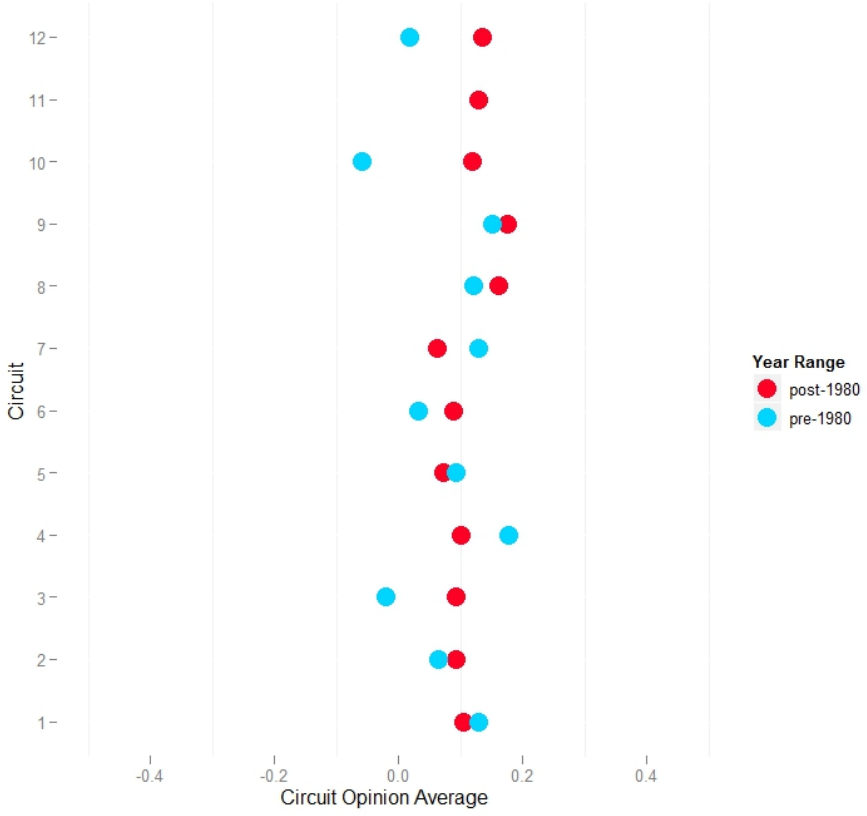

Figure 11: Average Majority Opinion by Circuit.

6 Analysis

While these estimates have a variety of potential applications, one intriguing use is to empirically examine the operation of precedent in the federal judiciary, as the role of precedent is

central to most theories of judicial politics. As noted in the conceptual outline above, while models of the application of *stare decisis* to precedent require that judges are constrained by precedent where its holding is clear, on indeterminate cases judges have discretion to exercise their judgment in deciding the case.

While indeterminacy may take several forms, one of the most notable forms of legal indeterminacy occurs where there is conflict between existing doctrines over the appropriate disposition of a case. As noted in discussion of the spacial construction of legal rules above, legal rules are necessarily incomplete in both their breadth and depth, describing their application to only a small portion of the fact space. This incompleteness generates the possibility of conflict between legal rules. For example, while groups are entitled to viewpoint-neutral access to student-fee funds (*Rosenberger v. Rector* 515 U.S. 819, 1995) and are able to exclude members on the basis of sexual orientation (*Boy Scounts v Dale* 530 U.S. 640, 2000), the application of these precedents to content-neutral nondiscrimination rules in university funding decisions (*Christian legal Society v Martinez*), conflicts with the requirement that public universities not spend funds in a discriminatory manner (*Roberts vs United States Jaycees* 468 U.S. 609, 1984). This generates contradictory legal expectations. Christian Legal Society would be expected to prevail on the rules established by *Rosenberger* and *Dale* but lose on those established in *Roberts*. In cases like these, judges have discretion to use their judgment (including policy preferences) to resolve the underlying legal conflict and set judicial policy.

Conflict between legal rules is thus particularly likely to occur where the facts present in a case occur at the intersection of several otherwise distinct lines of precedent. Therefore, in order to operationalize the presence or absence of conflict in existing precedent, I code cases with the potential for doctrinal conflict as cases where the headnotes identified by the court reporter (indicating the relevant fields of law addressed in the opinion) fall into three or more general legal issue categories. Approximately 16,000 cases fell into this category.

Table 1: Probit Analysis of the Determinants of Dissent

		Estimate	Std. Error	Pr(> |z|)
Distance between Opinion and Judge		0.064	(0.017)	0.000 ***
Doctrinal Conflict		-0.489	(0.053)	0.000 ***
Ideological Extremity		-0.021	(0.037)	0.567
Distance × Conflict		1.130	(0.087)	0.000 ***
Circuit Controls				
	Second	0.034	(0.095)	0.720
	Third	-0.099	(0.096)	0.302
	Fourth	-0.066	(0.096)	0.489
	Fifth	0.009	(0.092)	0.925
	Sixth	-0.022	(0.092)	0.808
	Seventh	-0.021	(0.097)	0.824
	Eighth	-0.049	(0.097)	0.621
	Ninth	-0.091	(0.091)	0.318
	Tenth	0.031	(0.099)	0.758
	Eleventh	-0.141	(0.155)	0.362
	Federal	0.055	(0.096)	0.570
Constant		-0.973	(0.090)	0.000 ***
n	516,822			

Table 1 shows the results of a probit analysis using dissent as the dependent variable, with ideological distance, doctrinal conflict, and their interaction as the main explanatory variables.

While judicial ideology does exert a significant influence on a judge's decision to dissent, its influence is muted on cases covered by existing precedent. On cases covered by existing

precedent, the predicted probability of a dissent moves from 15.6% for judges with policy preferences identical to the opinion location to 18.1% for judges whose policy preferences are two standard deviations away from the estimated opinion location, a 2.5% difference in predicted probabilities. In contrast, on cases falling into gaps, the predicted probability of dissent moves from 6.8% for judges with policy preferences identical to the opinion location to 64.3% for judges whose policy preferences are two standard deviations away from the estimated opinion location, a 57.5% difference in predicted probabilities. The substantive effect of ideology on decisions to dissent is thus limited to cases involving legal indeterminacy.

7 Conclusion

While theories of stare decisis have typically viewed precedent as both mechanistic and universal, incorporating legal indeterminacy via doctrinal conflict generates a novel framework to assess the influence of precedent on the expression of judicial ideology. This paper grounds an empirical measure of legal precedent in a theoretical model of judicial policy, and estimates measures of legal precedent and judicial preferences on the same scale for the Supreme Court and the Circuit Courts of Appeals.

This analysis suggests that while the role of ideology is fairly limited on cases whose outcome is well-defined by precedent, judicial ideology exerts a considerable influence on cases where precedent is indeterminate. While scholars have generally focused on determining the role that a judge's ideology plays in the judicial process, these results demonstrate that the contingency of ideology on existing precedent. The expression of ideology is largely conditional upon the necessity of reconciling the occasionally-contradictory nature of legal rules whose articulation is necessarily incomplete.

These results contextualize current findings on the ideological nature of judicial decision making. The influence of ideology is strongest where there is uncertainty in existing case law. Yet, these are also the cases that are most likely to be appealed, published, and

have dissents. Studies that focus exclusively on the non-unanimous cases of higher courts therefore suffer from an inadvertent selection bias that overstates the ideological nature of judicial behavior. While this is certainly appropriate for understanding how courts settle policy issues, it mischaracterizes the bulk of the work of the judicial system.

This research contributes to the ongoing evaluation of the role of ideology on the U.S. Appellate Courts by generating behavior-based estimates of judge ideology. The estimates presented here have applications beyond an analysis of the role of precedent, including theories of judicial hierarchy (Cameron, Segal and Songer 2000) and analysis of the role of other personal characteristics like gender and race on bargaining (Boyd et al 2010).

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