Policy and Legal Preferences of Supreme Court Justices: Change and Continuity *

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Estimating the preferences of Supreme Court justices is crucial to understanding their behavior and testing theories about the role of the Court in the political system. Ideally, these estimates will be comparable over time, comparable to estimates of other political actors and will allow the possibility that justices value non-ideological factors. This paper updates Bailey (2013) to present Supreme Court ideal points up to 2019 that satisfy these requirements, based on the use of bridging observations across institutions and over time. This paper also presents updated results on the influence of legal factors such as precedent.

Keywords: Ideal points, Supreme Court, Congress, President, inter-institutional preferences, legal influences on Supreme Court

Introduction

Estimating judicial preferences is challenging. For a single court in a single point in time, we typically need to implement an item response theory model of non-trivial complexity. If we want to assess individual level preference change over time, statistical identification requires that we have bridge observations of judges taking positions on cases in other time periods. If we would like to compare preferences across the judicial, legislative and executive branches, we need bridge observations of actors taking positions on cases and votes outside their institution.

In addition, if we believe that judges could be distinctively influenced by legal values we will need models to account for this possibility. While a considerable literature casts suggests justices only pursue their ideological goals (Segal and Spaeth, 2002, 2001), Bailey and Maltzman (2011) present evidence that legal values also matter. For example, it is hard to explain why Justice Roberts switched his vote on virtually identical state limits on abortion providers in the *Hellerstedt* and *June Medical Services* cases without referring to precedent as a legal value.

This paper builds on previous efforts to produce Supreme Court preference measures that are inter-temporally and inter-institutionally comparable (Bailey, 2007, 2013). Previous measures of

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this sort stopped at 2011. The estimates here extend to 2019, based on hundreds of court cases, thousands of more bridge observations and tens of thousands more individual congressional votes.

Having nine more years of preference estimates is useful for several reasons. Most obviously, we can increase the time period we can describe political preferences across institutions. This will generally increase the statistical power of theory testing and may allow for more exploration of theories with more fine-grained predictions. We also are able to better understand the specific justices. For example, in Bailey (2013) Justices Alito and Roberts were estimated to value precedent based on a relatively small number of observations. This update adds a substantial number of relevant observations for these and other justices.

This paper proceeds as follows. Section 1 discusses the challenges in estimating Supreme Court preferences. Section 2 presents the model and estimation approach. Section 3 presents two sets of results, one based only on ideology and another that includes estimates of both ideological preferences and legal values.

Section 1: Ideal points and the Supreme Court

This section summarizes the challenges that arise when we seek preference estimates that are comparable over time and across institutions and also take into account potential non-ideological factors. Bailey (2017) provides a more detailed discussion.

Inter-temporal

Court watchers generally agree that at least some justices change preferences over time, with examples including Justices Black, Brennan, Blackmun, Souter and perhaps others. Once we allow preferences to change, however, we are confronted with a statistical identification challenge. Figure 1 illustrates this for a simple example. The top row shows ideal points of three justices on Case 1, a case on which two of the justices voted liberally and one voted conservatively.

The next two rows in the figure present two very different mappings for Case 2, a case on which two justices voted conservatively. In the constant-cutpoint scenario in the middle panel, the case cutpoints on Case 2 is the same as for Case 1 and this means that justice 2 has moved to the right. In the different-cutpoint scenario in the bottom panel the case cutpoint has moved left and justice

2 has not moved at all. Both scenarios for Case 2 are logically possible and, indeed, highly plausible as we could easily imagine cases that have similar ideological cutpoints as earlier cases and cases that have different cutpoints than earlier cases.

Deciding which scenario is correct is crucial for accurate measurement. Simply knowing that there were two conservatives versus one liberal on Case 2 is not sufficient to distinguish between the scenarios. Models such as Martin and Quinn (2002) that do not include bridging information essentially assume that the case cutpoint distribution is constant across all the cases, which may or may not be true across time.

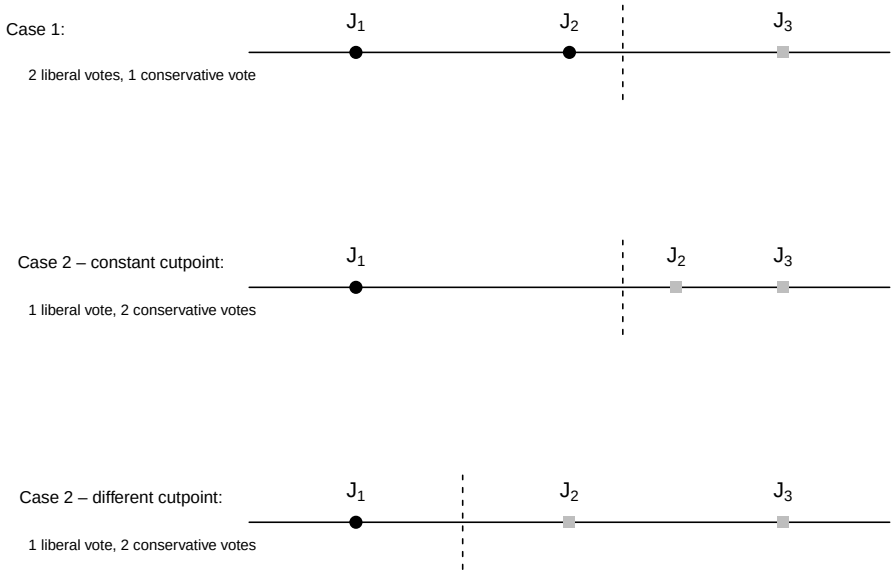

Figure 1: Identification

Inter-institutional

Producing inter-institutionally comparable preference measures is also challenging. Again, the root issue is a statistical identification one. Suppose we simply compare the percent of time Supreme Court justices vote conservatively to the percent of time U.S. senators vote conservatively. While there would be some broad comparability in the sense that the most conservative actors in each institution would be on the right, we could have little confidence in such measures. Surely, the agendas differed across these institutions. What if a given level of ideology led to a 50 percent

conservative voting record on the court, but a 70 percent conservative record in the Senate?

Calibrating educational tests presents a close analogy. Suppose we have two classes who are given different tests. Would we feel comfortable saying an 85 in the first class is the same as an 85 in the second? What if one class is algebra and the other is calculus?

The solution for producing inter-institutionally comparable preference measures follows the same strategy used in standardizing tests: find specific questions that appear on each test and build a model around that these questions are of equal difficulty. In the court and political context, this requires finding cases or issues on which both justices and political actors take positions (Bailey and Chang, 2001; Bailey, 2007, 2013). We discuss these bridge observations in the data section below.

Non-ideological influences

There is fundamental debate over whether justices are simply ideological (Segal and Spaeth, 2002) or are also influenced by non-ideological factors specific to the courts (Bailey and Maltzman, 2011). Whatever the reality, it is useful for a preference model to at least allow (and perhaps reject) the possibility that legal factors influence justices. This is important for two reasons. First, if the non-ideological aspects of cases changes over time, we risk inferring preference change where they may be none. (Farnsworth, 2007, 1896) provides an example:

> Suppose, to take a simplified example, that Justice Kennedy tends to vote for the government in cases involving criminal procedure, but against the government in cases involving free speech, while Justice Rehnquist-a less libertarian sort of conservative-tends to vote for the government in both situations. (Both assumptions happen to be accurate.) Imagine that in term T, there are many criminal procedure cases (where the two Justices vote the same way) and few speech cases (where they don't). Then in term T + 1, there are lots of free speech cases. Kennedy's preferences may appear to drift to the left relative to Rehnquist's when they haven't really changed at all.

Second, the extent to which justices are influenced by non-ideological factors may in and of itself be interesting. We hear much about the influence of precedent, often from the side trying to protect one. How much is this posturing to cover ideological goals and how much of this is an authentic influence on judicial decision-making?

We must also work through statistical identification of models with non-ideological factors. If

everyone in the data set also cared about legal factors in the same way, we would not be able to distinguish a case in which everyone was ideological and the ideological cutpoint was in the middle producing a roughly even split on the case from a case in the ideological cutpoint was far to the right but that the non-ideological factor (such as precedent) pushed justices to vote liberally even though they would have voted differently based only on ideology. We'll illustrate the problem below when presenting the model and discuss how including non-judicial actors in the model achieves statistical identification.

Section 2: Model and estimation

This section presents two models for estimating preferences and the data and methods used in the estimation process.

Models

The ideology-only model is a standard item response theory model of vote choice:

$$\text{Prob}(y_{itv} = 1) = \Phi(\alpha_v(\theta_{it} - \kappa_v)) \tag{1}$$

where α_v is the vote discrimination parameter of vote v, θ_{it} is the ideology of individual i at time t, κ_v is the cutpoint of vote v. More details are in the appendix and Bailey (2013). The ideology-and-law model adds legal parameters to the above model (Bailey and Maltzman, 2011). For example,

$$Pr(y_{itv} = 1) \quad = \quad \Phi(\alpha_v(\theta_{it} - \kappa_v) + \pi_i Precedent_v + \delta_i DefCongress_v + \sigma_i Speech_v) \tag{2}$$

where π_i, δ_i, and σ_i are the weights justice i places on precedent, deference to Congress, and free speech. $Precedent_v$, $DefCongress_v$, and $Speech_v$ are precedent, deference to Congress and speech variables. These variables are coded as 1 if the facts of the case are such that a conservative vote is consistent with the principle indicated, -1 if the facts of the case are such that liberal vote is consistent with the principle indicated and 0 if the principle indicated is not specifically relevant.

The analysis presented here also includes legal factors related to deference to federal agencies,

concern for Sixth Amendment rights and federalism (Bailey, 2013).

The legal coefficients (π_i, δ_i, and σ_i) are constrained to be zero for non-judicial actors; were they not, the main effects of the legal variables would simply be absorbed by the case cutpoint variable (note that κ and the legal variables all have the same subscript).[1]

Data

There are 801,041 observations from 1950 to 2019, 716,390 of which are on congressional roll calls and 84,651 of which are on Supreme Court cases.

Supreme Court voting data comes from Spaeth et al. (2015). Congressional voting data comes from Lewis et al. (2020). We include all votes in Congress on topics related to those that dominate the court docket, including civil rights, race, abortion, speech and Senate confirmations of judicial nominees. Even though these votes are not directly bridge observations, they provide the information needed to pin down the preferences of members of Congress relative to each other.

Bridge observations are originally gathered and merged into the broader data sets. Bridge observations of political actors taking positions on Supreme Court cases are found in amicus filings, public pronouncements on specific cases in the *Congressional Record* or (recently) social media, and votes and cosponsorhip in Congress on bills that directly relate to cases considered by the court.

There are 43,162 bridge observations of members of Congress taking positions on Supreme Court cases. There are 1,422 individual level bridge observations of presidential positions on congressional roll call votes and 681 bridge observations of presidents taking positions on Supreme Court cases. More details on the votes are in the supplemental material.

There are two types of bridge observations for justices. First, justices sometimes take clear stands on cases that were decided earlier. For example, in *FEC v. Wisconsin Right to Life* (2007) Scalia stated that *Austin v. Michigan Chamber of Commerce* (1990) was "wrongly decided"; in *Allegheny v. ACLU* (1989) Justice Kennedy wrote "I accept and indeed approve both the holding

[1] Suppose, for simplicity, that $\alpha_v = 1$ and $\pi_i = 1$ for all justices (meaning all justices care about precedent when voting). If we estimate Equation 2 using only Supreme Court justices, we could generate the same probability of conservative votes by setting $\pi_i = 0$ for all justices and $\kappa'_v = \kappa_v + Precedent_v$. If we include members of Congress, however, such an identification problem goes away as we cannot roll the effect of precedent into the case cutpoint as the case cutpoint for members of Congress will depend only on ideology.

and the reasoning of Chief Justice Burger's opinion in *Lynch* (1984)]." This information helps identify preference change over time. Second, more rarely, justices take positions on issues that were voted on in Congress, such as major civil rights legislation.

In some instances we know the relative ideological positioning of votes. For example, the cutpoint of the Civil Rights Act of 1957 was to right of the Civil Rights Act of 1964 as the earlier act clearly was less progressive. This information is incorporated into the estimation process by requiring the cutpoints to be consistent with the substantive relation between the two votes. Such information was available for 277 votes in Congress and 360 cases in the Supreme Court.

Finally, for 175 votes in Congress we can bridge across the House and Senate by matching votes on conference reports and other identical bills.

Estimation is implemented via Markov Chain Monte Carlo process using Gibbs and Metropolis/Hastings algorithms. More details are in the appendix and cited work therein.

Results

The results are available at https://michaelbailey.georgetown.domains/. This section provides an overview and discusses some clear trends.

Figure 2 presents the ideal points for justices who served between 1990 and 2019. Several justices moved left in this period, including Souter, Blackmun and Stevens. Justice Kennedy, long the pivotal justice, was relatively constant, picking up near Justice O'Connor (the previous median) and remaining moderately conservative, with a move left in the 2010s followed by a move to the right in his last year. Chief Justice Roberts has moved left over time. When Roberts becomes the court median in 2019 his ideology was quite close to where Kennedy left off.

Figures 3 and 4 present similar information for earlier eras, allowing us to assess court ideology for any given time period. The ideological evolution of Blackmun stands out in Figure 3, as does the movement Justices Black, Frankfurter and Warren in Figure 4.

The preference estimates include members of Congress. The estimation of congressional preferences is often considered a settled matter, as Nominate and related procedures have produced measures that are widely used to characterize rising polarization, among other topics (Poole and Rosenthal, 1997). However, we should be mindful of the limits of these measures, at least in some

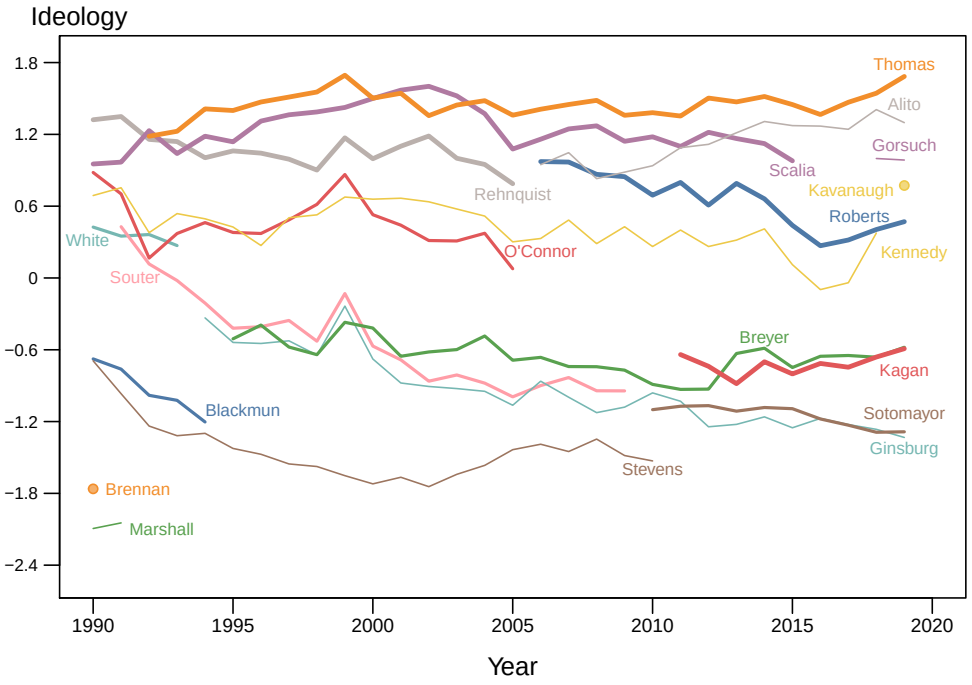

Figure 2: Ideal points of justices, 1990 to 2020

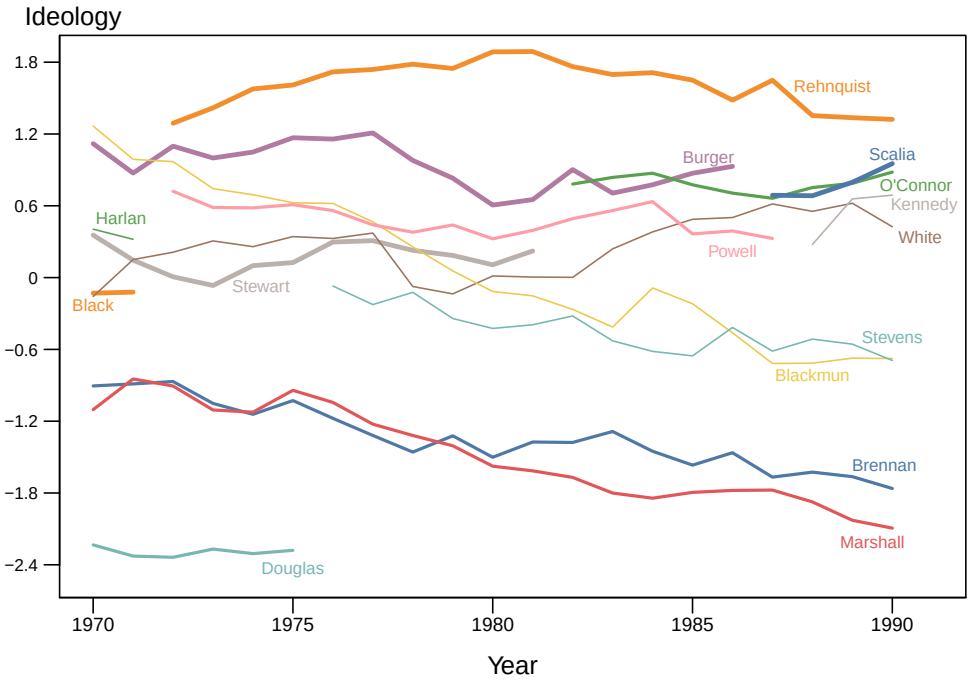

Figure 3: Ideal points of justices, 1970 to 1990

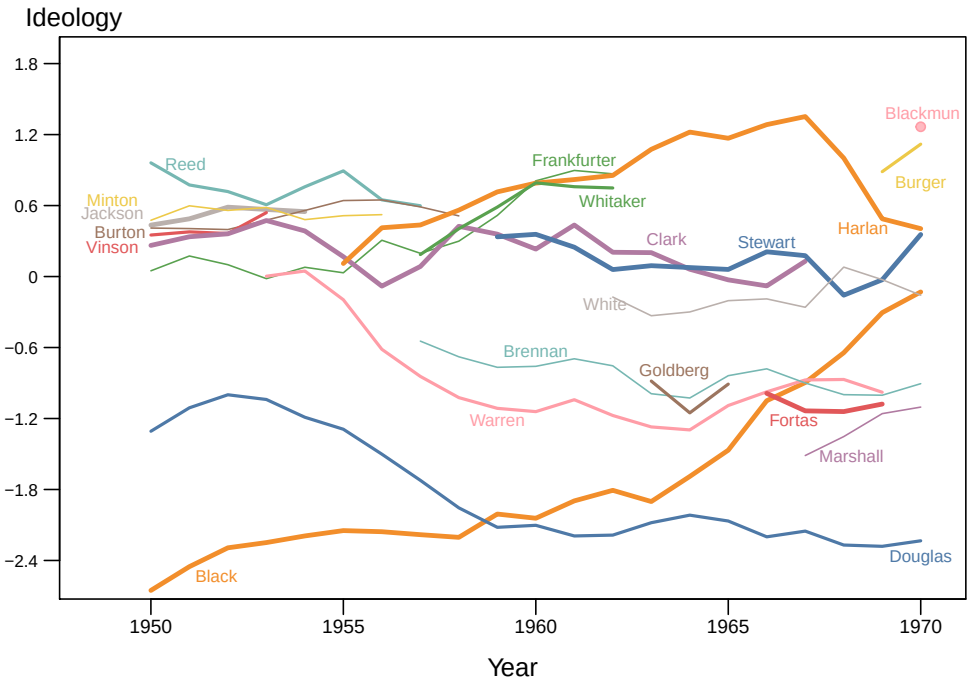

Figure 4: Ideal points of justices, 1950 to 1970

contexts. Figure 5 shows two-dimensional NOMINATE ideal points for selected senators. Using either of these dimensions for across time comparison produces shocking results. For example, if we use the first dimension scores, modern moderate Republicans such as Lincoln Chafee and Susan Collins would be similar to (if a bit *more* conservative) than notorious segregationists like Richard Russell and James Eastland. More conservative Republicans like John McCain would be markedly more conservative than the segregationist senators.

Using the second dimension creates a different – and almost opposite set of issues. The Nominate second-dimension preferences of moderate Democrats like Sam Nunn and Fritz Hollings look like the segregationist senators. And the second-dimension Nominate scores for Chafee and Collins are very liberal, more liberal than Hubert Humphrey and Barack Obama. McCain would be to the left of Obama when using the second dimension, as unbelievable as the implication that he was to the right of the segregationists on the first dimension.

In addition, these Nominate scores are static. It certainly seems plausible that the Senator Hollings of 1970 would differ from the Senator Hollings of 2000, something ruled out by the assumption of fixed preferences. (Other Nominate scores allow for changing preferences but they are explicitly not identified over time and nonetheless produce results with regard to cross-time

comparisons similar to those in Figure 5.)

The problem with Nominate is not an idle problem. The widely used Judicial Common Space scores (Epstein et al., 2007) use Nominate first dimension as their basis.

The bridged estimates reported in this paper differ markedly from Nominate scores. Figure 6 shows the bridged-ideal points for selected senators over time. The segregationists are, as they should be, the most conservative. Those who remained in Congress moderated over time. Strom Thurmond, for example, remained very conservative, but later in his career he hired African-American staff members, something highly unlikely early in his career.

The other patterns make more sense than the Nominate scores as well. Obama is clearly to the left of McCain. Moderate Democrats such as Hollings and Nunn started quite conservative, but moved steadily to the left, a pattern consistent with their eventual support of the 1991 Civil Rights Act, for example. Moderate Republicans like Chafee started quite liberal, but moved to the middle.

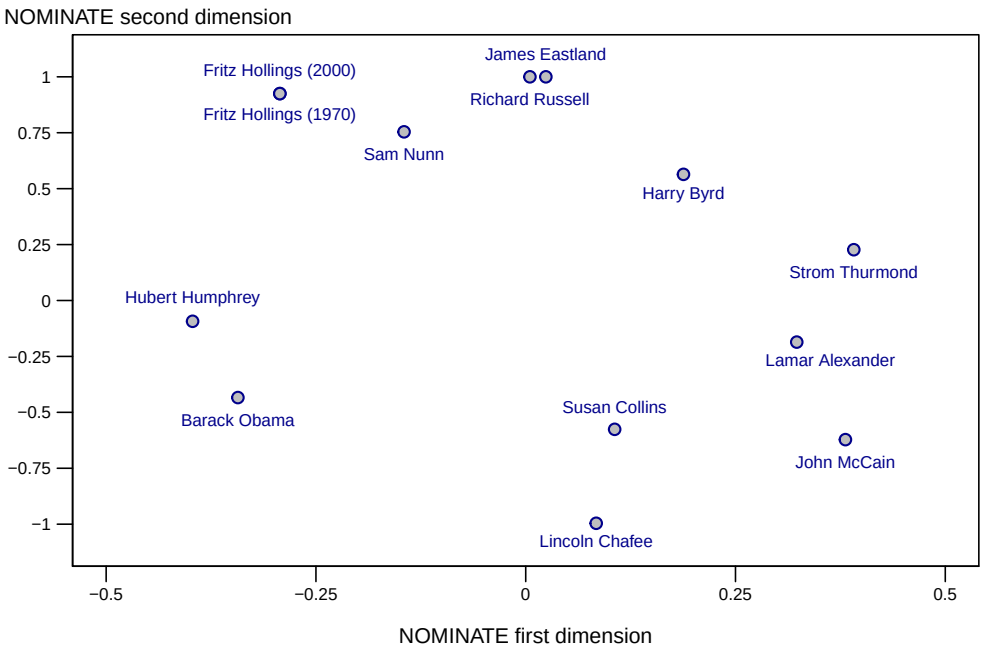

Figure 5: NOMINATE Ideal Points

With more confidence in the face validity of the individual preference estimates, we can also have more confidence in the inter-institutional comparisons. Figure 7 presents the estimated preferences of the presidents and the medians in the Supreme Court, House and Senate. With few exceptions,

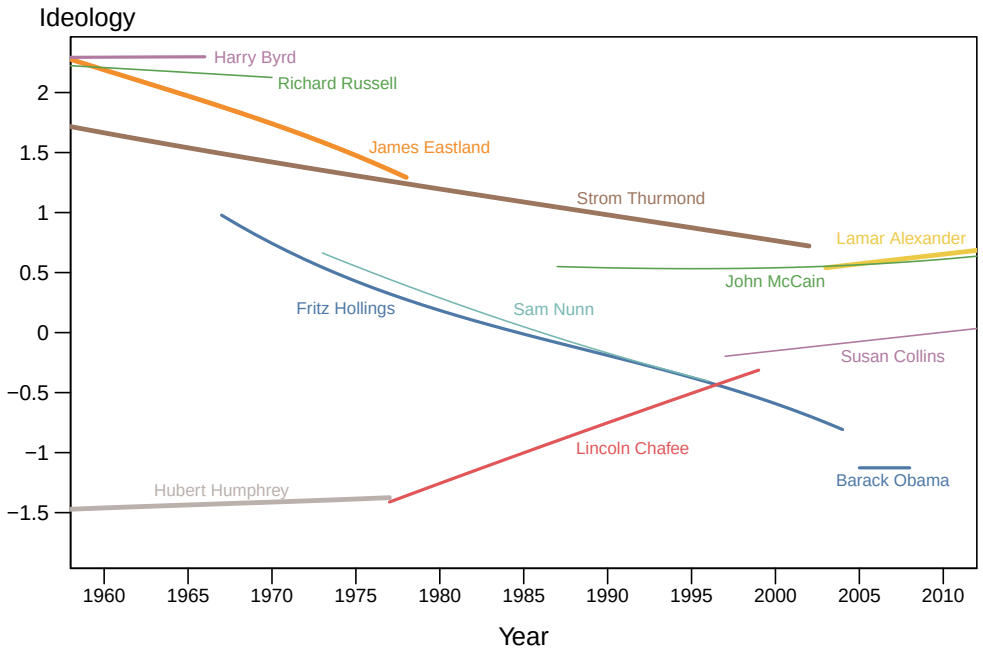

Figure 6: Ideal points for selected senators

the court median is in the space spanned by the other medians, a fact very important in separation of powers models of the court (Clark, 2009; Bailey and Maltzman, 2011; Cottrell, Shipan and Anderson, 2019). Since 2011, the court initially moved left as Kennedy moved in that direction. The median moved strongly to the left when Justice Scalia passed away. By 2019, however, the court median was back to roughly same place as it had been from 2006 to 2015.

These estimates also avoid some of the apparent problems in inter-temporal estimation that occur in models that do not use bridges. As discussed in Bailey (2007) and Bailey (2013), the court medians produced by the Martin and Quinn scores suggest that the court was at a conservative peak in 1973, something at odds with the court's path breaking liberal cases such as *Roe* (Martin and Quinn, 2002).

Figure 8 shows the legal influences on specific justices ranked from those most influenced by the particular legal factor to the least. (Some justices such as Kavanaugh and Gorsuch have less than 20 relevant observations for particular legal factors so do not have estimates.) Justices most influenced by precedent include many of the more liberal justices of the recent court. But some conservative justices also exhibited a concern for precedent. Note that the precedent effect is identified over and above ideology. In order to have a positive estimated effect of precedent one needs, more or less, to

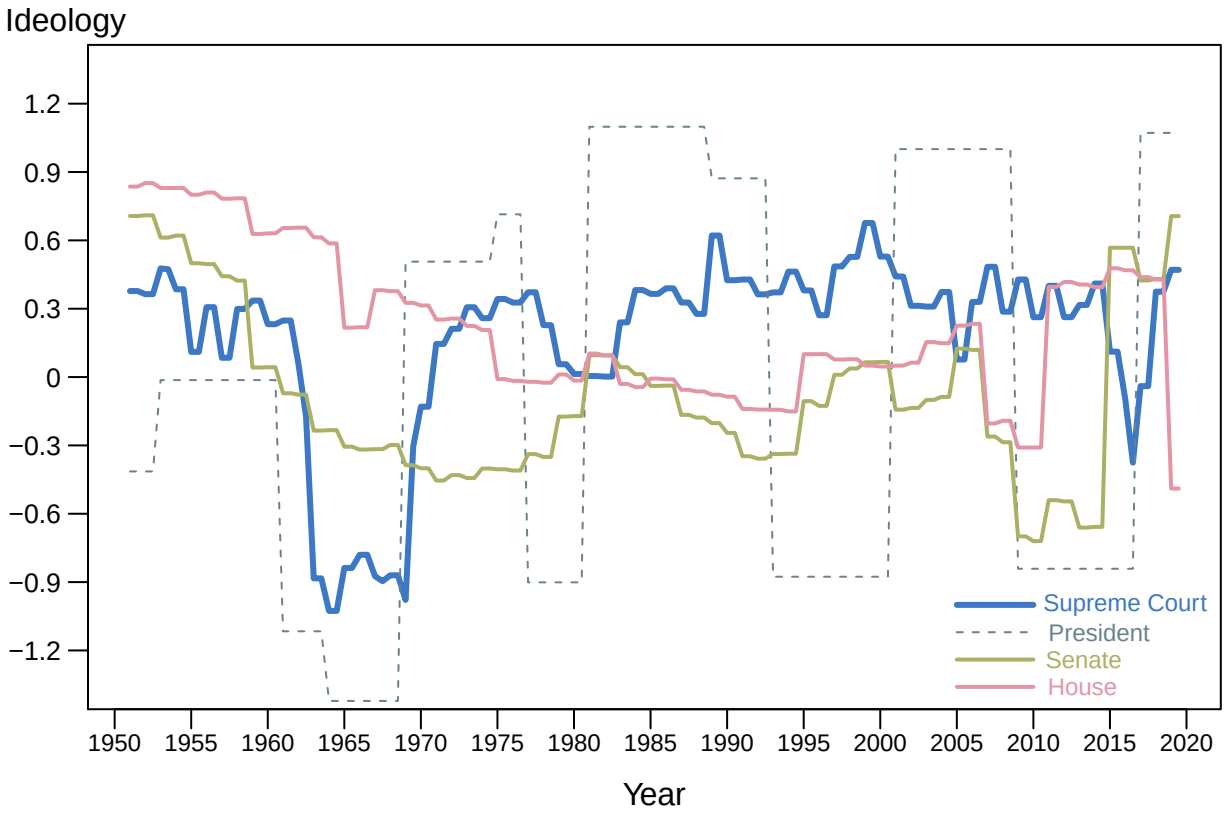

Figure 7: Institutional preferences over time

sometimes vote against one's ideology in favor of precedent on some cases. Roberts vote on *June Medical* is an example (even as that case is not in the data at this point).

Those least likely to vote with precedent also are ideologically mixed, including Justices Fortas, Douglas, Warren, Thomas and Harlan. They are united by the fact that they were serving in a time when they were trying to move the court away from precedents.

Some justices also showed an inclination to defer to Congress, although these tend not to be contemporary justices. Justices with strong ideological views such as Thomas, Black and Douglas have been disinclined to defer to Congress.

Many justices showed signs of being influenced by free speech to be willing to vote against their typical ideology. This includes many on the current court, including Ginsburg, Roberts, Alito and Sotomayor. This list also includes justices famously devoted to the First Amendment including Black and Kennedy.

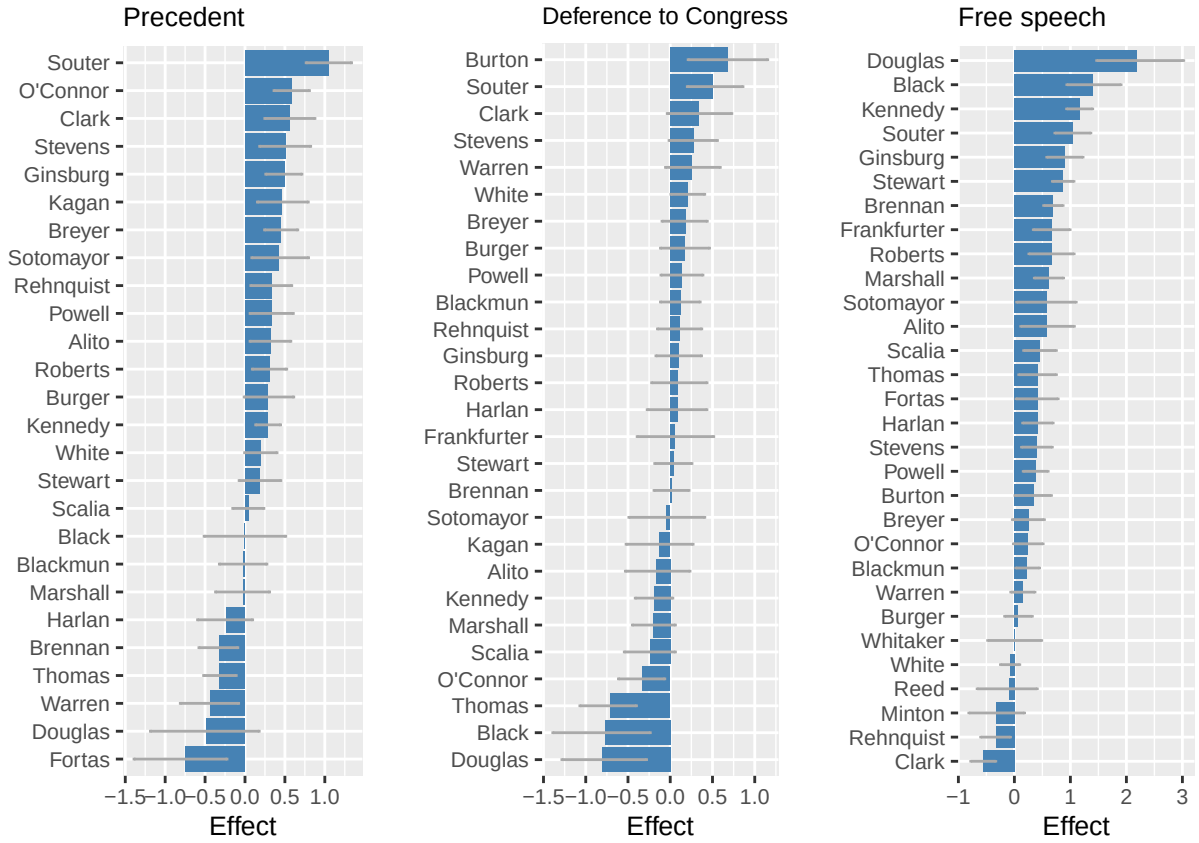

Figure 8: Legal influences on justices

Other legal influences are more limited, but those who do stand out are consistent with their

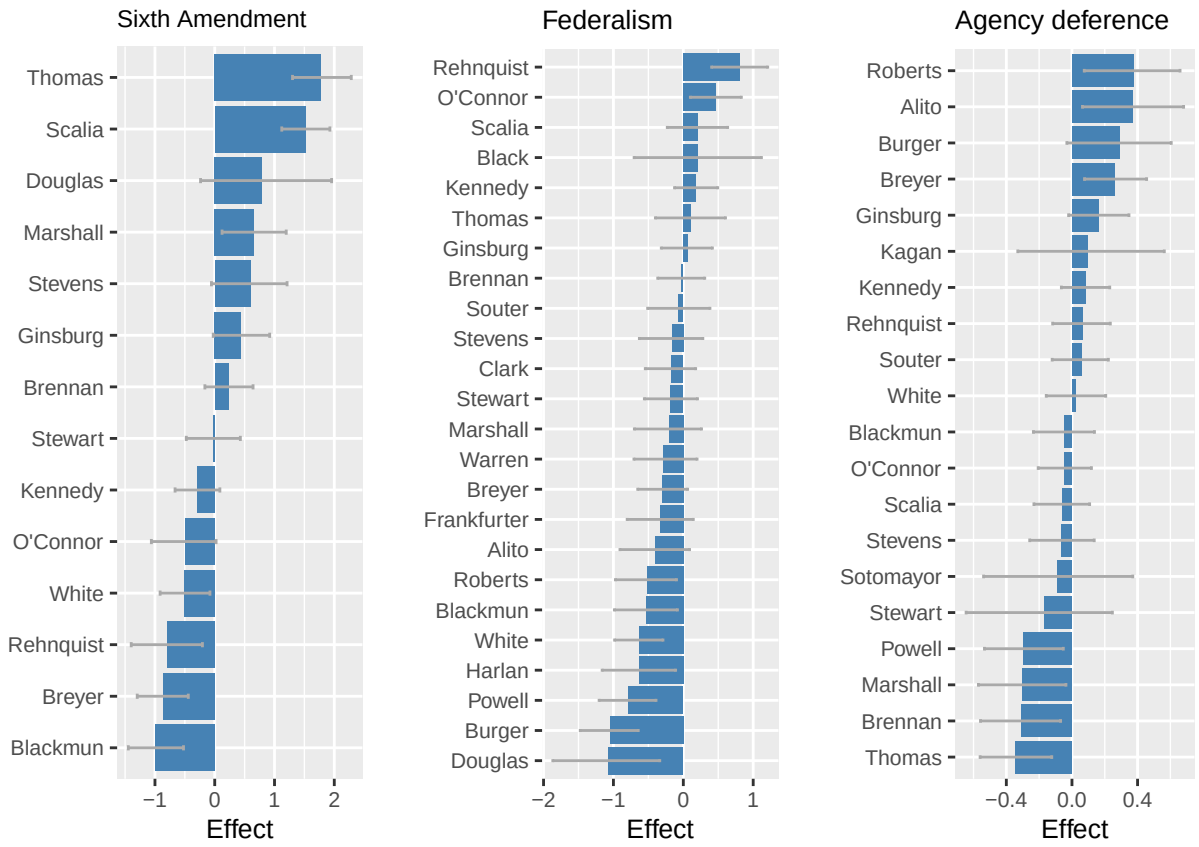

Figure 9: Legal influences on justices - 2

reputations. Justices Scalia and Thomas have famously voted in favor of defendants on Sixth Amendment grounds. On federalism, only Chief Justice Rehnquist and O'Connor showed signs of meaningfully deviating from their ideology on behalf of state authority. For Rehnquist, this is consistent with, in the words of Greenhouse (2020), his central goal of "elevating the role of the states in the federal system." The justices with negative values on this parameter voted in favor of national authority over states.

Finally, Figure 9 shows the estimated variance parameter for each justice. Note that this parameter is not the variance of the ideal point estimates, something that is affected both by justice-specific variation but also by sample size. Instead, these are estimates of how much each justice is prone to vote against his or her typical ideology. Lauderdale (2010) estimated a similar quantity for members of Congress.

Justice-specific variability is interesting in many respects. First, it is interesting descriptively as many accounts of the recent court have tried to understand, for example, specific votes by Gorsuch and others that are odds with their supposed ideological orthodoxy. Second, the fact that justices can be unpredictable has many theoretical implications, including creating incentives for presidents to nominate extreme justices in order to minimize the risks associated with ideological surprises (Bailey and Spitzer, 2018).

The justices who score high on variability are not surprising. Justice Gorsuch has earned widespread notice for being generally conservative, but prone to side with liberals on several high profile cases. Justice Stevens emerged as a solid liberal, but was still apt to side with conservatives from time to time such as on flag burning. Justices Thomas and Scalia have very conservative voting records, but on some issues can side with liberals on textual or other grounds. Among the justices with relatively low levels of variability are several on the current court, including Alito, Kagan and Roberts.

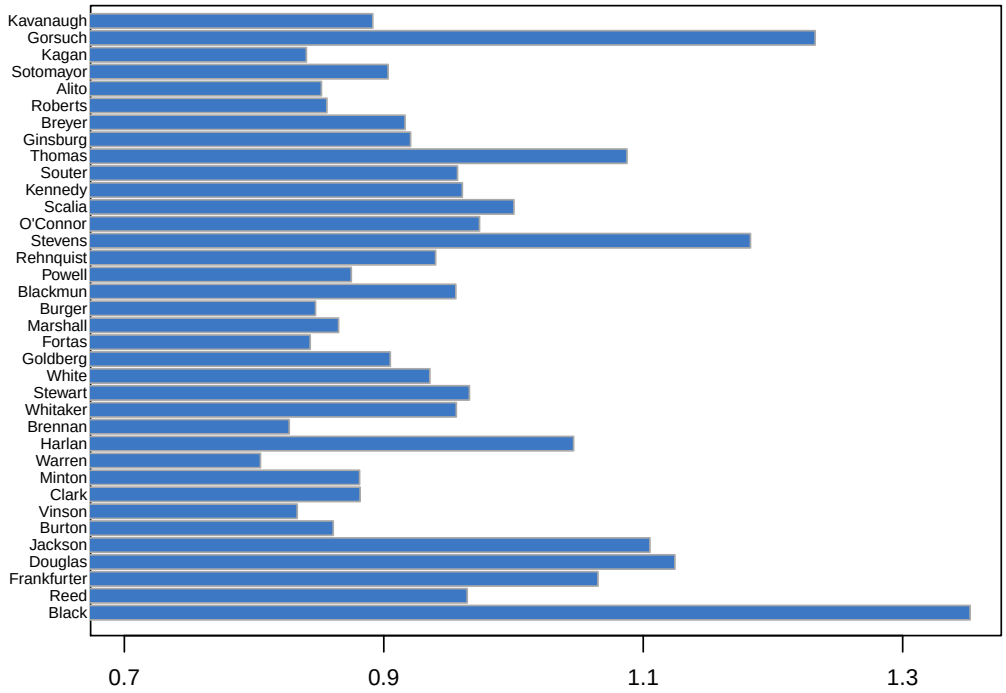

Figure 10: Justice-specific uncertainty

Conclusion

This paper has presented update preference estimates for justices, members of Congress and presidents from 1950 to 2019. These estimates use bridge observations to identify preference change over time and across institutions. These estimates are directly interesting as descriptions of ideological change within and across institutions. They are also useful inputs in tests of theory for situations in which preferences need to be comparable inter-temporally and/or inter-institutionally.

Appendix

Derivation of the IRT model

The latent variable specification in Equation 1 is derived from a random utility framework. Let i = 1,. . . ,N index individuals and v = 1,. . . ,V index votes. The utility of actor i of voting for the conservative alternative is

$$u_i(\lambda_v^C) \quad = \quad -(\theta_{it} - \lambda_v^C)^2 + (\alpha_v^L \delta_i)' D_v^C + \eta_{iv}^C \tag{3}$$

where λ_v^C is the spatial location of the conservative alternative, θ_{it} is the ideal point of the actor at the time of proposal t, α_v^L is a L x 1 vector of the weights placed on the legal variables, δ_{iv} is a L x 1 vector of weight justice i places on legal variables, D_v^C is a L x 1 vector of dummy variables indicating which equal 1 if the legal issue favors the conservative side and 0 otherwise for the L legal variables, and η_{iv}^C is a random shock. The utility of voting for the liberal alternative with spatial location of λ_v^L is analogous.

Let y_{itv}^* be the utility difference between the conservative and liberal alternatives. It is

$$\begin{aligned} y_{itv}^* &= -(\theta_{it} - \lambda_v^C)^2 + \delta_i' D_v^C + \eta_{itv}^C + (\theta_{it} - \lambda_v^L)^2 + \alpha_v^L \delta_i' D_v^L - \eta_{itv}^L \\ &= 2\theta_{it}(\lambda_v^C - \lambda_v^L) + \lambda_v^{L2} - \lambda_v^{C2} + \alpha_v^L \delta_i'(D_v^C - D_v^L) + \eta_{itv}^C - \eta_{itv}^L \\ &= (\lambda_v^C - \lambda_v^L)(2\theta_{it} - (\lambda_v^L + \lambda_v^C)) + \alpha_v^L \delta_i' D_v + \eta_{itv}^C - \eta_{itv}^L \end{aligned} \tag{4}$$

where an element of D_v equals +1 if the legal variable is associated with a conservative outcome, -1 if the legal variable is associated with a liberal outcome and 0 otherwise. Let $\hat{\epsilon}_{itv} = \eta_{itv}^C - \eta_{itv}^L$ be a mean-zero random variable with variance $= \sigma_i^2$, meaning that each individual may have differing degrees to which their behavior can be explained by their ideology. The variance associated with each vote is captured in the discrimination parameter, discussed below.

Re-writing yields

$$y_{itv}^* \quad = \quad \alpha_v(\theta_{it} - \kappa_v) + (\alpha_v^L \delta_i)' D_v + \epsilon_{itv} \tag{5}$$

where $\kappa_v = \frac{\lambda_v^L + \lambda_v^C}{2}$ is the vote cutpoint, $\alpha_v = 2(\lambda_v^C - \lambda_v^L)$ is the vote ''discrimination parameter" and $\epsilon_{itv} = \eta_{itv}^C - \eta_{itv}^L$ is a mean-zero random variable with variance σ_i^2.

Data

In order to ensure that the data corresponds to the assumption of unidimensionality, I limit the sample to cases that are conventionally associated with the standard left-right splits on the Court.

Estimation

This algorithm allows us to draw samples from the posterior distribution of the parameters (Gelman et al 1995, 326; see also Johnson and Albert 1999, 194-197). To start the process, I set provisional ideal points to be the percent of conservative votes by the individual minus 0.5; this anchors conservative ideologies as high values and liberal ideologies as low values. After a "burn in" period, the following iterative procedure will produce random samples from the underlying posterior distribution.

1. Calculate latent propensity to vote conservatively

   Equation 1 implies that y^*_{itv} (where i indicates individual, t indicates term and v indicates vote) will be distributed according to one of the two truncated distributions (see e.g. Jackman 2000, 311)

$$y^*_{itv}|y_{itv} = 1 \quad \sim \quad N(\alpha_v(\theta_{it} - \kappa_v) + (\alpha^L_v\delta_i)'D_v, \sigma^2_i)I(y^*_{itv} > 0) \tag{6}$$
$$y^*_{itv}|y_{itv} = 0 \quad \sim \quad N(\alpha_v(\theta_{it} - \kappa_v) + (\alpha^L_v\delta_i)'D_v, \sigma^2_i)I(y^*_{itv} \leq 0) \tag{7}$$

   where I is an indicator function that serves to truncate distributions above or below zero.

2. Generate estimates for θ_{it}.

   - For justices, we estimate separate ideal points for each year. We use a prior based on the ideal point of each justice in the year preceding (and use a general prior for the first year).
   - For presidents, we estimate a single ideal point for their entire tenure.
   - For members of Congress, we potentially allow their ideal points to evolve over time according to a polynomial function in time. For members of Congress with 8 or fewer years of service, we estimate a single ideal point. For members with between 9 and 16 years of service, we allow for a linear trend. For members with between 17 and 24 years of service we allow for a quadratic trend and for members with more than 25 years of service we allow for a cubic trend.

   Specifically we model $\theta_{it} = X'_{it}\gamma_i$ where γ_i is a 4 x 1 vector where the values of γ_i are constrained to zero following the above protocol.

   Substituting $\theta_{it} = X'_{it}\gamma_i$ into Equation 1 and rearranging yields

$$y^*_{itv} + \alpha_v\kappa_v - (\alpha^L_v\delta_i)'D_v = \alpha_v X'_{it}\gamma_i + \epsilon_{itv}. \tag{8}$$

   Because of the heteroscedasticity implied by the above, use GLS results to calculate the distribution of γ to be

$$\gamma_i \quad \sim \quad N((X'_i\Sigma^{-1}_i X_i)^{-1}X'_i\Sigma^{-1}_i\tilde{y}, \sigma^2_i(X'_i\Sigma^{-1}_i X_i)^{-1}) \tag{9}$$

   where X_i is a $n_i \times 4$ matrix of covariates for individual i, n_i the number of observations for individual i, $\tilde{y} = y^*_{itv} + \alpha_v\kappa_v - (\alpha^L_v\delta_i)'D_v$ and Σ_i is a $n_i \times n_i$ covariance matrix with σ^2_i down the diagonal. I impose a N(0,Ω) prior on γ to identify the preferences of individuals who vote conservatively or liberally all the time. We assume that the means of all γ parameters are zero and that the variances are 1, 0.02, 0.001 and 0.0005, respectively, for the four γ parameters. These values were chosen based on the means of the estimates when priors were looser.

   Without priors, the estimated ideal points can become unbounded. The implementation of the prior follows Gelman et al (1995, 260).

3. Simulate σ^2_i for each individual from an inverse χ^2 distribution.

   A problem with variance parameters is that they can become unbounded (creating a situation in which the variance is very high and the preference parameters are essentially meaningless).

To prevent this, I include an Inv-$\chi^2(n_{0i}, s^2_{prior})$ prior which is equivalent to having observed n_{0i} observations with variance equal s^2_{prior} (Gelman, Carlin, Stern and Rubin (1995, 261).

A variance of s^2_{prior} implies that an individual with an ideal point of 1 (toward the conservative edge of the spectrum) would have about a [for $s^2_{prior} = 0.36 : 5$] percent chance of voting liberal on a vote for which an individual with an ideal point of 0 would have a [for $s^2_{prior} = 0.36 : 50$] percent chance of voting liberal.

We use a prior of $s^2_{prior} = 0.8$ and n_{0i} is the greater of 30 or 20 percent of the votes for an individual. In other words, for each individual, we assume we have at least 30 observations in which the variance was 0.8. This serves to pin down the variance; without this prior, the variance can spiral out of control for some individuals.

The posterior distribution of σ^2_i is Inv $\chi^2(n_{0i} + n_i, \frac{n_{0i}s^2_{prior} + n_i s^2_i}{n_{0i}+n_i})$. To draw from this distribution, draw Z_i from the $\chi^2_{n_{0i}+n_i}$ and let $\sigma^2_i = (n_{0i}s^2_{prior} + n_i s^2_i)/Z$ (where

$$s^2_i = \frac{\sum(y^*_{itv} - \alpha_v\theta_{it} + \alpha_v\kappa_v)^2 - (\alpha^L_v\delta_i)'D_v}{n_i})$$

(see Gelman, Carlin, Stern and Rubin 1995, 480).

For justices we estimate a single σ^2 for each justice over their entire career.

4. Generate $\alpha, \alpha\kappa$ on a vote-by-vote basis.

   If we let $\beta_v = [\alpha_v, \alpha_v\kappa_v]'$ and $\Theta_v = [\theta_{it}, -1]$ (indicating the preference parameter of individual i for vote v which occurred during term t) we can re-write Equation 1 as

   $$y^*_{itv} \quad = \quad \Theta_v\beta_v + (\alpha^L_v\delta_i)'D_v + \epsilon_{itv} \tag{10}$$

   where the variance of $\epsilon_{itv} = \sigma^2_i$. We can use standard weighted least squares results to generate the distribution of β

   $$\beta_v \quad \sim \quad N((\Theta'_v\Sigma^{-1}_v\Theta_v)^{-1}\Theta'_v\Sigma^{-1}_v y^*_v), (\Theta'_v\Sigma^{-1}_v\Theta_v)^{-1})$$

   where Σ_v is a $n_v \times n_v$ covariance matrix with the individual level variance parameters (σ^2_i) of the individuals who voted on vote v on the diagonal and zero elsewhere (with n_v being the number of votes cast on vote v), and y^*_v is a vector of the latent utility differences for all individuals who voted on vote v.

   The discrimination parameter measures vote-specific ideological variance and, as a variance parameter is subject to becoming unbounded as discussed above (see also Baker 1992, 97-98; Mislevy and Bock 1990, 8). I therefore incorporate normal priors on α following Gelman, Carlin, Stern and Rubin (1995, 254, 260). For more guidance on priors in these models, see Johnson and Albert (1999, 192).

   The knowledge we have about the relations between vote cutpoints is incorporated in the following manner. Knowing that a case had a cutpoint lower than another (in the manner discussed in the body of the paper) implies that the cutpoint parameter distribution is truncated at the cutpoint of that other case. Given that cutpoints are jointly distributed with discrimination parameters, I sample from this truncated distribution by drawing from the truncated joint distribution of both vote parameters via rejection sampling.

5. Generate δ estimates for justices.

Re-write Equation 1 so as to isolate the δ parameters on the right-hand side:

$$y^*_{itv} - \alpha_v X'_{it}\gamma_i + \alpha_v \kappa_v = (\alpha^L_v D_v)\delta'_i + \epsilon_{itv}. \tag{11}$$

which implies that

$$\delta_i \sim N(((\alpha^L_v D_v)'\Sigma_v^{-1}(\alpha^L_v D_v))^{-1}(\alpha^L_v D_v)'\Sigma_v^{-1}\tilde{y}_v), \sigma_i^2((\alpha^L_v D_v)'\Sigma_v^{-1}(\alpha^L_v D_v))^{-1})$$

The δ_i parameters are identified because the exclusion restriction that $\delta_i = 0$ for all legal variables for all members of Congress.

6. Generate α^L_v estimates, which are the weight placed on legal variables for each vote.

   This will only be estimated for Supreme Court cases for which there is at least one legal variable with a non-zero value of D_v.

   Re-write Equation 1 so as to isolate the $alha^L_v$ parameters on the right-hand side:

$$y^*_{itv} - \alpha_v X'_{it}\gamma_i + \alpha_v \kappa_v = (\alpha^L_v D_v)\delta'_i + \epsilon_{itv}. \tag{12}$$

   which implies that

$$\alpha^L_v \sim N(((\delta_i D_v)'\Sigma_v^{-1}(\delta_i D_v))^{-1}(\delta_i D_v)'\Sigma_v^{-1}\tilde{y}_v), \sigma_i^2((\delta_i D_v)'\Sigma_v^{-1}(\delta_i D_v))^{-1})$$

A model is unidentified "if the same likelihood function is obtained for more than one choice of the model parameters" (Gelman et al 1995, 422). For fixed-preference one-dimensional models, it is sufficient to fix polarity (meaning, for example, conservative preferences are high values and liberal preferences are low values) and two observations (which I do by setting the mean $\theta = 0$ and variance of $\theta = 1$) (see discussions in Clinton, Jackman and Rivers (2004, 356) and Bafumi, Gelman, Park and Kaplan (2005)).

In the core model above we assumed that the variance of $\epsilon = 1$. If we allowed this variance to equal something else, we could simply re-scale all values of $\alpha_v = \frac{\alpha_v}{\sigma}$ to produce the same likelihood.

When we allow σ to vary by individual, it is possible to re-scale the α_v by any value of σ_i to generate the same likelihood. Therefore, in order to identify the variance parameters, we restrict $\alpha_v = 1$ for a single vote. We choose *Roe v. Wade* as there are many observations that cross institutions and time and this is a reasonable reference point in the ideological space in which the court and political actors operate.

Missing values are not imputed as a computational convenience that does not affect estimation. In order to facilitate convergence to the true conditional densities I deleted the first $80,000$ iterations (often referred to as the "burn in" period) and took every 40th sample produced thereafter until I had $1,000$ MCMC samples.

Identification

Observed votes (as opposed to unobserved latent values above) are denoted by y_{itv}. I address rotational identification (e.g. liberals can have high values or low values) by coding votes in the conservative direction as $y_{itv} = 1$. I identify the location and scale of ideal points by assuming they have mean 0 and variance 1; this is equivalent to fixing two individuals at arbitrary points (see, e.g., Bafumi, Gelman, Park and Kaplan 2005).

References

Bailey, Michael A. 2007. "Comparable Preference Estimates Across Time and Institutions for the Court, Congress and Presidency." *American Journal of Political Science* 51(3):433–448.

Bailey, Michael A. 2013. "Is Today's Court the Most Conservative in Sixty Years? Challenges and Opportunities in Measuring Judicial Preferences." *Journal of Politics* 75(3):821–834.

Bailey, Michael A. 2017. Measuring Ideology on the Courts. In *The Routledge Handbook of Judicial Behavior*, ed. Robert M. Howard and Kirk A. Randazzo. Routledge Press.

Bailey, Michael A. and Forrest Maltzman. 2011. *The Constrained Court: Law, Politics and the Decisions Justices Make*. Princeton University Press.

Bailey, Michael A. and Kelly Chang. 2001. "Comparing Presidents, Senators, and Justices: Inter-institutional Preference Estimation." *Journal of Law, Economics and Organization* 17:477–506.

Bailey, Michael A. and Matthew L. Spitzer. 2018. "Appointing Extremists." *American Law and Economics Review* 20(1):105–137.

Clark, Tom S. 2009. "The Separation of Powers, Court Curbing and Judicial Legitimacy." *American Journal of Political Science* 53(4):971–989.

Cottrell, David, Charles R. Shipan and Richard J. Anderson. 2019. "The Power to Appoint: Presidential Nominations and Change on the Supreme Court." *The Journal of Politics* 81(3):1057–1068.

Epstein, Lee, Andrew Martin, Jeffrey A. Segal and Chad Westerland. 2007. "The Judicial Common Space." *Journal of Law, Economics and Organization* 23(3):303–325.

Farnsworth, Ward. 2007. "The Use and Limits of Martin-Quinn Scores to Assess Supreme Court Justices, with Special Attention to the Problem of Ideological Drift." *Northwestern University Law Review* 101(4):1891–1904.

Greenhouse, Linda. 2020. "The Many Dimensions of the Chief Justice's Triumphant Term." *New York Times* (July 16).

Lauderdale, Benjamin E. 2010. "Unpredictable Voters in Ideal Point Estimation." *Political Analysis* 18(2):151–171.

Lewis, Jeffrey B., Keith Poole, Howard Rosenthal, Adam Boche, Aaron Rudkin and Luke Sonnet. 2020. "Voteview: Congressional Roll-Call Votes Database." https://voteview.com/.

Martin, Andrew and Kevin Quinn. 2002. "Dynamic Ideal Point Estimation via Markov Chain Monte Carlo for the U.S. Supreme Court, 1953-1999." *Political Analysis* 10(2):134–153.

Poole, Keith and Howard Rosenthal. 1997. *Congress: A Political-Economic History of Roll Call Voting*. Oxford University Press.

Segal, Jeffrey A. and Harold J. Spaeth. 2001. *Majority Rule or Minority Will: Adherence to Precedent on the U.S. Supreme Court*. Cambridge University Press.

Segal, Jeffrey A. and Harold J. Spaeth. 2002. *The Supreme Court and the Attitudinal Model Revisited*. Cambridge University Press.

Spaeth, Harold J., Lee Epstein, Andrew D. Martin, Jeffrey A. Segal, Theodore J. Ruger and Sara C. Benesh. 2015. "Supreme Court Database." http://Supremecourtdatabase.org.