Polarized Preferences versus Polarizing Policies*

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Abstract

Much of contemporary political debate in the United States focuses on the issue of polarization: specifically, its causal antecedents and its consequences for policymaking and political conflict. In this article, we argue that partisan preference polarization – conventionally defined as the difference in the favored policy positions of legislators from the two major parties – is not a sufficient statistic for potential political conflict in national politics. Rather, a well-defined measure of potential conflict must take into account (1) the locations of status quo policies and proposed alternatives; and (2) the shape of underlying utility functions. We propose measures of the likely contentiousness of a given status quo policy, and of a proposal to move that policy. We then demonstrate the usefulness of these measures using estimates of utility function and final passage vote parameters on enacted legislation from the 111th Senate (2009-2011).

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1 Introduction

Jack and Jill live down the street from each other in a gated community whose bylaws dictate that the exteriors of all houses be painted the same color. Jack's family share the same favorite color: green. They uniformly hate yellow. Jill's family most prefer yellow, and hate green. Both families find blue an uninspiring second choice. One year, the homeowner's association settles on blue as the mandated color. Some time passes, and the measure is debated again. This time, Jill proposes yellow, which narrowly passes. Nothing else changes between the two families. Common sense would suggest that if there is any animosity between the families, it should be higher in the second period than the first. However, applied to this example, the logic underlying common interpretations of measures of political polarization implies that the propensity for conflict between the families is the same in both periods.

The foregoing example captures a key intuition behind the critique of these measures and a proposal for the alternative measures we make in this paper. That intuition is that the distance between decision-makers' ideal points is not a sufficient statistic for the friction between them; comprehensive measures of the potential for political conflict must reflect the options on the table and the tradeoffs among them. To put this another way: political disagreement is a necessary but not sufficient condition for political conflict. While ideal point polarization is clearly a critical component in the constellation of causes of contemporary political dysfunction in the United States, resting explanations on ideal point polarization alone omits first-order effects that may dramatically enrich the narrative.

To address this concern directly, we propose three measures of potential political conflict that take as inputs both the preference profile of a legislature (as with conventional measures of polarization) as well as policy alternatives. The first two measures consider the contentiousness of a status quo policy independent of the alternative. To understand the logic underlying the first, suppose there exists a readily identifiable welfare-maximizing policy, and that the status quo is gridlocked away from it. One reason for this departure from the social optimum may be the political or fiscal infeasibility of utility transfers that might

arise in a multilateral bargaining environment that would smooth a transition to the more efficient policy by compensating losers. The total magnitude of such unrealized transfers, then, is a measure of how unproductively "stuck" the status quo policy is. We refer to the general class of such measures as "Transfer Potential" (TP) measures, and examine a version of the measure within the Nash bargaining framework (NTP).

The second measure, labeled *marginal resistance potential* (mRP), captures the willingness of political losers – those on the right wing when the status quo is relatively far to the left, and vice versa – to invest resources in making incremental change from a status quo policy in their preferred direction via means outside of the ordinary legislative process – electoral, legal, or even extra-constitutional.

Our third measure of potential political conflict, labeled *absolute resistance potential* (aRP) considers the anticipated friction from proposed departures from a given status quo policy, and is formalized as the total cost to those who stand to lose from such a departure (or, alternatively, what they would need to receive as a transfer in order to become indifferent with respect to the change).

After describing some properties of these measures, we estimate them for a range of possible status quo policies and proposal/status quo pairs using data from the 111th Senate. First, we estimate senator and vote parameters using one-dimensional alpha-NOMINATE (Carroll et al. 2013). This procedure, which nests quadratic and gaussian functional forms for the systematic components of legislator utilties, is particularly appropriate given the critical importance of the shapes of utility functions, and not just ideal points, in our analysis. Next, we describe the three measures as applied to this specific legislative body and, as a heuristic exercise, discuss how the aRP measure applied to specific legislation enacted during the 111th Congress accords with our qualitative intuitions about the level of controversy associated with those bills.

We conclude by showing how asymmetries in legislator utility functions derived from institutional incentives can dramatically change our predictions about the likely contentiousness

of specific legislative proposals and providing a preliminary analysis of the relationship between our measures and conventional measures of polarization. Before proceeding, we wish to be clear that we do not mean to suggest that those conventional measures capture nothing meaningful about the potential for friction or conflict within a political system. Rather, our analysis suggests that political polarization is best thought of as an important but insufficient factor governing political conflict.

2 Background: Related Research

The research presented here builds on a number of literatures in political science and political economy. The first, unsurprisingly, is the copious literature on the polarization of American politics. Pioneered by Poole and Rosenthal in their groundbreaking (1984) article, this strand of research may be fruitfully divided into three (often overlapping areas). The first of these seeks to document the emergence and extent of polarization among elites and the mass public. Among elites, heavy focus has been placed on the U.S. Congress. The portion of this research focused on legislative ideal points derived from recorded roll call votes is most closely identified with Poole and Rosenthal and their co-author Nolan McCarty (See, especially McCarty, Poole, and Rosenthal 2016). An important finding in this research is the concurrent rise of party polarization and increase in the unidimensionality of voting in Congress (Poole and Rosenthal 2007), where the first dimension captures "the substance of party conflict" (McCarty, Poole, and Rosenthal 2016; see also Barber and McCarty 2013). Other scholars documenting the extent of elite polarization have supplemented roll call vote information with surveys of politicians (Shor and McCarty 2011) and campaign finance records (Bonica 2014). At the level of the mass public, Fiorina and Abrams (2009) argue that citizens are considerably less polarized than their elected officials, a point disputed by Abramowitz (2010). More recently, Iyengar, Sood, and Lelkes (2012) provide evidence suggestive of increasing personal antagonism across party lines – so called "affective" polarization. The consequences of polarization have also been the subject of considerable scrutiny, including the

examination of the consequences of political polarization for legislative productivity (Binder 2003; McCarty 2007), and the detailing of the deterioration of informal cooperative norms that previously characterized Congress (Sinclair 2006, 2008; Mann and Ornstein 2012).

A second body of research that we draw on concerns constitutional design, particularly in conflict-prone states. Most important in this regard is Przeworski (1991), who argues that a critical function of constitutions is to "lower the stakes" of politics by taking certain political outcomes off the table. While our focus is not on constitutional design per se, our analysis explicitly considers what sorts of policy proposals would raise the stakes in ways likely to exacerbate political conflict.

Our analysis also draws on the theoretical and empirical literature concerning "buying off" critical legislators to secure enacting coalitions on policy (Snyder 1991; Evans 2004; Jenkins and Monroe 2012; Gordon and Hafer 2007). Specifically, two of our measures frame the question of the harm to losers associated with hypothetical policy changes in terms of the magnitude of transfers that would be necessary to effect specific policy changes (whether efficient or inefficient).

This research is also related to papers exploring the relationship between polarization, policy making, and political dysfunction given the supermajoritarian political institutions of the U.S. national government. Gordon and Landa (2017*a*), for example, demonstrate that under a broad range of circumstances, a shock to a common problem faced by all actors in a political system can increase political polarization but simultaneously create a space for welfare-enhancing policy change. And the formal literature on federalism (e.g., Crémer and Palfrey 2000, 2006; Gordon and Landa 2017*b*; Hafer and Landa 2007) shows how the federal structure of the United States creates important asymmetries in preferences over federal policymaking. In particular, Gordon and Landa (2017*b*) explore the consequences of these asymmetries for polarization, gridlock, and political conflict at the national level. In an extension below, we adopt a reduced-form representation of those asymmetric preferences to clarify the effect of the asymmetry on the contentiousness of policy proposals.

Lastly, the research presented here is close in spirit to a series of papers by Esteban and Ray (1999; 2008), in which the authors draw a distinction between polarization on the one hand and conflict (in their analysis, violent civil conflict) on the other. Drawing on their earlier theoretical work on the measurement of polarization (Esteban and Ray 1994), the authors demonstrate, using a conflict-success technology, that increased polarization in a society may make conflict less likely, but its incidence more severe; and that the effect of polarization is itself contingent on the payoffs to various actors of the non-conflict outcome (analogous to payoffs from the status quo policy in our examination).

3 Measuring Potential Conflict in Legislatures

3.1 How Contentious is the Status Quo?

Suppose that a policy is gridlocked. One question we might ask is the extent to which, in a broader sense, that policy is likely to engender opposition from those most opposed to it, taking the preference profile as given. We explore two different ways to come at this question: one based on a logic of transfers and one based on a logic of marginal disutility to legislators from the gridlocked policy.

In what follows, we will suppose that there are n legislators indexed by $i \in \{1, \ldots, n\}$. There is a unidimensional policy space $X \in \mathbb{R}$, with specific policies denoted by $x \in X$. We will let x° denote a status quo policy and x^* the policy that maximizes the joint utility of the n legislators.[1] Each legislator has utility function $u_i := X \to \mathbb{R}$, with $\mathcal{U}$ denoting the preference profile.

The First Measure: Unrealized Transfers to Political Losers. The Coase theorem implies that given (a) unanimity rule; (b) unconstrained inter-legislator transfers; (c) no

[1]We do not distinguish here between the preferences of the legislature and those of the citizenry more broadly. Of course, it could be the case that a policy gridlocked away from x^* might be better from the standpoint of the citizenry than x^* itself. To the extent that we are endeavoring to measure potential conflict among legislators, however, x^* remains a relevant quantity.

transaction costs; and (d) full information, legislative bargaining will yield a Pareto efficient outcome consisting of the socially optimal policy x^* and an $n \times 1$ vector of (positive and negative) transfers $\mathbf{t}$ whose elements sum to zero.

Of course, the very premise of legislative gridlock implies the presence of unrealized gains from trade that prevent the political system from realizing the optimal policy. There are several sources of transaction costs that might perpetuate inefficiency. Acemoglu (2003) and Bednar (2009) point to two in particular: commitment problems emerging from the incentive to renege on the part of the interests that control the government at a given time, and opportunistic burden-shifting and shirking by some states at the expense of others.

A somewhat distinct consideration that is particularly relevant to us concerns the dimensionality of the underlying issue space. A natural interpretation of transfers that states could make to each other is as policy concessions trading off gains and losses across different, possibly less salient policy dimensions. This would, of course, entail the policy space being non-trivially multidimensional (in contrast to the assumption of unidimensionality here). But, with limited exceptions, policy conflict at the national level in the U.S. has been (consistent with our model) largely unidimensional, particularly since the early 1980s (Poole and Rosenthal 2007).

In light of this, a natural summary metric for the extent to which a status quo policy creates friction is the absolute magnitude of unrealized transfers for a given gridlocked status quo, preference profile, and legislative bargaining protocol – what might be labeled *transfer potential*. One may think of transfer potential as reflecting how much gridlock "leaves on the table." Critically, because we are interested in the sentiments of *losers* – that is, legislators outside of a hypothetical winning coalition – unrealized transfers are calculated assuming unanimity rule rather than actual chamber rules.

While many legislative bargaining protocols are possible, for simplicity we employ the Nash bargaining solution, which satisfies appealing properties (Pareto efficiency, symmetry, scale invariance, and independence of irrelevant alternatives) and extends easily to a mul-

tilateral framework (Krishna and Serrano 1996). It is straightforward to demonstrate that the transfer to legislator i associated with a Pareto efficient move from x° to x^* under the Nash framework, $t_i^{Nash}(x^\circ, x^*)$, is given by

$$\begin{aligned} t_i^{Nash} &= \frac{1}{n}\left(\sum_{j\neq i}(u_j(x^*) - u_j(x^\circ)) - (n-1)(u_i(x^*) - u_i(x^\circ))\right) \\ &= E[u_i(x^*) - u_i(x^\circ)] - (u_i(x^*) - u_i(x^\circ)). \end{aligned}$$

In words, the transfer to legislator i is equal to the shortfall, associated with the policy shift, in the legislator's utility gain from the policy shift from the average utility gain. Let T^+ denote the set of legislators for whom $t_i > 0$. Then, noting that $\mathcal{U}$ induces x^*, the transfer potential measure under Nash bargaining is given by

$$NTP(x^\circ,\mathcal{U}) = \sum\nolimits_{i\in T^+} t_i^{Nash}. \tag{1}$$

A property of NTP that will prove useful in comparing with the alternative measures discussed below is the following: if and only if the status quo is the socially optimal policy ($x^\circ = x^*$), then $NTP(x^\circ,\mathcal{U}) = 0$. This is, of course, immediate from the foregoing: no one would part with resources to effect zero change in the policy.

The Second Measure: Marginal Resistance Potential. For this section we will assume that all legislators have single-peaked preferences with i's ideal point given by $\hat{x}_i$. Consider that conflict over policy is embedded in a broader political environment. In a well-functioning democracy, conflict in that environment is engendered by electoral competition, judicial challenges to statutes, interest group advocacy, etc. In a poorly functioning political system, that environment may also encompass violent threats to the regime itself. What we are interested in is the incentives of political actors to contest a status quo policy through channels outside of the process of ordinary legislation.

Note that any status quo policy x° divides the legislature into two sets: those who

would prefer an incremental rightward shift, and those who would prefer a leftward shift. Denote the first set S^+ and the second S^-. We would like to derive a measure capturing the extent of dissatisfaction among the losers associated with a particular status quo policy, and accordingly, their willingness to invest effort to shift the status quo policy incrementally in the direction of their ideal points. When the status quo is relatively low, losers will be mostly on the right; when high, on the left.

An index of an individual legislator's incentives to contest a gridlocked status quo policy x° in the broader political arena is the absolute value of that legislator's marginal utility evaluated at x°. This reflects, in a sense, the legislator's willingness to invest in shifting the status quo policy incrementally in the direction of their most preferred policy (recalling the maintained single-peakedness assumption). An absolute marginal utility of zero corresponds to a legislator's ideal point, in which case she would be willing to invest nothing. Suppose a legislator's utility were globally concave; under such circumstances, her resistance individual potential would be increasing in the absolute distance between her ideal point and the status quo, $|\hat{x}_i - x^\circ|$. If, on the other hand, a legislator's utility was convex over some interval (as in the case of the Gaussian functional form assumed for the kernel of legislator utility functions in all but one version of the NOMINATE procedure for estimating ideal points – see below), then there may be status quo policies so distant from the legislator's ideal point that an investment in incremental change is "not worth it."

Let $mRP^+(x^\circ) \equiv \sum_{i \in S^+} \left.\frac{\partial u_i(x)}{\partial x}\right|_{x=x^\circ}$ denote the *right-side marginal resistance potential* (that is, the total resistance potential of legislators favoring a rightward shift in policy), and correspondingly, $mRP^-(x^\circ) \equiv -\sum_{i \in S^-} \left.\frac{\partial u_i(x)}{\partial x}\right|_{x=x^\circ}$ the left-side marginal resistance potential. Overall, marginal resistance potential is given by

$$mRP(x^\circ) \equiv \max\{mRP^+(x^\circ), mRP^-(x^\circ)\}. \tag{2}$$

Before proceeding, we note two interesting properties of the resistance potential measure. First, if the status quo is the socially optimal policy ($x^\circ = x^*$), then $mRP^+(x^\circ) = mRP^-(x^\circ)$.

This is immediate upon inspection by noting that the first order condition for x^* is equivalent to $mRP^+(x^*) = mRP^-(x^*)$. While the proof is trivial, the substantive interpretation is interesting. In particular, what it suggests is that at the social optimum, rightward and leftward political forces are, ceteris paribus, balanced.[2]

Second, suppose each legislator has a strictly concave utility function. Then $mRP^-(x)$ is strictly increasing from zero and $mRP^+(x)$ is strictly decreasing toward zero. The intuition is as follows: mRP^- is driven by two factors: the number of legislators in S^- and the extent of their disaffection from the status quo policy x°, as represented by each of their marginal utilities evaluated at that policy. If (but not if and only if) utilities are strictly concave, then each of these factors points in the same direction: as the status quo moves to the right, the number of legislators in S^- grows, and each legislator in S^- grows increasingly disaffected because of decreasing marginal utility. If utilities were not strictly concave, these factors could move in opposite directions, making the relationship between mRP^- and x° ambiguous. An identical logic holds for mRP^+.

3.2 How Contentious is a Policy Proposal?

The *NTP* and *mRP* measures each take as their arguments the status quo policy and the preference profile of the deliberative body under study. These measures provide an answer to the question, how unhappy are people with the policy currently in place? A related, though distinct question concerns policy proposals: given the policy in place, how unhappy would people be with a hypothetical policy that replaced it?

To answer this question, suppose that legislators have single-peaked preferences. Without loss of generality, assume a status quo policy x° and a proposal $x > x^\circ$. In the absence of transfers, given status quo policy x° and proposal x, there exists a cutpoint $\tilde{x} \in (x^\circ, x)$ that divides legislators into a set that would support the proposal, $S^x \equiv \{i|\hat{x}_i \geq \tilde{x}\}$ (assuming

[2]Note also that the relationship is not "if and only if" – the two *mRP* measures could be equal at local minima in a social welfare function that is not globally concave.

indifferent legislators support the proposal), and a set of legislators that would vote for the status quo, $S^\circ \equiv \{i|\hat{x}_i < \tilde{x}\}$.

Now suppose, first, that $q > \frac{n}{2}$ legislators are needed to enact a proposal; and second, that a proposer may offer a vector of transfers to individual legislators to secure their support. The cost-minimizing strategy for the proposer will be to allocate zero transfers if $|S^x| \geq q$, and otherwise allocate transfers to those legislators that are closest to indifferent between x and x° up to their respective points of indifference to secure a coalition of size q.[3] Label the set of legislators *ultimately* supporting the policy (*after* the cost-minimizing transfer strategy has been implemented) Q^x. Then the *absolute resistance potential* (aRP) of proposal x given status quo x°, threshold q, and preference profile $\mathcal{U}$ is

$$aRP(x, x^\circ|q,\mathcal{U}) \equiv \sum\nolimits_{i \notin Q^x} (u_i(x^\circ) - u_i(x)). \tag{3}$$

The intuition behind aRP is simple: it represents aggregate utility loss associated with a policy shift to those excluded from the ultimate support coalition – or, alternatively, the total amount of transfers to losers that would be necessary to make them indifferent to the proposal. Note that clearly, aRP is decreasing in q: the smaller the set of hypothetical "losers" associated with a proposal, the less the aggregate loss associated with the change it would entail. By the same token, ceteris paribus an increase in q will lead to a broader range of potentially gridlocked policies, which will tend to increase resistance to the status quo (as captured by NTP and mRP measures).

[3]In equilibrium, the proposer, in trading off between the benefits of the policy shift and the cost of transfers, will typically moderate her proposal away from her own ideal point. Insofar as we are considering transfers associated with *any* proposal, this is immaterial to our derivation. Likewise, we do not explicitly consider the strategic consequences of counteroffers by proponents of x°, which will generally increase the number of legislators to whom a proposer might make transfers above those necessary to achieve q (Groseclose and Snyder 1996). One may regard the quantity q as a reduced form representation capturing both formal legislative rules and such strategic considerations.

4 Empirical Approach

To assess the practical value of the three metrics described above, we apply them to the 111th Senate (2009-2010). This setting is the first two years of the Obama presidency, in which the Democrats assumed unified control of government for the first time since 1994. This, combined with the financial crisis of the preceding two years, rendered the political environment ripe for major legislative change, which we observed in the form of landmark legislation including the American Recovery and Reinvestment Act, the Affordable Care Act, and the Dodd-Frank Wall Street Reform and Consumer Protection Act.[4]

To estimate legislative utility functions (including ideal points) as well as yea- and nay-locations on policies (for final passage votes), we rely on the anominate package in R (Carroll et al. 2017). This package estimates the relevant parameters using the Alpha-NOMINATE methodology described in Carroll et al. (2013). Alpha-NOMINATE is a fully Bayesian method for estimating ideal points and vote characteristics that was designed to adjudicate between different assumptions about the shapes of the deterministic portions of legislators' utility functions: in particular, the Gaussian shape assumed in all variants of NOMINATE since Poole and Rosenthal (1985), and the quadratic shape typically assumed in Bayesian Item Response Theoretic (IRT) approaches (e.g., Clinton, Jackman, and Rivers 2004). Alpha-NOMINATE takes advantage of the fact that the Taylor Series representation of a Gaussian function is an infinite sum of quadratics. In particular, adopting the standard random utility framework, under Gaussian utility the payoff to a vote by legislator i with ideal point $\hat{x}_i$ for policy x_j is given by

$$u_i(x_j) = \beta \sum_{i=0}^{\infty} \frac{(-\frac{1}{2}w^2(\hat{x}_i - x_j)^2)^i}{i!} + \varepsilon_{ij}, \tag{4}$$

[4]The more prosaic reason for using the 111th Senate is that we wish to avoid the temptation to "cherry-pick" a Congress that best demonstrates the value of our approach. The 111th Senate, it turns out, is the demonstration dataset included with the statistical package we employ to derive the inputs to our measures. We leave the task of comparisons across different Senates to future research.

where β is a signal-to-noise parameter, w is a weight (set to a constant value of $\frac{1}{2}$ in this implementation), and ε_{ij} is an idiosyncratic error term. Alpha-NOMINATE models the legislator's utility as a mixture. Noting that the first term in the sum in (4) is equal to β, the procedure represents a legislator's utility as

$$u_i(x_j) = \beta - \frac{1}{2}w^2(\hat{x}_i - x_j)^2 + \alpha\beta \sum_{i=2}^{\infty} \frac{(-\frac{1}{2}w^2(\hat{x}_i - x_j)^2)^i}{i!} + \varepsilon_{ij},$$

where $\alpha \in [0, 1]$ is a parameter to be estimated. If x_j denotes a proposal (yea vote) paired against a status quo x_j° (nay vote), then the probability of a yea vote is $\Pr[u_i(x_j) > u_i(x_j^\circ)]$.

For our purposes, the value of this procedure is that it permits us to remain agnostic as to which model better captures legislator utility, allowing the data to inform the answer to that question. This is particularly useful in a context where, as noted above, the shape of legislators' utility functions is as important as their ideal points. For α close to zero, utilities are best approximated by the quadratic; whereas for α close to one, the Gaussian provides the better fit. Note that in either case, utilities are still assumed to be *symmetric*. We return to this issue below.

We simulated 60,000 draws from the posterior distribution of the parameters of the mixture distribution using roll call data from the 111th Senate, discarding the first 10,000 as a burn-in, and retaining every tenth iteration. We calculate our resistance potential and hypothetical Nash transfer measures for each draw over a range of possible status quo points, presenting the 95 percent credible interval for the measures as a function of the status quo.

To estimate unrealized transfers associated with hypothetical (proposal, status quo) pairs, we derive our measure employing the posterior means of the Senators' ideal points as well as the mean of the posterior distribution for α and β. We then use the mean estimates for the Yea and Nay locations to examine where specific pieces of legislation from the 111th Senate fall relative to the measure, in order to assess the measure's face validity.

5 Results

5.1 Preliminary: Alpha-NOMINATE Ideal Point Estimation

Before proceeding to the main portion of our empirical analysis, we pause to describe the results of the ideal point estimation outlined in the preceding section. The left panel of Figure 1 displays a scatterplot of posterior mean ideal points from the alpha-NOMINATE procedure plotted against the more commonly used W-NOMINATE scores. The correlation between the two measures is nearly perfect, the exception being at the extreme ends, where the latter is constrained to lie between -1 and 1. Also displayed in this panel are the 95% credible intervals from the posterior distribution of the ideal points. As is evident from the graph, with only a handful of exceptions, the ideal points are very tightly estimated.

Figure 1 About Here

The right panel of the figure plots smoothed densities for the posterior mean ideal point distributions of Republicans in the 111th Senate (red, on the right) and Democrats (blue, on the left). The figure replicates others reported in the literature, showing substantial polarization between the parties.

Consistent with Carroll et al. (2013), we estimate a very high posterior mean for the shape parameter α parameter: 0.9987 (95% credible interval: 0.9951 to 0.9999). This suggests that legislator utilities are better approximated by a gaussian than quadratic functional form. Finally, the posterior mean β (the signal-to-noise ratio) is 12.27 (11.47 to 13.15). Trace plots for these parameters indicate good convergence of the MCMC algorithm.

5.2 Contentiousness of Status Quo Policies

Figure 2 displays, for a range of status quo policies, our two measures of political friction that we would anticipate associated with each policy, derived from the posterior distribution of parameters describing Senators' utilities. For each policy on the range from -1 to 1, we

calculated, for each of the 5,000 retained draws from the posterior, the transfer and marginal resistance potential measures. These are plotted along with their associated 95% credible intervals. Also depicted in the figures are the jointly efficient policy, x^*, as well as the posterior mean of the median senator's ideal point, denoted $\hat{x}_m$. Note that these two values do not converge (and would only do so under restrictive assumptions on the shapes of utility functions or distribution of ideal points.)[5]

Figure 2 About Here

As noted above, both measures are minimized at x^*. Owing to the divergence of this policy from the median's ideal point, this suggests that a more majoritarian set of institutions in the Senate would not be conflict minimizing.

Other than these features, there are two observations to take away from the pictures. First, other than being on different scales, the two measures are nearly identical. Second, to the left of the socially efficient policy, both measures are dominated by the concerns of the political right wing. As the status quo policy increases, those concerns are muted, and so the policy measures of conflict decline. To the right of the socially efficient policy, it is the left-wing that is most alienated by the status quo policy. As the status quo policy gets even more conservative, the resistance potential and transfer measures increase accordingly. We should expect contention to increase as the status quo moves in either direction.

5.3 Political Conflict over Proposals

aRP. We next turn to our discussion of polarizing proposals. We estimated absolute resistance potential (aRP) using posterior mean ideal points and other parameter estimates for the 111th Senate. Figure 3 displays the aRP measure over a grid of proposals x (the vertical axis) and status quos x° (the horizontal axis). When examining this figure, it is critical to keep in mind that it does not represent individual policies in a two-dimensional space.

[5]The mean posterior ideal point also diverges from x^*, albeit by a smaller amount.

Rather, it represents *pairs* of policies in a one-dimensional space. In the figure, the 45° line represents all cases in which the proposal is equal to the status quo. The lines parallel to this diagonal denote "iso-spread" curves: all points on one of these lines correspond to proposals and status quos that differ by a constant amount, i.e., $x - x^\circ = k$. Ceteris paribus, therefore, points farther away from the 45° line correspond to larger policy changes entailed by adoption of the proposal. The white diagonals perpindicular to the iso-spread lines are iso-cutpoint lines: All points along one of these lines correspond to the same cutpoint dividing the proposal and status quo, i.e., $\frac{x+x^\circ}{2} = k$. The black curves are contour lines for $aRP(x, x^\circ)$. Also depicted in the figure are the estimated yea and nay alternatives corresponding to final passage votes on legislation passed during the 111th Congress (discussed in further detail below).

Figure 3 About Here

Before proceeding to the specific legislation in question, several key features of the figure stand out. First, unsurprisingly, departures from the 45 degree line correspond, ceteris paribus, to higher levels of *aRP*, and thus to more contentious proposals in relation to the status quo policy. Second, this relationship is itself conditioned by the cutpoint between the status quo and alternative: proposals for a large move from an extreme to a more moderate policy (the lower left and upper right) will engender less opposition than comparatively small moves from a moderate to a more extreme one. Accordingly, the slopes of the contour lines may be thought of as marginal rates of substitution between spread and cutpoint on *aRP*. The final aspect of the figure to note is that it is not precisely symmetric – owing to asymmetries in the distribution of ideal points. This underscores the fact that *aRP* is a function not just of the proposal and status quo locations, but also of the underlying preference profile.

Evaluating the Controversy Associated with Specific Proposals. To ascertain the validity of the *aRP* measure, we overlay on Figure 3 the estimated yea and nay locations

for final passage votes on 40 pieces of legislation that became law during the 111th Congress. Table 1 displays the bill titles.

Table 1 About Here

Before discussing specific pieces of legislation, two important caveats are in order. The first concerns estimation. As noted in Poole and Rosenthal (2007) and Poole (2005), while the cutpoint between yea and nay locations is precisely estimated, the locations themselves, which pick up roll-call-specific error variances, are not as precisely estimated. Alternative approaches to estimating the locations include Woon (2008) and Peress (2013), who exploit the positions of bill co-sponsors; and Clinton and Meirowitz (2001), who incorporate constraints on nay locations in voting agendas.

The second concerns vote-buying: suppose on purely spatial grounds, a proposal fell five votes short of the 60 necessary to invoke cloture, but that the leadership is able to buy off the remaining five. Assuming that the leadership targets the five senators who are closest to indifferent, this will have little effect on the ideal point estimates. However, it will bias the estimated yea and nay locations, as these estimates will reflect the yea votes of the 5 "bought" senators as well as the 55 who favored the legislation on its merits, rather than the latter set alone. Both of these considerations suggest that what follows should be interpreted as a heuristic exercise.

It is immediate that the two proposals that score highest on aRP are HR3590 and HR4872. The first of these is the Affordable Care Act, perhaps the single most contentious legislative proposal in a generation. The ACA was signed into law on March 23, 2010, having passed the Senate 60-39 the preceding December. The Senate voted on HR4872, the Health Care and Education Reconciliation Act of 2010, just two days later: the purpose of the bill, which was brought under budget reconciliation, was to fix differences between the House and Senate that could not be done in conference following the Democrats' loss of their filibuster-proof majority. HR4872 passed the Senate 56-43 (with three Democrats voting against).

Three other pieces of legislation with high aRP are HR1, the American Recovery and Reinvestment Act (the stimulus package), which passed the Senate 61-37 early in the term; HR4314 (which increased the debt ceiling by $290 billion in December of 2009) and HR4851 (a continuing resolution financing various federal programs). Two other controversial measures from the 111th Congress: the Dodd-Frank Wall Street Reform and Consumer Protection Act, (which passed the Senate 59-39 in May of 2010) and the Lily Ledbetter Fair Pay Act (which passed 61-36 in January of 2009) score relatively high on aRP. By contrast, bills like the Legislative Branch Appropriations Act of 2010 (HR2918) and the one for Appropriations to the Department of Homeland Security (HR2891) score low on aRP.

6 Asymmetric Utility Functions

The foregoing has maintained the assumption, ubiquitous in the ideal point estimation literature, that preferences are Euclidean and therefore, that utilities are symmetric about an ideal point. Political environments may exist, however, in which preferences (either induced of primitive) over policies are asymmetric. One such environment, for example, is where the national government sets a floor level of either regulation or public goods provision, and in which states may "top up" above that floor but not set policy below it, i.e., "top down" (Gordon and Landa 2017*b*; Crémer and Palfrey 2000, 2006). Gordon and Landa (2017*b*) demonstrate that in such environments, and in the presence of cross-state externalities, the induced preferences of states over national policy may be single-peaked but asymmetric. This condition arises because increases in the national policy up to the policy the state would impose on its own are all upside from that state's perspective, which gets to enjoy the spillovers from the burdens imposed on other states while paying none of the costs. By contrast, policies above a state's ideal state-level policy come with both costs and benefits.

The functional forms for the induced preferences derived in that paper over national policy are complicated, involving integrals of CDFs of underlying preference parameters. In what follows, we adopt the following reduced form representation of federalism-induced

asymmetric preferences, which has the shape that closely approximates the derived preferences in Gordon and Landa (2017*b*):

$$u_i(x|\hat{x}_i,\theta) = \begin{cases} \frac{2\theta\exp(x)}{\exp(\hat{x}_i-\theta)} - \theta^2 - 2\theta & \text{if } x < \hat{x}_i - \theta \\ -(x-\hat{x}_i)^2 & \text{otherwise,} \end{cases} \tag{5}$$

for $\theta > 0$. This piecewise function is exponential to the left of $\hat{x}_i - \theta$, and quadratic to the right. (Note that in this context, values of x to the left correspond to "less" federal involvement in a policy, traditionally the politically right-wing position.) These functions intersect at $\hat{x} - \theta$ (i.e., the function is continuous); and, moreover, have the same slope at that point. The left panel of Figure 4 displays examples of this utility function, for $\theta = 0.1$ and $\hat{x} = 0.25, 0.5$, and 0.75.

Figure 4 About Here

Next, we calculated the *aRP* measure for a grid of status quo policies and proposals for a simulated legislature consisting of 99 members with ideal points uniformly distributed from 0.01 to 0.99. (Deriving an algorithm that estimates ideal points and a value of θ for an actual legislature given the posited functional form is a task we leave for future work.) A contour map of the aRP measure appears in the right panel of Figure 4.

The result is unmistakable: the asymmetry in the utility functions induced by federalism creates a corresponding asymmetry in the level of conflict associated with different proposed policy changes. Specifically, absolute resistance potential associated with even a small increase in the scope of the federal policy is likely to generate substantially more resistance than a push to decrease the policy by an equivalent amount – holding everything else symmetric. This suggests a conservative bias in national policy making in federal systems that has been insufficiently explored.

7 Is Polarization Irrelevant?

Up to this point, we have remained silent on the relationship between the measures described above and conventional measures of polarization. This does not imply that we believe the traditional measure is in and of itself immaterial in describing the nature and extent of political conflict. It does suggest, however, the importance of exploring its relationship with the measures described above.

With this in mind, suppose, for the purpose of exposition, that utilities are quadratic: $u_i(x) = -(x - \hat{x}_i)^2$. Then the socially efficient policy is equal to the mean ideal point. Insofar as the quadratic functional form implies that absolute marginal utilities are strictly increasing in the distance from the mean, it is immediate that an increase in polarization implies that even if the political system were able to achieve the first best, the extent of polarization would imply greater resistance (in the *mRP* sense) from *both* sides of the political spectrum. In contrast to *mRP*, *NTP* will equal zero at the social first best irrespective of the level of polarization. To the extent that we want to understand conflict potential across institutions and levels of polarization, this fact clearly points to a limitation of the latter measure compared with *mRP*.

The relationship between polarization and absolute resistance potential is, in contrast, more, rather than less, subtle. Again assume quadratic utilities, and suppose that (a) the status quo is moderate and (b) a party makes a proposal somewhere in the range of the ideal points of its members. If that policy proposal is relatively extreme and polarization is low, a bunch of moderates from that party will be unhappy with the proposal and may require buying off, possibly along with moderates from the other party.

Now suppose polarization is high. Now "moderates" in the proposing party are relatively extreme, meaning they like the extreme proposal more, and may not have to be bought off at all: this is the *attractor* effect of polarization. But the moderates in the *other* party hate it more – the *repulsor* effect. These two effects move in opposite directions, potentially yielding non-monotonic effects of polarization on the *aRP* measure evaluated at different

status quo/proposal pairs.

To demonstrate this, we conducted a simulation with the following steps: (1) construct a hypothetical legislature composed of 50 "Democrats" uniformly distributed on the interval from 0 to Δ (with $\Delta < 1$), and 50 "Republicans" on the interval from $1 - \Delta$ to 1. It is straightforward to demonstrate that polarization (the difference between the mean Republican and Democrat) is equal to $1 - \Delta$. (2) Randomly draw $U(0, 1)$ status quos, and $U(1 - \Delta, 1)$ (i.e. "Republican") proposals. (3) Calculate the aRP measure for each draw. We then repeated steps (1)-(3), varying the value of Δ (and hence polarization). Figure 5 plots aRP against polarization).

Figure 5 About Here

Note that for any value of polarization, the aRP measure is minimized at zero – this corresponds to situations in which the proposal is equal to the status quo. More interesting is the maximal aRP at different levels of polarization (highlighted by the blue line). When polarization is relatively low and increases, the attractor effect appears to dominate, driving down maximum aRP. By contrast, when polarization is relatively high, the repulsor effect dominates, and consequently the maximal aRP is increasing in polarization.

8 Conclusion

Our goal in this paper has been to present a critique of relying on ideal point polarization as the summary statistic of the degree of contention or conflict potential in a political system and, constructively, propose measures that may be used to supplement polarization in order to capture this key feature of politics. Although the measures we suggest correspond to attractive formalizations of the micro-level incentives of political actors, our approach has been reduced-form in that we do not proceed by specifying an explicit game with opportunities for the actors to engage in political conflict and the dependence of the policy-making process on the expectations of actors' choices with respect to those opportunities. A key reason for

adopting this approach is to avoid committing to a particular set of assumptions about such a game, for one may reasonably expect the political resistance or conflict to materialize in ways corresponding to a large family of strategically distinct interactions. The measures we focus on operate apart from but also in relation to such interactions. In effect, the underlying assumption, which seems to us to be a plausible approximation, is that the opportunities to effect a resistance to a policy or policy change are largely independent of the incentives to engage in such resistance – so, focusing, as we do, on the potential incentives to resist is without substantial loss of generality.

That plausibility notwithstanding, it is important to recognize the value in pursuing the analysis of models with an explicit possibility of conflict. And, indeed, our focus on the potential for such conflict underscores important dimensions of political analysis that have been missing from the existing work on policy-making and its dysfunctions. One such possible dimension concerns the implications of conceiving the relationship between political actors in the context of a repeated policy-making-and-conflict interaction. A plausible equilibrium expectation in such a context may be a norm of incremental, as opposed to radical, policy change: even if a radical policy change may garner enough votes to pass in a one-shot setting, it may, in a repeated game setting, trigger a retaliation through costly actions by others, including policy losers, that deters the attempts to move the policy by more than an incremental distance. We hope our analysis stimulates work on re-conceiving the incentives in policy-making to take a fuller account of this and other possibilities entailed in its conflict-generating potential.

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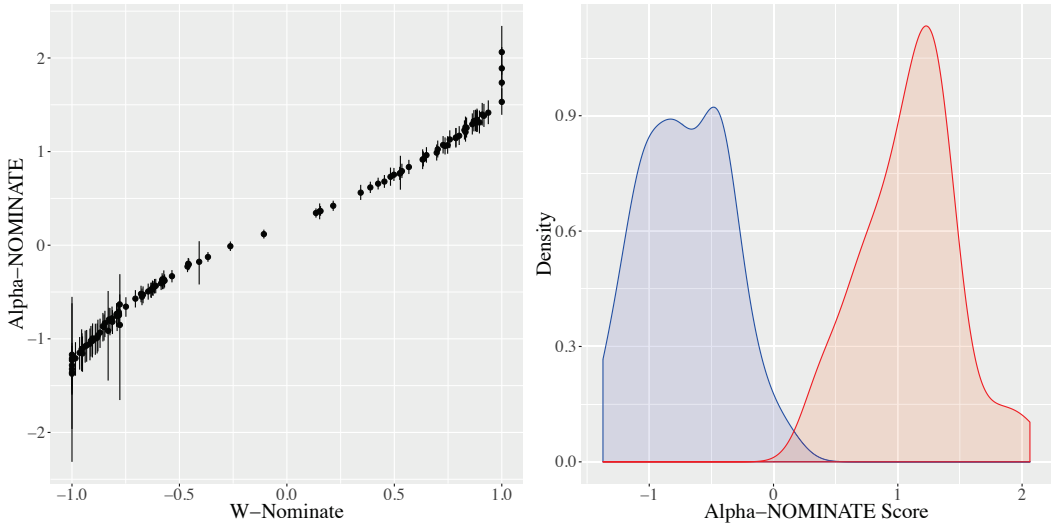
Table 1: Final Passage Roll Call Votes Included in Analysis

HR1	American Recovery and Reinvestment Act of 2009
HR2	Children's Health Insurance Program Reauthorization Act of 2009
HR146	Omnibus Public Land Management Act of 2009
HR627	Credit CARD Act of 2009
HR1256	Family Smoking Prevention and Tobacco Control Act
HR1388	Serve America Act
HR1586	FAA Air Transportation Modernization and Safety Improvement Act
HR2346	Supplemental Appropriations Act, 2009
HR2847	Hiring Incentives to Restore Employment Act
HR2892	Department of Homeland Security Appropriations Act, 2010
HR2918	Legislative Branch Appropriations Act, 2010
HR2996	Department of the Interior, Environment, and Related Agencies Appropriations Act, 2010
HR2997	Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2010
HR3081	Continuing Appropriations Act, 2011
HR3082	Continuing Appropriations and Surface Transportation Extensions Act, 2011
HR3183	Energy and Water Development and Related Agencies Appropriations Act, 2010
HR3288	Consolidated Appropriations Act, 2010
HR3326	Department of Defense Appropriations Act, 2010
HR3357	To restore sums to the Highway Trust Fund, and for other purposes.
HR3435	Making supplemental appropriations for fiscal year 2009 for the Consumer Assistance to Recycle and Save Program.
HR3548	Worker, Homeownership, and Business Assistance Act of 2009
HR3590	Patient Protection and Affordable Care Act
HR4173	Dodd-Frank Wall Street Reform and Consumer Protection Act
HR4213	Unemployment Compensation Extension Act of 2010
HR4314	To permit continued financing of Government operations.
HR4691	Temporary Extension Act of 2010
HR4851	Continuing Extension Act of 2010
HR4872	Health Care and Education Reconciliation Act of 2010
HR4899	Supplemental Appropriations Act, 2010
HR5297	Small Business Jobs Act of 2010
S22	Omnibus Public Land Management Act of 2009
S160	District of Columbia House Voting Rights Act of 2009
S181	Lilly Ledbetter Fair Pay Act of 2009
S386	Fraud Enforcement and Recovery Act of 2009
S454	Weapon Systems Acquisition Reform Act of 2009
S510	FDA Food Safety Modernization Act
S896	Helping Families Save Their Homes Act of 2009
S1023	Travel Promotion Act of 2009
S1390	National Defense Authorization Act for Fiscal Year 2010
S1963	Caregivers and Veterans Omnibus Health Services Act of 2010

Figure 1: Alpha-NOMINATE Ideal Point Estimation for the 111th Senate



The left panel plots posterior means and 95% credible intervals for Senators' ideal points from the Alpha-NOMINATE procedure against estimates using W-NOMINATE. The right panel displays smoothed kernel density estimates for posterior means for Democratic and Republican Senators.

Figure 2: Measures of Political Friction from Gridlocked Status Quo Policies

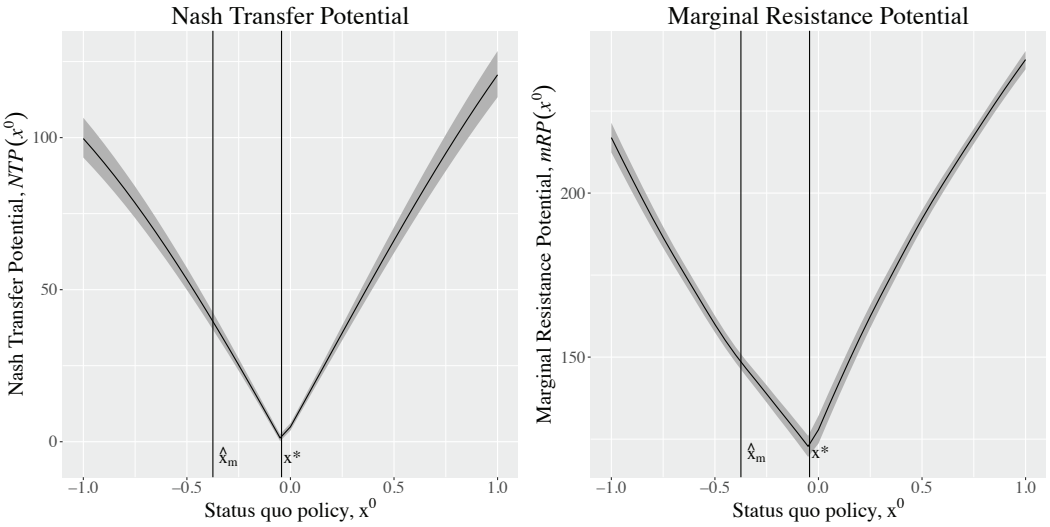
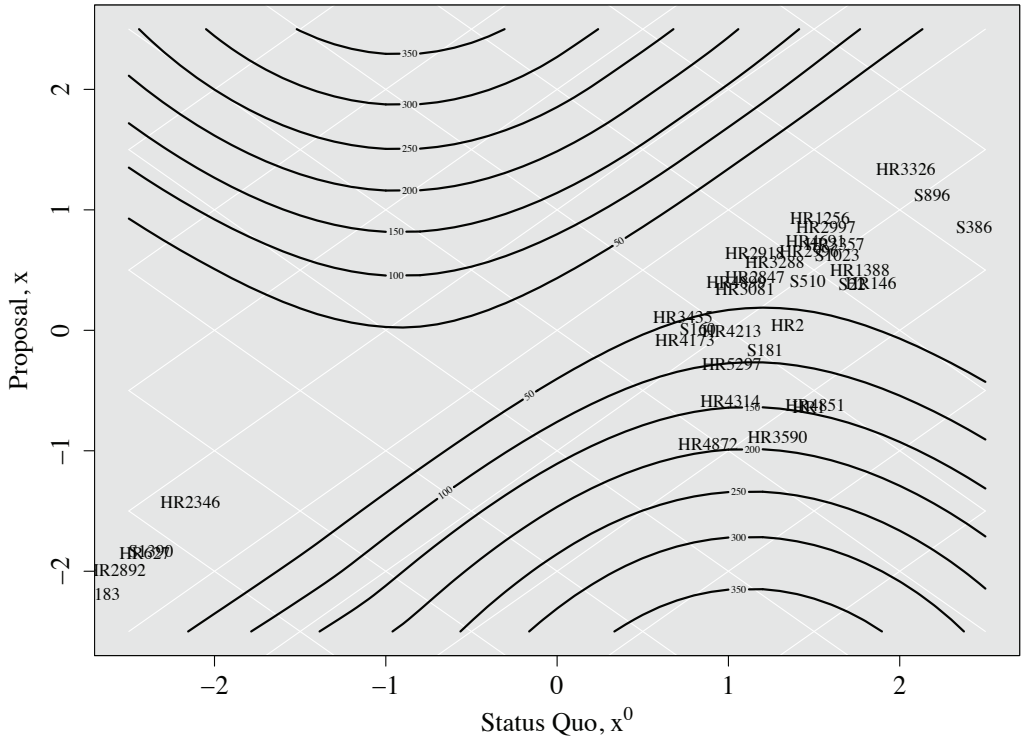
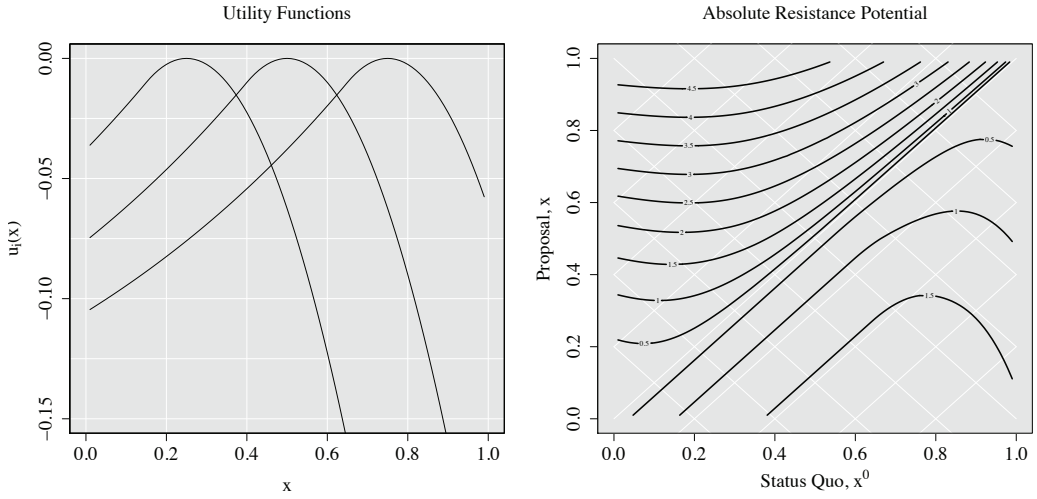


Figure 3: Absolute Resistance Potential for Different proposal/status quo pairs



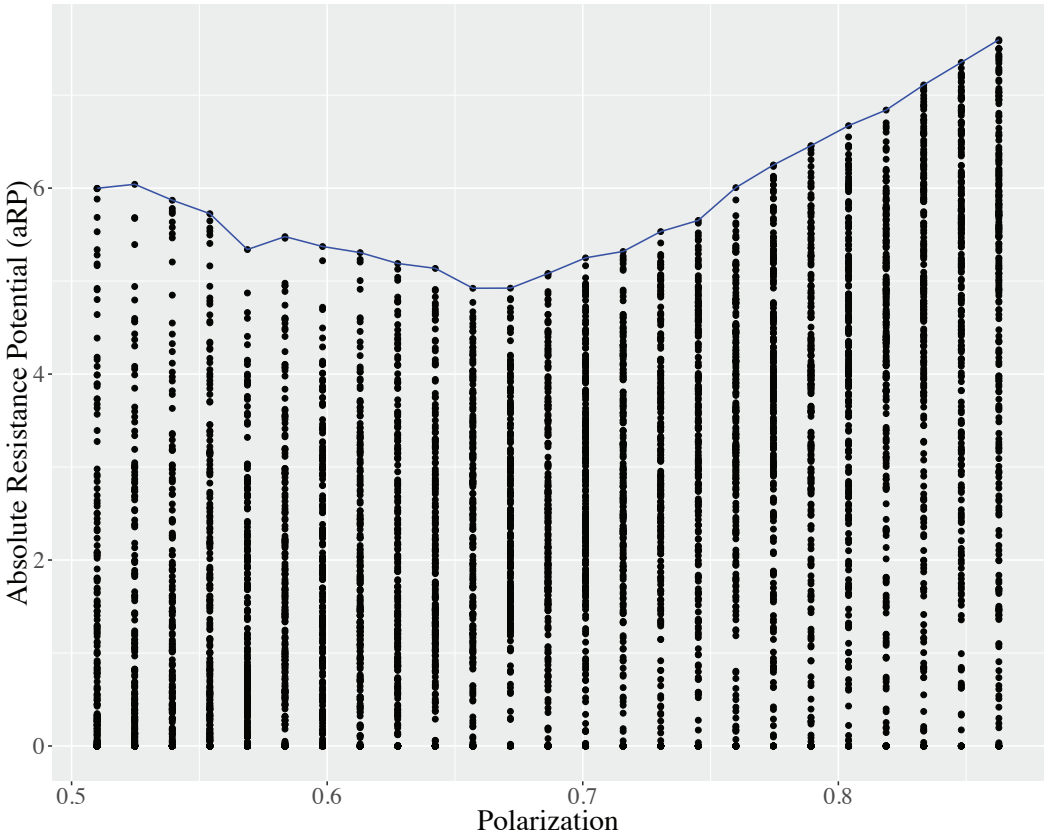
The black curves are contour lines for the $aRP(x, x^\circ)$ measure described in the text, using ideal point estimates and ancillary parameters estimated via Alpha-NOMINATE for the 111th Senate. The white upward-slanting lines are iso-spread curves, each of which corresponds to a constant value of $x - x^\circ$. The white downward-slanting lines are iso-cutpoint curves, each of which corresponds to a constant value of $\frac{x+x^\circ}{2}$. See Table 1 for a description of legislation whose yea and nay alternatives are plotted.

Figure 4: Absolute Resistance Potential given Simulated Asymmetric Preferences



The left panel displays the reduced-form asymmetric utility functions described in the text for legislators with ideal points at 0.25, 0.5, and 0.75, respectively ($\theta = 0.1$). The right panel displays contour lines for $aRP(x, x^{\circ})$ given those utility functions for a simulated 99-person legislature with ideal points uniformly distributed from 0.01 to 0.99. See the note for Figure 3 for a description of iso-cutpoint and iso-spread lines.

Figure 5: The Relationship Between *aRP* and Polarization in a Simulated Legislature



Each point depicts aRP for a randomly drawn status quo/proposal pair holding constant polarization (see text). Maximal values for each simulated value of polarization displayed in blue.