Examining Congress with a Two-Dimensional Political Space

John H. Aldrich
Duke University

David W. Rohde
Michigan State University

and

Michael W. Tofias
Duke University

AUGUST 2004

Abstract

In earlier work we have found that it is not innocuous to assume a one-dimensional political space for the purposes of empirical work regarding the US Congress. Analysis that takes into account only the first dimension from an ideal point estimation procedure may be missing important information regarding the underlying structure of politics. In this paper we explore the theoretical underpinnings of the conditional party government argument with a formal model.

Prepared for the American Political Science Association Annual Meeting, Chicago, Illinois, September 2-5th, 2004. Material from this paper has been presented at the 2003 and 2004 History of Congress Conferences. Special thanks goes to Michael Munger and Michael Ting for their helpful comments. For the latest version of this paper as well as previous iterations and code please check http://www.duke.edu/~mwt/cpg

Introduction

Conditional Party Government (cpg) argues that the degree of partisan polarity in Congress affects the extent to which party organizations within the legislature are given greater powers and thereby more effectively can arrange the policy making process to achieve the (more consensually held) policy goals of the majority party. In this way, majorities can move policy away from the overall center of policy preferences in the legislature. One of the most powerful mechanisms that a majority has available is manipulation of the agenda. Congressional agenda manipulation (and other cpg maneuvers) may provide a micro-foundation to the macro-level results obtained by Erikson, MacKuen, and Stimson (2003). As they argued, feedback mechanisms concerning national policy may exist. They claim that it is common for the majority party to "overshoot" the policy inclinations of the public; the majority party moves policy closer to their own ideal than the public as a whole desires. The overshoot sets in motion feedback, presumably via elections, that begins to shift policy sentiment and as a result might strengthen the minority party and move policy back toward the center. Of course this may be achieved through a new majority party, which may overshoot once more, this time in the opposite direction, continuing the cycle. From this perspective, if the "cpg" account is correct, it plays a central role in understanding the dynamics of party, policy, and elections, while giving a central role to the actions of elites that has been missing from the macropolity account.

In earlier studies, (Aldrich, Rohde, and Tofias 2004, Aldrich, Berger, and Rohde 2002, etc.) we have examined the historical variability of cpg, requiring the development of an over-time comparable measure of what we call the "condition" in conditional party government. We include a brief statement of the most recent measure in the appendix to this paper. In this study, we seek to provide a more theoretical justification for this type of measure. Aldrich and Rohde (e.g., 2000) have long argued that the theory of cpg is particularly relevant for multidimensional policy spaces, although they have also developed their theory to fit unidimensional as well as multidimensional policy spaces. Since our recent empirical work has focused on the 2-dimensional nature of Congress, it seems important to develop a theoretical model that is also 2-d. The purpose of this study, therefore, is to understand what theory might lie behind the measurement of a multidimensional space of the original cpg measure. In a sense we are studying "clouds of preferences" in two dimensions and the way that their shapes might affect congressional policy making.

Conditional party government begins when electoral mechanisms screen, select, and induce candidate-legislators into performing certain behaviors. From that behavior, politicans reveal a set of underlying preferences for legislation (whether "true" personal preferences or induced preferences or, most likely, both).[1] Revelation occurs through voting on the floor and other policy-making actions. These preferences may be shaped by legislators' personal views (or Fenno's goal of making good public policy) as well as the consequences flowing from the reelection incentive. Members' behavior, we further assume, may also be shaped to a considerable degree by the legislative party. While parties as electoral institutions likely have the larger impact on behavior, we do assume that the parties may have considerable effect on members' behavior through their partisan

[1] This discussion is based on Aldrich and Rohde (2000).

legislative institutions. Further, the relative importance of the party, as a legislative institution is a consequence of the degree to which the "condition" in conditional party government is satisfied. By satisfaction of the condition, we mean the degree to which the preferences of party members are similar within each party (particularly the majority), and different between the parties. Because the degree of satisfaction is partially due to electoral forces, the electoral party and the internal legislative party are closely related.

Three sets of consequences flow from the increasing degree to which the condition is satisfied. First, members of a party are increasingly likely to choose to provide their legislative party institutions and party leadership with stronger powers and with greater resources, the greater the degree to which the condition is met. Second, the party will be expected to employ those powers and resources more often, the greater the satisfaction of the condition. Third, provided that the majority party has (by virtue of its being the party that organizes the legislature) more powers and resources to employ than the minority party, then legislation should reveal that fact. In particular, the greater the degree of satisfaction of the condition in conditional party government, the farther or more frequently the policy outcomes should be skewed from the center of the whole Congress toward the center of opinion in the majority party. This policy consequence can be seen as a tug-of-war between the chamber and the majority party within it, contesting over the pull of the policy center of the legislature and the push toward the center of the majority party.

We offer a highly stylized conception of agenda-structured policy making that is an initial foray into one aspect of a formalization of conditional party government. The model should probably be considered more suggestive of current intuition and future directions than substantive results, but we think it is sufficiently interesting at this time for inspection. Where Aldrich, Grynaviski and Rohde (1999) was an attempt to model roll call voting in the US Congress, we attempt to model the choice to empower a majority leadership with agenda control powers, but more importantly we attempt to reconcile the verbal, formal, and empirical accounts of cpg. We consider a probabilistic model of a legislature as a way to model cpg that allows us to explicitly demonstrate the connection between cpg theory and empirical cpg measures (in either one or two dimensions). We offer this model not because it is a feature rich in description of Congress, but because it is the simplest framework we can model that incorporates individual preferences, the shape of all members preferences, and tangible features of partisan control of a legislature.

The congressional literature is currently one of models. But none of the models offer a road map to connect preferences and agenda setting. Much of the contemporary congressional modeling literature can be thought of as a response to Arrow's Theorem (1951) and the suggestion that there is not an obvious way to describe the mapping of collective preferences from individual preferences. Our own thinking about Arrovian politics has led us not to consider a parsimonious analytical model of voting. Plott (1967) and McKelvey (1976) have effectively undermined such attempts to model a multi-dimensional Congress. We take a different view of an agenda mechanism that precludes a chaos-like outcome. The Baron-Ferejohn model (1989) is based on a random recognition rule. We go one step further and employ a completely random mechanism that chooses over the set of points in a win-set, not merely over legislators' ideal points.

Shepsle (1979) and the structure induced equilibrium project, described a problem with traditional social choice theory as the way in which it ignores the "institutionally rich features" of the modern legislature. One of the features of traditional formal analytic models in general is that they are not naturally prepared for the examination of the impact of legislator preference changes over time. Explicitly incorporating agenda choice into a strategic model may also be problematic because it may well lead to a familiar Rikerian (1980) dilemma where the choice of institutions becomes the grist for political conflict. It seems that there may be a good deal to consider with respect to preferences without dealing with this problem. For instance, random agenda rule reflects the idea that there may be many majorities (Aldirch and Rohde 1997-98) and perhaps a multi-headed leadership as opposed to a single well-defined policy point.

The Cox and McCubbins (1993) view of partisan congressional organization comes from a view that parties form "legislative cartels." These cartels are able to enable yet constrict the flow of legislation from legislators who would prefer to spend all possible resources on their districts. Restriction of the agenda mechanism is one way to model cartel behavior. While it does not reflect all of the possible ways that a cartel might restrict member behavior, it taps an important method. The additional insight of the cpg perspective is the "comparative statics" associated with the conditions. The current framework will give us space to consider those claims.

One of the key differences between majoratarian and partisan theories of Congress is the way that each deals with the shape of members' preferences that make up a given session. These differences are not merely theoretic in nature; they each imply that different information be considered when describing a Congress. In fact, the theories each imply a different data reduction scheme in aggregating from 435 members to a single Congress in order to study such things such as historical variability. In Krehbiel's majoratarian theory (see Krehbiel 1998), Congress can be described by studying the preferences of the *pivotal members,* the median voter, the two-thirds or veto-override voter, etc. Furthermore, one of the assumptions of Krehbiel's models is unidimensionality of the preference space potentially making certain questions or eras difficult to study.

Both partisan and ideological models (including most forms of informational models) anticipate there will be a major space of policy action of low dimensionality. In this they differ from distributive models which anticipate a space of many "small" dimensions (e.g., one dimension per legislative district, to receive the benefits distributed). Indeed, in our case, we believe that the space in which actual partisan policy voting takes place is of low dimensionality precisely because of partisan influence over the agenda. The Cox-McCubbins-Kiewiet account (see Cox and McCubbins, 1993; Kiewiet and McCubbins, 1991), for example, is that the majority party exerts great control over the agenda, whether positive (on cpg-like occasions) or negative (at all times). While they do not develop this particular point, it seems likely that they would expect a space of low dimensionality for most policy purposes. Our account also anticipates a small dimensional space over which parties contest (plus at least consistent with a lot of "small" dimensions, akin to distributive policy).

We expect that actual policy is a battle over both what is shared in common (e.g., partisan reputations and publicly discussed policies) and what is unique to the needs of particular members and their districts and constituents. Thus, while some information is lost when using lower dimensionality spaces, we will be picking out the areas over which

partisan competition is most keen – and over which public dialogue is most intense. It is, however, our contention that (too much) important information is lost when reducing the space from two to one dimensions.

The Model

Consider a two-dimensional spatial legislature with *N* legislators and *M* members affiliated with a majority party, and a known *status quo* position. Assume that in a non-partisan legislature a policy outcome is determined by a uniform draw from the win-set of the entire n-legislator body. Under a partisan regime, policy is determined by a uniform draw from the win-set determined by the subset of participating majority party members (i.e., the exclusion of all coalitions in the win-set in which minority party votes are necessary to win). Majority party members decide to participate in a partisan regime by making a simple expected Euclidian distance calculation between the two regimes. CPG theory suggests that these partisan regimes increase in strength as members of the majority party become ideologically more like each other and more distant from the minority party.

Sequence. The Sequence of legislative action is as follows:

> 0. *Inherited* status quo *and exogenous elections determine legislature*. We consider the all of the inputs into the legislature to be exogenously determined.
>
> 1. *Organizational vote.* A pre-vote takes place, in which the legislature decides which agenda mechanism to employ. This is equivalent to the majority party deciding whether or not to empower its leadership. The outcome is determined by majority rule.
>
> 2. *Agenda selection.* Nature draws an alternative policy position using the rule determined by the action taken in the previous organizational vote.
>
> 3. *Legislative vote*. In a binary vote, each legislator selects either the status quo or the alternative policy. The outcome is determined by majority vote and in turn determines the legislators realized utility.

This seems like a reasonable framework for studying the underlying preference conditions for agenda control by a majority party as opposed to the floor. Switching to the reduced win-set of the majority party implies a restriction in the agenda, both in gate-keeping and proposal power. Thirdly, and perhaps most important for the current project, it should be possible to investigate the direct linkage between the inter-party heterogeneity and intra-party homogeneity components of the cpg measure to the likelihood of the partisan regime and its effects on shape of the expected policy outcome.

Building a toy model of a unicameral legislature will allow us to investigate the conditions under which a legislator in the majority party give support in order to shape outcomes. Our model will only be helpful insofar as if generates measurable implications

for the study of real politics. We need to keep in mind the question of how might observations of legislatures might help us to assess conditional party government? Finally (for future work), how might we build a general equilibrium model in which we can investigate the resource allocation decision by MCs where expected utility is maximized across policy outcomes and reelection prospects?

Definition 1 (A Legislature). *Let* $i = 1,...,N$ *denote a legislator (sometimes referred to as an MC) where* $\|N\| = N$ *members of a legislature. Let M and m denote the Majority and minority parties respectively, such that* $\forall i,\ i \in M$ *or* $i \in m$,

$$\{M \cup m\} = N \text{ and } \{M \cap m\} = \varnothing \text{ such that } \|M\| > \|m\|.$$

The objective of the legislature is to consider changes in policy from the *status quo.* Legislation as such requires the consideration of many bills, each bill subject to many possible changes and refinements, and each subject to modification. Bills may be intended to for exogenous policy change or endogenous legislative reorganization. All legislators possess full information about the content of each bill.

Definition 2 (Policy Space). *Let the set of all logically possible policy outcomes be a closed, compact, convex set X;* $X \subset R^n$.

Let $s \in X$ denote the *status quo* policy for the legislature, that is the policy that was chosen by the legislature at the end of the preceding legislative game. This point was that which was in effect for the intervening electoral game that selected the current set of N legislators, and that remains in effect until replaced by this legislature. We assume rational legislators, such that they posses mappings of policy locations to utility.

Definition 3 (Legislator Utility). *Let there be* $\forall i \in N\ \ \mathrm{U}_i(\mathbf{X}): \mathbf{X} \to \Re^1$, *a utility function over multidimensional policy space. Let there be* $\forall i \in N\ \ \mathbf{x_i} \in \mathbf{X}$ *is there ideal point:* $\max \mathrm{U}_i(\mathbf{X}) = \mathrm{U}_i(\mathbf{x_i})$ *and let* $\mathrm{U}_i(\mathbf{X})$ *be monotone decreasing in distance from* $\mathbf{x_i}$.

We will assume strict Euclidian quadratic utility:

$$\mathrm{U}_i(\mathbf{y}) = -(\mathbf{y} - \mathbf{x_i})'\mathbf{I}(\mathbf{y} - \mathbf{x_i}).$$

It is useful to denote a legislator's utility valuation of the status quo, $\mathbf{s}$:

$$\forall i \in N \quad \mathrm{U}_i(\mathbf{s}) = (\mathbf{s} - \mathbf{x_i})'\mathbf{I}(\mathbf{s} - \mathbf{x_i}).$$

As each legislator, i, contemplates the coming legislative session we assume they view the end results of the session as a choice between keeping the *status quo* intact or choosing to replace it with an alternative policy, located at $\mathbf{v}$. Therefore, for purpose of decisions, such a legislature may be considered truncated to a choice between the status quo, **s** and its replacement, **v**, as if the legislative session consisted of choosing over a

single bill. In this analogy, while the legislative session consists of choosing, modifying, amending, etc, the result is to replace the status quo with a single binary choice between **s** and **v** decided by a simple majority vote. We will assume that $X, s, f(x_i)$, where $f(x_i)$ is the distribution of ideal points in the legislature, and $\mathrm{U_i}(\cdot)$, the utility function held by all legislators is all common knowledge.

Definition 4 (The Agenda Mechanism). *Let* $\mathrm{P}(\cdot)$ *denote various possible probability density function of points in the policy space. Nature draws an alternative policy point from the PDF setting up a binary vote between* **v** *and* **s** .

Here we simplify $\mathrm{P}(\cdot)$ such that is a uniform distribution over the win-set. Therefore, **v** is chosen from a uniform distribution over all **x** such that $\mathbf{x} \in \mathrm{W}(\mathbf{s})$, where $\mathrm{W}(\mathbf{s})$ is the win-set associated with the policy point **s** . Therefore we may loosely describe **v** as a function of **s,** even though it is really the expectation of **v** that is a function of **s**. When the $\mathrm{W}(\mathbf{s}) = \varnothing$ then an arbitrary alternative may be selected, which in any event will not be able to defeat the *status quo*. We will also assume that the probability distributions over outcomes are common knowledge.

This set-up yields two immediate consequences:

1. All legislators vote *sincerely* because the choice is over a last period, binary vote.

2. The set of alternatives that can be chosen by the agenda mechanism to compete against **s** is the very set of points that can replace **s** , because by definition the win-set is the set of points that are preferred to **s** by a simple majority. Hence the set of feasible replacements (say v) to s is the *win-set*,

$$W(s) = \left\{ v \in P : \left\| U_i(v) - U_i(s) > w \right\| > \left\| U_i(v) - U_i(s) \leq 0 \right\| \right\}$$

In more general cases, or in a separated power system, or both, there maybe strategic aspects to the selection of {**v, s**}, for example, in repeated play extending across elections and, hence, potentially valuing outcomes over more than one legislative setting. We restrict our considerations to a simple unicameral setting.

Thus $\forall i \in N$, and any $\mathbf{x} \in \mathbf{X}$,

$$\begin{aligned} \mathrm{EU_i}(\mathbf{x}) &= \mathrm{P}(\mathbf{x})\,\mathrm{U_i}(\mathbf{x}) \\ &= \int \cdots \int \mathrm{P}(\mathbf{x})\,\mathrm{U_i}(\mathbf{x}) d\mathbf{x}\,, \end{aligned}$$

where **x** is restricted to the set of **v** such that $\mathbf{v} = \{\mathbf{x} : \mathbf{x} \in \mathrm{W}(\mathbf{s})\}$

If we assume $W(s) \neq \varnothing$, then we can assume that

$$\int \cdots \int_{W(s)} \mathrm{P}(x)dx = 1 \text{ and } \int \cdots \int_{\sim W(s)} v(x)dx = 0.$$

At this point it is worthwhile to consider some of the aspects of our toy legislature. Essentially, we are proposing a model where legislators have perfect information about the preferences of their colleagues, but somewhat poor information about the legislative process, conveyed through the use of a uniform distribution over possible policy outcomes. This set-up makes a great deal more sense as we add a notion of a legislature under a (majority) *party regime*.

The conditional party government argument rests on the idea that when the preferences of the majority party meet the conditions of external heterogeneity and internal homogeneity, than the membership will seek to enact a party regime where leadership is empowered to move policy outcomes from the center of the floor and towards the center of the party.

The difference between the legislature and the legislature under a party regime we consider to be the *party differential.* The party differential is the difference in expected utility to each member of the legislature under each institutional setting. If we can specify this comparison, the condition in "conditional party government" can be defined as the conditions under which the party regime is enacted. Here we consider the large category of conditions under which it a majority of the majority party's members have *ex ante* preferences for enacting the party regime – clearly, a substantial but incomplete first step towards modeling CPG.

Definition 5 (The Party Regime). *Allow a "non-policy" pre-vote between the use of different agenda mechanisms. Recall the standard mechanism* $\mathrm{P}(x)$ *and let the agenda mechanism of the party regime be* $\mathrm{P}(x|M^+)$*. Where* $\mathrm{P}(x|M^+)$ *denotes the probability that x is chosen, given that the majority party has chosen to enact the party regime.*

Then we can write out the expected utility for a legislator under the party regime as:

$$\mathrm{E}U_i(x|M^+) = \int \cdots \int \mathrm{P}(x|M^+)U_i(x)dx.$$

Further more let $\mathrm{P}(x|M^+)$ *imply that* **v** *is chosen via a draw from a uniform distribution over the win-set of members of the majority party who vote to enact the party regime. We denote this set by* $\mathrm{W}^{\mathrm{M}}(\mathbf{s})$*. Note the majority party's win- set is such that*

$$\left(\mathrm{W}^{\mathrm{M}}(\mathbf{s}) \cap \mathrm{W}(\mathbf{s}) \neq \varnothing\right) \bigcap \left(\mathrm{W}^{\mathrm{M}}(\mathbf{s}) \cap \mathrm{W}(\mathbf{s}) \neq \mathrm{W}^{\mathrm{M}}(\mathbf{s})\right).$$

Therefore we have to further restrict $\mathrm{P}(x|M^+)$ such that $\mathrm{P}(x|M^+) = 0 \forall x \notin \mathrm{W}(s)$*. We will assume that when* $\mathrm{W}^{\mathrm{M}}(s) \neq \varnothing$ **v=s***. Since unlike the no-party case, an arbitrary v may still be in the win-set of the floor.*

The implication is that under the party regime the majority can (probabilistically) enact more desirable outcomes. By "more desirable outcomes" we mean that the majority party

can use its resources to shape the agenda such that the set of possible outcomes has a higher expected utility for at least a majority of its members than the above case.

Definition 6 (Party Regime Enactment). *We can formulate the party differential, D_i for any $i \in N$:*

$$D_i = \mathrm{E}U_i\left(x \middle| M^+\right) - \mathrm{E}U_i(x)$$

If $D_i > 0$, the legislator expects that the party regime will give i greater expected returns than the unconditional arrangement. The party regime is enacted if

$$\left\| i \in M : D_i > 0 \right\| > \left\| i \in M : D_i \leq 0 \right\|.$$

What differentiates the unconditional and conditional cases is the expectation over outcomes. This framework is, of course, fully general to different assumptions about $\mathrm{P}(x)$ and $\mathrm{P}\left(x \middle| M^+\right)$.

Some Results from Numerical Computations

Since the model we are using is largely comprised of sincere voting, it has the feel of being largely deterministic. This feature should not be troubling because we are advancing this model not as an institutionally rich description of legislative behavior, but as a simple starting block for incorporating the main concepts that drive cpg theory and measurement. As simple as the framework seems to be, it becomes rather difficult to trace the implications of different distributions of legislator preferences and status quo points. We have resorted to a paramaterized computational model derived from the above set-up in order to explicate the details of different configurations of the shapes of legislator preferences.

Within a framework suitable for computation, we have had some initial success producing the qualitative results that embody cpg theory. For computational reasons, some simplifications to the above, already simple, model must be made. We call the resulting model computational conditional party government (CCPG 0.5) and we hope that this will be a first step in investigating aspects and implications of conditional party government than have been available through traditional analytical means. The CCPG code used in the model is available from the authors.

CCPG is a model of a two dimensional legislature, with *N*=101 legislators. Each legislator is assigned to either the majority or minority party and is assigned an ideal point drawn from two univariate normal distributions. We treat majority size and the initializing distributions as parameters. We use the changes in the parameters of the normal distributions to simulate changes in the inter-party distance and the intra-party homogeneity. The minority party's initializing distribution is always $\sim \mathrm{N}(-3,1)$ and we vary the mean of the majority party's mean from –1 to 5 and the standard deviation from .5 to 2. Since we want to calculate the win-set, the location of the *status quo* is crucial. For each legislature we vary the *status quo* from –6 to 6 along the x-axis, keeping y=0 (this can be generalized for future investigations).

The resulting variables are characterized in Table 1. Note that Inter-party Heterogeneity and Majority Spread are analogous to "independent variables" in the

analysis to come and are two of the four measurements of cpg proposed in our earlier work (and discussed in the appendix). Majority Party Regime is solved according to the data and definition of MPR given above.

Table 1: Summary Statistics from simulation 44616 observations

Variable	**Mean**	**Std. Dev.**	**Min**	**Max**
Majority Party Regime	.8020441	.3984632	0	1
Inter-party Heterogeneity	7.069872	2.657522	2.09359	12.0667
Majority Spread	1.489931	.5790117	.497074	2.95423
Majority Size	56	4.082529	51	61
Distance to *status quo*	4.770721	2.505279	.0053446	12.6152

Perhaps the most important simplification and the most computationally intense component of the model is the calculation of the win-set. While social choice theory suggests continuous win-sets, at this time our computations are based on an approximation which checks every point at .1 intervals of a policy space that goes from –25 to 25 for both dimensions. This means that for every *status quo*, we have to test the utility associated with 250,000 points. For utility functions we use the strict Euclidian metric. We define the *majority party regime* (MPR) to be the restriction of the agenda mechanism to be a uniform draw from the win-set of those coalitions that do not require minority party participation. We will use the "pre-vote" of majority party restriction as a dependent variable stand-in for conditional party government. At this level of win-set granularity we have completed 11 runs for each parameter set giving us nearly 45,000 observations; it is this data set that we will analyze.

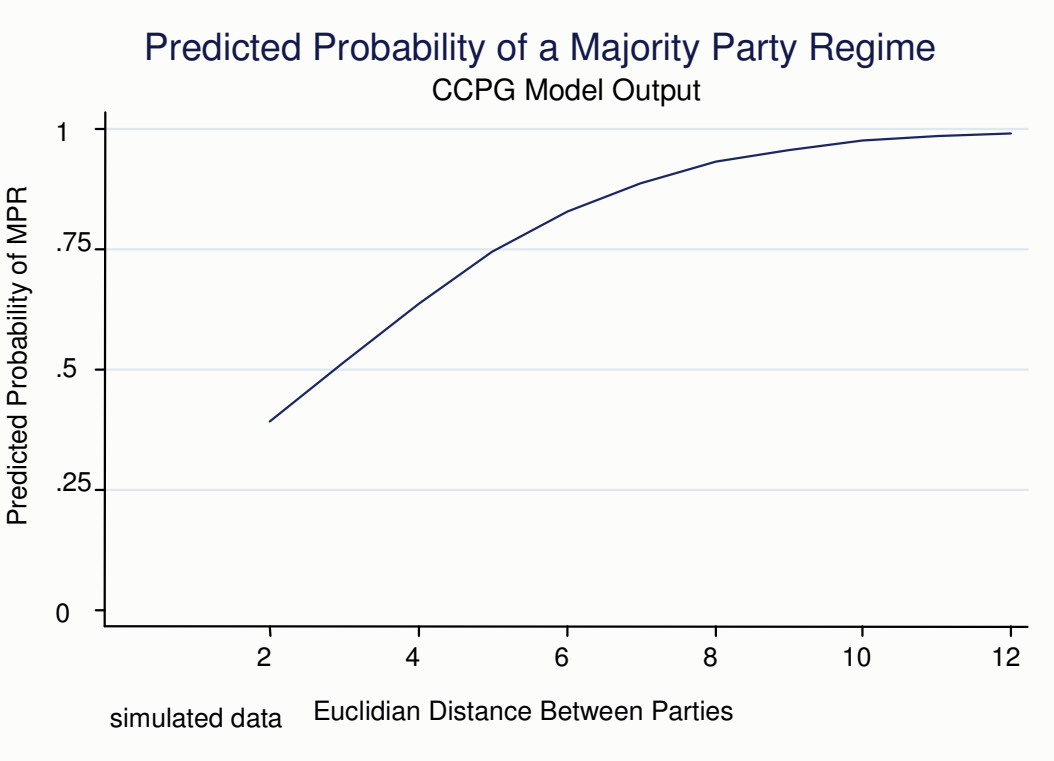
Conditional party government theory suggests that the most important variables for predicting strong party behavior are the inter-party heterogeneity and the intra-party homogeneity. For inter-party heterogeneity, we calculate the Euclidian distance between the two-dimensional means of each party. We represent intra-party homogeneity with the average Euclidian distance of each majority party member to the party's two-dimensional mean point, which we call the majority spread (really the reverse of homogeneity, i.e., it is a measure of intra-party). Statistical analysis is used here to describe the behavior of the model *not* for traditional inferential work. The results are reported in Table 2.

Table 2: Logit Analysis of the Basic Model. Dependent Variable: Majority Party Regime

Variable name	**Coefficient**	**[95% Confidence Interval]**	
Inter-party heterogeneity	.5443006	.5306108,	.5579903
Majority Spread	-1.729971	-1.783986,	-1.675956
Constant	.8655079	.7624377,	.9685782
Discrimination: Area under ROC curve = 0.8657			

The logit analysis suggests that in the simulated legislature, while the "conditions" of conditional party government are met a majority will act in the proscribed way to strengthen its hold over the agenda mechanism. We can see this most clearly by noticing the substantive impact (as summarized by the coefficient and 95% confidence intervals on the two measure of cpg and their role in shaping the simulated choice of MPR) The signs of both predictors are in the right direction and the area under the ROC is equal to .8657 suggesting that the cpg variables do a fairly good job at discriminating across cases. Of course, its always easier to interpret logit coefficients graphically. Holding one variable at its mean, we can observe the changes in the predicted probability.

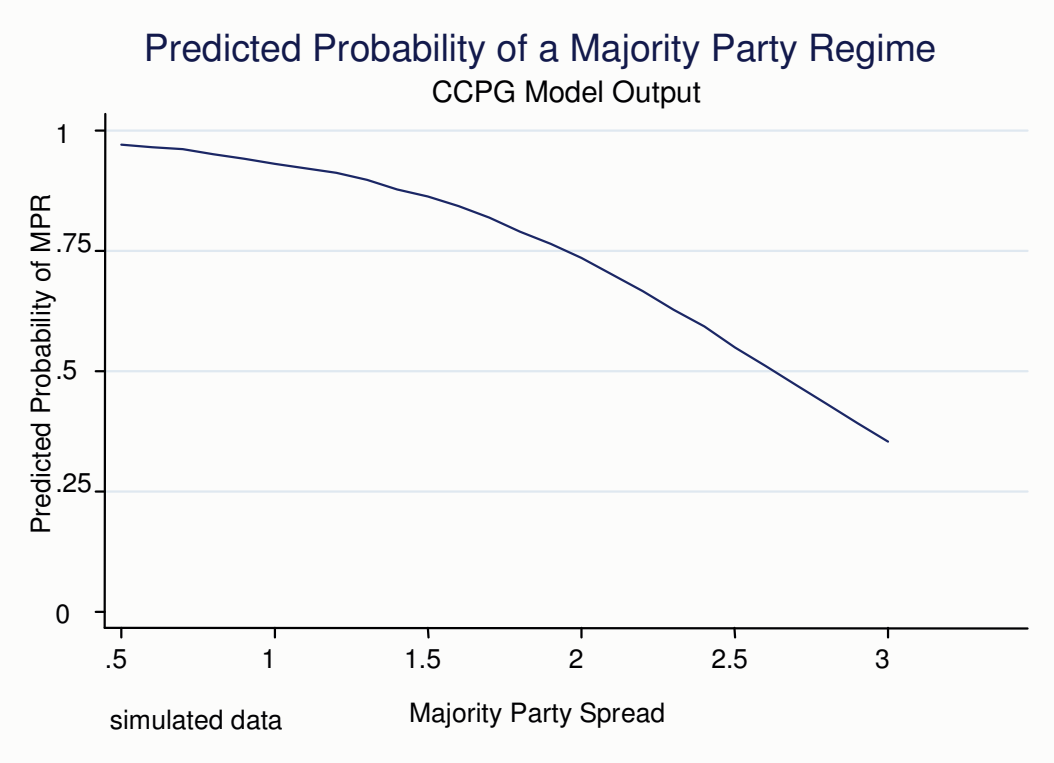
Figure 1.



It is interesting to note how little the parties the parties have to spread apart before a majority party regime will be enacted. The results are quite similar for intra-party

homogeneity, expressed through majority spread. In the CCPG world, the legislature as a (bipartisan) majoratarian body is quite fragile and readily becomes a partisan institution.

Figure 2.



Of course our model also includes other interesting parameters such as the size of the majority party and the distance of the majority party to the *status quo*. Part of our investigation should consider their affects on the model.

If we add the number of MCs in the majority party to the model, it has a small positive effect, doesn't change the cpg coefficients very much, and only raises the discrimination power slightly (the area under ROC curve increases to 0.8799) without consequentially affecting the role of the two "standard" measures of cpg. However, adding the distance of the majority party from the *status quo* matters quite a bit. The farther the *status quo* is from the majority party, the more likely are that party's members to adopt MPR.

Table 3: Logit Analysis of Revised Model. Dependent Variable: Majority Party Regime

Variable name	**Coefficient**	**[95% Confidence Interval]**	
Inter-party heterogeneity	.4327342	.4107598,	.4547085
Majority Spread	-3.504235	-3.605931,	-3.402538

Distance to *status quo*	1.704286	1.660321,	1.748251
Constant	-1.065072	-1.213055,	-.9170899
0 failures and 653 successes completely determined.			
Discrimination: Area under ROC curve = 0.9666			

It is clear that in the CCPG simulation, knowing the relationship between the majority party and the *status quo* is quite helpful at increasing the discrimination ability of the statistical model. This makes sense since the concept of the *win-set* is impossible without a *status quo*. The size of the win-set is a function of the location of the *status quo*. As the *status quo* gets farther from the majority party, not only is the win-set going to grow, but the area of the win-set that requires minority participations is going to grow as well. Of course, in the real world it is quite difficult to develop an estimate for the location of the *status quo*. It is comforting to know that measuring the conditions of conditional party government are still a helpful way to understand and predict majoratarian behavior. It is also important to note that use of an interaction between inter-party heterogeneity and majority spread does very little to increase discrimination, suggesting that there might simply be an additive relationship between the conditions of cpg.

Concluding Remarks

Theory: While at root the cpg arguments have always been about the shape of the memberships' preferences, here we have tried to explicitly incorporate ideas about the *status quo* and agenda control into the stylized story of conditional party government. By no means is this an exhaustive study of the relationship between the theoretical and the measured CPG, in fact it is only a starting point. This line of research should point itself towards the investigation of the party overlap and party label fitness measures next. A model that could simulate voting behavior and generate a roll call vote matrix for scaling is also appealing. This model has natural extensions into a dynamic and/or general equilibrium framework that could incorporate elections and endogenize the *status quo*. The model already suggests that under certain conditions (such as a "good" *status quo*) partisan muscles may not need to be flexed. It seems the study of cpg has a future in agent-based models.

Measure: The conditional party government variant of partisan theory implies knowledge of the entire shape of preferences of a Congress. Specifically cpg uses the heterogeneity of the two parties and the homogeneity of the majority party. CPG theory assumes an n-dimensional preference space. However, one cannot proceed with 435 pieces of information even if members of Congress were to arrive in Washington with their ideal points stamped on their foreheads (as in the CCPG simulation). Like many other studies of Congress we are forced to use roll call data estimated ideal points to describe the members of Congress. The question for the measurement of the conditions of conditional party government becomes how to measure inter-part heterogeneity and intra-

party homogeneity. This measurement is a theoretically required data reduction from the estimated ideal points.[2]

An interesting extension of the current work may be to simulate a roll call vote matrix, using our random agenda mechanism and scaling the matrix to see how it approximates current work on roll calls. One might be able to say a fair number of things against the sort of random agenda mechanism that we have developed. Arguments that suggest a (single) stable agenda point across an entire Congress (within the framework of multiple votes) may be flawed on the basis of scaling. Scaling procedures returning both a distance and a direction (and or multiple dimensions) would rule out a stagnant framework. A random utility set-up with the "mistakes" correlated with distance would require a variable agenda point in order to develop sufficient variation to proceed with the scaling procedures. Since we observe differentiation in the received empirical results, we need to model that does not exclude variance but seeks to explain it.

Conditional party government forces us to consider how legislators' preferences interact with each other in a well-developed institutional space. We can need to develop models where the institutional power can be wielded. Ultimately, we may need to consider a class of models where a secondary political dimension that allows party leaders to induce (or bribe) members to vote against preferences and with a more partisan agenda. Hopefully, the current effort has outlined a direction for those sorts of models to be developed. Until then, it may be hard to look at the scaled votes and see too much more than the vestiges of a complicated bargaining or strategic interaction process that has been unmodeled without winking. Future efforts should focus more on understanding estimated spatial locations as revealed preferences and the implications that has for understanding the true motivations of legislators and democratic theory more generally. To simply finish this work it would seem we need a to investigate what happens in the comparison of statistical models (with simulation data) that tried to predict agenda restriction with only information about the 1st dimension (versus 2) to a model that incorporates information from both simulated dimensions with the same 2-d data generating process currently used. This would allow us to gauge the damage done by "discarding" a dimension.

References

Aldrich, John H., Mark M. Berger and David W. Rohde. 1999. "The Historical Variability in Conditional Party Government, 1877-1994." Presented at the History of Congress Conference, January 14-15, Stanford University.

Aldrich John H. and David W. Rohde. 1997-1998. "Theories of Party in the Legislature and the Transition to Republican Rule in the House." *Political Science Quarterly*.

[2] With our empirical data we proceed in a second level data reduction, the data reduction of a data reduction. The cpg measure is a data reduction of size M members' estimated ideal points to a single cpg measure per Congress from a data reduction on a roll vote matrix of M members by N votes. Both data reductions (our cpg measure and the DW-NOMINATE reduction) take advantage of changes (and the lack thereof) over time.

Aldrich, John H. and David W. Rohde. 1998. "Measuring Conditional Party Government." Presented at the annual meeting of the Midwest Political Science Association Annual. Palmer House Hilton, Chicago, Illinois.

Aldrich, John H. and David W. Rohde. 2000. "The Republican Revolution and the House Appropriations Committee." *The Journal of Politics.* 62:1-33.

Aldrich, John H., David W. Rohde and Michael W. Tofias. 2004. "One D is Not Enough: Measuring Conditional Party Government, 1887-2002." Working paper presented at the History of Congress Conference, December 5-6th 2004, San Diego, California.

Arrow, Kenneth J. 1951. *Social Choice and Individual Values*. New York: Wiley & Sons.

Baron, David P. and John A. Ferejohn. 1989. "Bargaining in Legislatures." *American Political Science Review.* 83:1181-1206.

Cox, Gary, and Mathew McCubbins. 1993. *Legislative Leviathan: Party Government in the House.* Berkeley: University of California Press.

Erikson, Robert S., Michael B. MacKuen and James A. Stimson. 2002. "The Macro Polity." New York: Cambridge University Press.

Kiewiet, Roderick, and Mathew McCubbins. 1991. *The Logic of Delegation: Congressional Parties and the Appropriations Process.* Chicago: University of Chicago Press.

Krehbiel, Keith. 1998. *Pivotal Politics: A Theory of U.S. Lawmaking.* Chicago: University of Chicago Press.

McKelvey, Richard D. 1976. "Intransitivities in Multidimensional Voting Models and Some Implications for Agenda Control." *Journal of Economic Theory*. 12:472-482.

Plott, Charles R. 1967. "A Notion of Equilibrium and its Possibility under Majority Rule." *The American Economic Review.*

Poole, Keith T. and Howard Rosenthal. 1997. "Congress: a political-economic history of roll call voting." New York: Oxford University Press.

Riker, William H. 1980. "Implications from the Disequilibrium of Majority Rule for the Study of Institutions." *American Political Science Review.* 74:432-446.

Shepsle, Kenneth A. 1979. "Institutional Arrangements and Equilibrium in Multidimensional Voting Models." *American Journal of Political Science*. 23:27-59.

Appendix One (From ART 2004)

Data and Measurement

In earlier work, Aldrich and Rohde (1998, and Aldrich, Berger and Rohde 1999) used a mixture of D-NOMINATE and W-NOMINATE ideal point estimates in order to develop a number of measures used to analyze the structure of both the House and Senate (in this paper, we look only at the analysis of the House for purposes of clarity and exposition). After constructing their four measures of partisan ideal point structures they ran a principal component analysis and found support for the thesis of a single underlying variable. In engaging the two-dimensional Congress we wed ourselves to the original methodology. These measures had to be reconceived in order to truly account for the two-dimensional nature of the DW-NOMINATE ideal point estimates. The concept of "median" becomes problematic, as there is not likely to be a median in all directions for the majority party. Similarly the score based on the standard deviation was measured as deviations about this same median. Overlap becomes similarly problematic to calculate, as overlapping area in two-dimensions becomes difficult to identify. Perhaps the most puzzling would be the OLS regression used to calculate R-sqd. In order to proceed we faced a research decision on how to incorporate the 2nd dimension, we chose to develop truly two-dimensional measures as opposed to creating 8 separate measures by merely carrying out on the 2nd dimension what had already been done on the first. The new measures, based on both dimensions of DW-NOMINATE (with the 2nd dimension weighted by .3 per Keith Poole's instructions, see http://voteview.uh.edu) are as follows:

1. Inter-party Heterogeneity: Inter-party Heterogeneity was calculated by finding the Euclidian distance between the intersection of both party "medians." For each party the intersection of the two medians in DW-NOMINATE space (dwnom1, dwnom2) was identified. The Euclidian distance between the "median point" of each party was calculated.

2. Intra-party Homogeneity: is a measure of dispersion. Intra-party Homogeneity was calculated by measuring the spread of the majority party around its "median" (using the same intersection technique as described above for identification). The Euclidian distances are calculated for each MC in the majority party to this "median" point. We take the median distance to get a measure of "majority spread," which is used for the factor analysis. For graphical purposes we calculate a measure of intra-party homogeneity by subtracting "majority spread" from 1. (This measure of spread has been checked against a similar measure where the central tendency statistic of distance from the "median" is the mean distance, it is quite similar and the correlation coefficient between the two measures is around .94.

3. Party Separation: Separation is measured by the percent of MCs correctly predicted by a discriminate function analysis preformed with party affiliation as the group variable with both dimensional scores of DW-NOMINATE used as predictors. As the percent of MCs correctly predicted increases, overlap decreases, making this really a measure of party separation.

4. Party Label Fitness: We use the (pseudo) R^2 from the discriminate function

analysis described above as a measure of party label fit. We interpret a higher R^2 to be associated with a goodness-of-fit between the party label of an MC and his or her two-dimensional DW-NOMINATE scores.

As the earlier papers held, we consider the four component measures to be generated by an underlying latent cpg variable. This variable is generated by conditions in the electorate, but should be observable in the actions (voting records) of Members of Congress since there voting records are being used to further their reelection goals. Therefore, we engage in a principal factor analysis in order to perform a confirmatory factor analysis. The results are reported in Table 1.

Table 1: House of Representatives CPG Factor Analysis

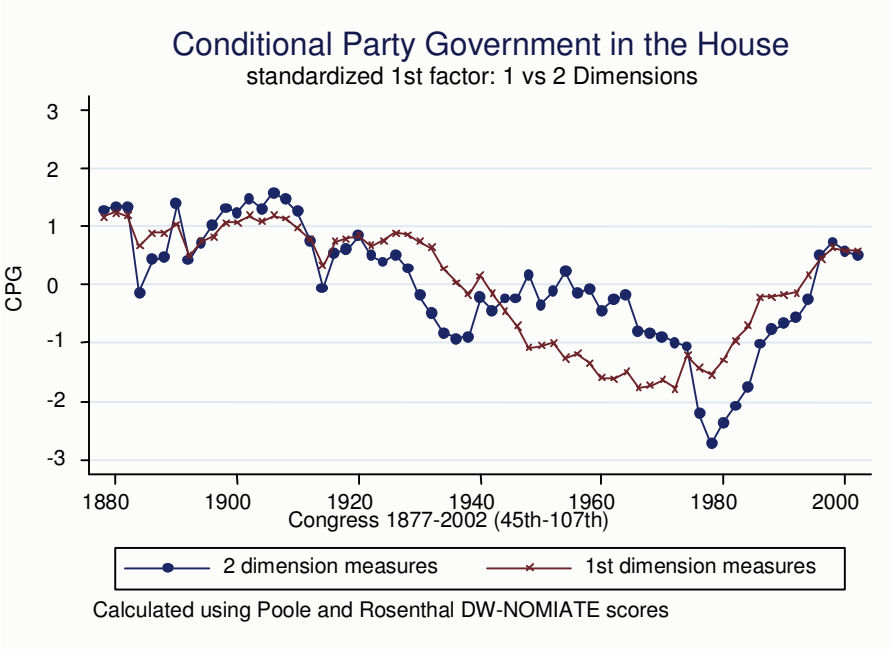
Factor	Eigenvalue	Difference	Proportion	Cumulative
1	2.42191	1.85837	0.8825	0.8825
2	0.56355	0.67093	0.2053	1.0878
3	-0.10739	0.02631	-0.0391	1.0487
4	-0.13369	.	-0.0487	1.0000

Using an Eigenvalue of 1 as the standard for accepting a factor, the first factor should be clearly accepted and the 2nd factor discarded as not having the information contained in even one variable. Roughly speaking, the first factor accounts for nearly 90% of the variation in the matrix. We regard this as being strongly suggestive of the existence of a single latent factor that can be used to describe our four component measures of the underlying ideal point structure of the House. The factor loadings on the first two dimensions, found in Table 2 further support this view.

Table 2: Factor Loadings

Variable	1	2	Uniqueness
Inter-party Heterogeneity	0.77813	-0.33714	0.28084
Intra-party Homogeneity	-0.63227	0.42765	0.41735
Overlap	0.74353	0.48123	0.21558
Party Label Fitness	0.92941	0.18821	0.10077

We find that all four component measures of conditional party government load on to the first factor, but do not load on to a second factor, further suggesting the appropriateness of the first factor. Also, each of the four strongly loads on the dimension (rather than it being asymmetrically dominated by one or two variables). Therefore we consider the first component to be our estimate of cpg. We think that the ability of the four measures to load onto a common factor suggests that there is some latent variable that drives the components in the predicted directions. Without such a variable, there is no good reason to expect that inter-party heterogeneity and intra-party homogeneity would move in similar directions. Second, we are less concerned with the specific values of cpg; instead we are concerned with its variation over time. Therefore we present a standardized factor (mean=0, SD=1) to facilitate analysis and comprehension of the variation in cpg over this time period. A more detailed analysis can be found in our earlier paper.


Conditional Party Government in the House
standardized 1st factor: 1 vs 2 Dimensions
CPG
3
2
1
0
-1
-2
-3
1880
1900
1920
1940
1960
1980
2000
Congress 1877-2002 (45th-107th)
2 dimension measures
1st dimension measures
Calculated using Poole and Rosenthal DW-NOMIATE scores