

Jointly Modeling the Choice of Formateur and Government in Parliamentary Democracies

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Abstract

Most analyses of the government formation process in parliamentary democracies examine which parties form the government separately from which party wins the prime ministerial position. In this paper we propose a new approach which allows us to model both processes together, since the choice of the prime ministerial post is not independent of the choice of the final party composition of the government cabinet. To capture the sequential and nested nature of the government formation process, we use a mixed nested logit model that allows us to evaluate some new hypotheses that cannot be tested with existing approaches. We evaluate our hypotheses linking ideological, institutional, and ‘size’ variables to the choice of government using a new data set that we constructed containing information on more than 147,000 potential governments drawn from nearly 700 government formation opportunities in 40 parliamentary and semi-presidential democracies from 1945 (or democratization) to 2012.

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1 Introduction

Following the collapse of a government in a parliamentary democracy, or a legislative election, voters and political elites turn their attention to the composition of the next government. Will it be radically different from the old government, so that one can expect a sharp difference in the policies being implemented? Or will the new government be a continuation of the old one, so that existing policies are likely to be maintained? Observers pay attention both to the identity of the prime minister as well as to the other parties that join the government, receiving ministerial portfolios that will allow them to design new policies and influence the implementation of existing policies in their domains. Will the members of the new government work effectively together, or will they clash over policy in areas where they have conflicting ideological preferences? Existing work tends to address either the party composition of the government *or* the choice of the prime ministerial party, but the government formation process combines both choices. Indeed, the choice of the party of the prime minister is not independent of the partisan composition of the cabinet. Some of the factors that affect the final government composition might affect the choice of the prime ministerial party, or the combination of parties in government, or both. In this paper we model both choices simultaneously, allowing us to test some new hypotheses that relate to the choice of formateur and how this affects, and is, in turn, affected by, the entire government formation process. Importantly, our empirical strategy allows us to examine the choice of formateur *within* the government formation process as a whole and evaluate things such as how the characteristics of potential governments influence the initial selection of a formateur.

Our empirical approach takes account of the fact that the government formation process involves the selection of a single government from the set of all potential governments, and that it can be thought of as nested in nature – a formateur party is selected, and then tries to form a government that contains her own party (with the formateur taking the position as prime minister, if successful). Our hypotheses are tested on a new data set that we constructed containing information on more than 147,000 potential governments, drawn from around 700 government formation opportunities in 40 parliamentary and semi-presidential democracies from 1945 to 2012. This data set is considerably larger and more detailed than any used in previous studies.

In the next section, we outline different theoretical approaches to the government formation process. We then draw on these theories to identify hypotheses linking ideological, institutional, and ‘size’ variables

to the choice of formateur and government. In the third section, we discuss the most appropriate way to empirically model the government formation process. Having described our data in section four, we then present and interpret the results from some preliminary empirical tests where we evaluate our hypotheses.

2 Theory and Hypotheses

We are interested in how governments – that is, the prime minister and her cabinet – form in parliamentary and semi-presidential democracies.¹ To be in office, governments in these democracies depend on the support, either tacit or explicit, of a legislative majority. When a government formation opportunity arises, either because there has been an election or the incumbent government has resigned, it is nearly always the case that there are many different potential governments, more than one of which might be acceptable to a legislative majority. But which one gets chosen, and why?

Virtually all formal and non-formal models of the government formation process make reference to some actor whose job it is to form the government (Austen-Smith & Banks 1988, Baron 1991, Laver & Schofield 1998, Laver 1998).² This actor is typically referred to as a ‘formateur’ or ‘proposer’. In effect, these models describe the government formation process as having two steps. In the first step, a formateur is chosen out of the set of all possible formateurs. In the second step, the formateur chooses a government out of the set of all possible governments that include her party.³ If there are multiple potential governments that would be able to successfully take office, then the identity of the formateur obviously plays an important role in determining which one is chosen. To take the sequential nature of the government formation process seriously, we need to identify factors that influence the choice of the formateur as well as factors that influence the choice of the government.

¹Unless otherwise noted, we will use the term ‘parliamentary’ to refer to both parliamentary and semi-presidential regimes.

²Numerous other studies note the role that a formateur plays in the government formation process (Laver & Shepsle 1996, Warwick 1996, Morrelli 1999, Baron & Diermeier 2001, Warwick & Druckman 2001, Ansolabehere et al. 2005, Fréchette, Kagel & Morelli 2005, Warwick & Druckman 2006). Although there are a few models of the government formation process, primarily cooperative game-theoretic models, that make no explicit reference to a formateur (Schofield 1993, Schofield 1997), the fact that they ignore the institutional context in which the government formation process takes place has led some to claim that they lack a certain amount of “realism” (Laver 1998, 18).

³If the formateur is non-partisan – something generally ignored by models of the government formation process and typically quite rare in practice, then she chooses among the set of all possible governments. In our upcoming empirical analyses, we drop the 49 government formation opportunities where the formateur is non-partisan.

2.1 Choice of Formateur

What determines the identity of the formateur who forms the government?⁴ Although the literature examining the identity of the government has a long history spanning many decades, it is only relatively recently that political scientists have begun to examine which party is chosen as the formateur in any real detail (Warwick 1996, Diermeier & Merlo 2004, Mattila & Raunio 2004, Isaksson 2005, Bäck & Dumont 2008, Glasgow, Golder & Golder 2011). Many of these studies have focused on the size or party seat share associated with each potential formateur. This is not a surprise given that most formal models of the government formation process assume that formateurs are chosen either sequentially in order of size starting with the largest party (Austen-Smith & Banks 1988) or probabilistically where the likelihood of being selected is proportional to the formateur's share of legislative seats (Baron & Ferejohn 1989).

- Formateur Hypothesis 1: A party is more likely to be chosen as formateur if it is the largest party.
- Formateur Hypothesis 2: A party is more likely to be chosen as formateur the larger its seatshare.

The most recent study of the choice of the prime ministerial party, Glasgow et al. (2011), finds that a party is, on average, more likely to be chosen as formateur if it is the largest party, but that this effect varies significantly across cases. Although being the largest party increases the likelihood of being a successful formateur around two-third of the time in the western European countries in their sample, being the largest party had a negative effect on the likelihood around one-third of the time. They also find that, on average, a party is more likely to be chosen as formateur the larger its seatshare, an effect that is consistent across cases.

Theory also suggests that the formateur is likely to be influenced by the party of the previous prime minister in many circumstances. For example, a popular prime minister who has to call constitutionally-mandated elections or one who has strategically called early elections at a time when he expects to do well in the polls (Lupia & Strøm 1995, Strøm & Swindle 2002, Smith 2003, Smith 2004, Kayser 2005) is likely

⁴It is worth noting that we are interested in the party of the formateur and not the identity of the particular politician who is designated to manage the bargaining process. It is not uncommon for a formateur to fail to form a government at the first or even second attempt in some countries. In our upcoming empirical analyses, we examine the factors that influence the identity of the 'successful' formateur, not the 'first' formateur. As Laver, de Marchi and Mutlu (2011) note, it is, for all practical purposes, impossible to successfully identify the identity of the first formateur from secondary sources anyway; only the successful formateur is systematically recorded.

to be in a strong position to be chosen as the formateur in the upcoming government formation process. Thus a good predictor of the next formateur might be the party of the incumbent prime minister. Indeed, Glasgow et al. (2011) do find that the party of the previous prime minister is more likely to be chosen as formateur than other parties, but that this effect is conditional on the previous government ending without conflict. Being the incumbent does a party no favors if the government ended in controversy or scandal, or was punished at the polls for providing unsuccessful policies.

- Formateur Hypothesis 3: The party of the previous prime minister is more likely to be chosen as formateur than other parties as long as the previous government did not end in conflict.

In addition to party size and incumbency status, the ideological location of the parties should also matter for formateur choice. Many models of the government formation process indicate that the median ideological party is likely to be in the government and play a significant role in the policy-making process, because the party that controls the median legislator is “effectively a dictator on policy” in one-dimensional theories of coalition bargaining (Laver & Schofield 1998, 111).

- Formateur Hypothesis 4: The party with the median ideological position is more likely to be chosen as formateur.

Evidence from Glasgow et al. (2011) suggest that the median party is more likely to be chosen as the prime ministerial party in their western European cases, though this pattern was not observed in their eastern European ones.

Finally, we ought not to forget the role of presidential heads of state, though they are often overlooked because their roles seem merely ceremonial compared to that of the prime minister in many countries. Several recent studies demonstrate the extent to which presidents affect the government formation process, particularly when it comes to the proportion of nonpartisan ministers in a cabinet (Amorim Neto & Strøm 2006, Schleiter & Morgan-Jones 2009, Tavits 2009, Schleiter & Morgan-Jones 2011). Glasgow et al. (2011) contribute to this new line of research by showing that presidents also play an active role in the partisan choice of PM party. Specifically, they show that indirectly elected presidents have an incentive to help their own parties gain the prime ministership but that their ability to effectively do this is diminished in the

presence of an investiture vote requirement.⁵

- Formateur Hypothesis 5: The party of the president is more likely to be chosen as formateur. This is less likely to be the case if there is an investiture vote and/or the president is directly elected.

Having examined factors that might influence the choice of formateur, we now turn to factors thought to influence the party composition of the government.

2.2 Choice of Potential Government

What determines the party composition of the government? To some extent, we have already begun to isolate some features of a potential government that might make it more likely to enter office inasmuch as we are assuming that the successful formateur's party will be in the government. We need to consider, though, whether the same factors that influence formateur selection also affect the party composition of the cabinet independently of formateur choice. For instance, theory would suggest that potential coalitions containing the party with the median legislator should be more likely to get into office even if the formateur is not from that party. This is because a government containing the median party is more likely to be able to effectively make policy than a government that is faced with the median legislator as part of the opposition. In other words, the median ideological party is likely to influence both the choice of formateur and the choice of government. In contrast, it is not immediately obvious whether potential coalitions containing the party of the previous prime minister or those containing the largest party will be more likely to form once the choice of formateur is taken into account. For example, a situation in which the party of the formateur has changed hands may well reflect a substantial change in the bargaining environment. If this is the case, it is possible that the new formateur will try to avoid potential coalitions containing the previous prime minister's party. Whether this is what happens or not is ultimately a matter for empirical analysis. Importantly, our methodological approach allows us to say something about how these sorts of factors affect the choice of government and whether their effect is conditioned on the choice of formateur. The theoretical literature has

⁵The idea is that a proposed government, and a proposed formateur, have to enjoy a higher level of explicit support in the legislature when there is an investiture vote than when there isn't one. When there is an investiture vote, the onus is on the government to demonstrate that it is supported by a legislative majority. In contrast, when there is no investiture vote, the onus is on the legislature to show that the government is not tolerated. This distinction between being *supported* and *tolerated* suggests that investiture votes might act as a constraint on the ability of presidents to influence the formateur selection process (Glasgow, Golder & Golder 2011).

focused on the role of size, ideology, and institutions in shaping the government formation process. We now examine the role of each of these factors in turn and generate hypotheses.

2.2.1 Size

Many of the early theories of the government formation process developed in the 1960s and 1970s focused on the effects of a potential government's size on its chance of forming. Are majority governments more likely to form than minority governments? Are minimal winning coalitions (MWCs) more likely to form than other types of government, and so on? In terms of size, we can distinguish potential governments into four exhaustive and mutually exclusive types: minority, single party majority, minimal winning coalition, and surplus majority.⁶ All previous empirical studies of the government formation process have ignored formation opportunities where a single party controls a majority of the legislative seats. The implicit assumption in these analyses is presumably that the identity of the majority party is equivalent to the identity of the government that will form and no further analysis is necessary. The problem is that this assumption is not borne out by the empirical evidence. As Laver and Schofield (1998, 1) note, "Even in this apparently cut-and-dried situation, it is not unknown for political parties to bargain and for a coalition administration to be formed." Since we see no theoretical reason to throw away useful data, we prefer to include all government formation opportunities and estimate how the presence of a potential single party majority government affects the identity of the government that forms rather than drop them from our sample. We do, however, expect single-party majority governments to be more likely to take office than other government types. If no single party controls a majority of the seats, then a minimal winning coalition should form (Riker 1962). The logic behind both predictions is that parties seeking office will want to form governments that do not include any unnecessary members so as to maximize their own share of the office benefits. Thus, governments should control a majority, but not have 'extra' parties.

- Government Hypothesis 1: A potential government is more likely to form if it is a single party majority government.
- Government Hypothesis 2: Potential governments are more likely to form if they are minimal winning

⁶Minority governments comprise parties that do not directly control a majority of the legislative seats. A minimal winning coalition is a coalition in which no single party can be removed from office without the government losing its majority status. A surplus majority coalition is one in which a single party can be removed from the cabinet without losing its majority status.

coalitions.

- Government Hypothesis 3: Potential governments are less likely to form if they are minority or surplus majority governments.

Various other hypotheses relating to a potential government's size can be found in the theoretical literature as well. For example, Leiserson (1968) has argued that potential governments with fewer parties will be more likely to form since they should find it easier to reach agreement. Others have argued that potential governments that include the largest legislative party are also more likely to form because the largest party is often a crucial actor in the government formation process that cannot be excluded (Van Deemen 1989, Peleg 1981).

- Government Hypothesis 4: Potential governments are more likely to form the fewer parties that comprise them.
- Government Hypothesis 5: Potential governments are more likely to form if they contain the largest legislative party.

2.2.2 Ideology

The theoretical literature provides several hypotheses about how the ideological composition of potential governments influences the government formation process. These hypotheses generally come from policy-seeking models, which assume that political parties are motivated by policy goals rather than a desire to simply hold office. The most common prediction from these models is that potential governments are less likely to take office the more ideologically diverse they are (Axelrod 1970, De Swaan 1973). One reason for this is that parties wish to minimize the policy concessions they need to make when building majority legislative support. Another reason is that it is harder for ideologically diverse governments to reach an agreement on a coalition policy, which might prompt the parties in such a potential government to anticipate future problems. As Strøm et al. point out, the “greater the preference diversity between the parties, the more fragile their coalition is likely to be.” (2010, 521).

- Government Hypothesis 6: Potential governments are less likely to form the more ideologically diverse they are.

A second prediction is that governments containing the median ideological party are more likely to enter office. As we noted earlier in our discussion of formateur selection, the logic behind this is that the median legislator can be thought of as “a dictator on policy” in one-dimensional models of government formation (Laver & Schofield 1998, 111). A third prediction is that minority governments are more likely to enter office if the ‘majority’ opposition is ideologically divided (Laver & Schofield 1998, 80-81). The reason is that minority governments are better able to exploit issue-by-issue differences between opposition parties to make policy and remain in office (Strøm 1990). A final ‘ideological’ prediction is that a potential government is more likely to form the closer its ideological position to that of the formateur; that is, formateurs will want to form government coalitions that are close to them ideologically (Austen-Smith & Banks 1988, Baron 1991).

- Government Hypothesis 7: Potential governments are more likely to form if they contain the median ideological party.
- Government Hypothesis 8: Potential minority governments are more likely to form the greater the ideological divisions in the opposition.
- Government Hypothesis 9: Potential governments are more likely to form the closer they are ideologically to the formateur.

Note that testing this last hypothesis effectively requires that we link the choice of government with the choice of formateur in a single empirical framework. As such, this hypothesis cannot be tested with the standard models of government choice that are predominant in the literature.⁷

2.2.3 Institutions

More recent theories have explicitly focused on the role that institutions play in structuring the government formation process. Some of these institutionalist theories emphasize the role that particular actors play

⁷One might think to take the choice of successful formateur as given and simply examine whether potential governments that are closer to this particular formateur are more likely to be chosen. However, there are two reasons to question the utility of this approach. The first is that, in our opinion, taking the choice of successful formateur as given somewhat defeats the purpose of actually modeling the government formation process. The second is that it ignores the fact that the initial choice of formateur is likely to be endogenous to the characteristics of the set of potential governments from the which the formateur must choose. The endogeneity of formateur choice is something that we will return to in the next section.

in forming governments. Earlier, we presented arguments suggesting that the president and/or incumbent prime minister may, under certain circumstances, be able to influence the formateur selection process (Lupia & Strøm 1995, Strøm & Swindle 2002, Smith 2004, Kayser 2005, Kang 2009, Glasgow, Golder & Golder 2011). The same theoretical arguments might lead one to wonder whether these actors can also influence the choice of government. For example, is it the case that potential governments containing the party of the president or incumbent prime minister are more likely to form? Note that any effect of the incumbent prime minister might depend on whether the previous government ended in conflict, since incumbency is not likely to be advantageous in that scenario.

- Government Hypothesis 10: Potential governments are more likely to form if they contain the president's party.
- Government Hypothesis 11: Potential governments are more likely to form if they contain the incumbent prime minister's party, provided that the previous government did not end in conflict.

Other theories focus on specific institutions or arrangements that are thought to affect the likelihood that particular governments take office. For example, a number of scholars have suggested that minority governments are less likely in countries that require a formal investiture vote (Strøm 1990, Strøm, Budge & Laver 1994, Bergman 1995). To a large extent, investiture votes are essentially rubber stamps if the government seeking approval already controls a legislative majority. As a result, one would not expect an investiture vote to influence the likelihood that a majority government takes office. In contrast, there are reasons to believe that minority governments will find it harder to take office in countries where there is an investiture vote. These reasons are the same as we noted earlier to explain why investiture votes might constrain the ability of presidents to influence the selection of the formateur. In effect, minority governments must be explicitly supported rather than simply tolerated if there is an investiture vote.

- Government Hypothesis 12: Potential minority governments are less likely to form if there is an investiture vote.

We have drawn on both formal models and empirical accounts of the government formation process to identify five hypotheses relating to formateur selection and another twelve hypotheses relating to

government selection. We now turn to a discussion of the most appropriate way to empirically model the government formation process and evaluate these hypotheses.

3 Empirically Modelling the Government Formation Process

We argue that there are several characteristics of the government formation process that any empirical model of it should take into account. None of these characteristics will come as a surprise to anyone who has read descriptive accounts of the government formation process.

The first is that the government formation process involves the selection of a single government from the set of all potential governments. The second characteristic to take into account is the large amount of unobserved heterogeneity in the government formation process. Some potential government alternatives may be more (or less) attractive than others for reasons that are not fully captured by the independent variables in our models, such as personality clashes and ad hoc events. In general, it is easy to think how features specific to particular countries or elections that are not captured in the usual set of independent variables might make some government alternatives more or less attractive than others.

Related to this second point, the third characteristic of the government formation process that an empirical model should recognize is that the assumption of the independence of irrelevant alternatives (IIA) that is required for some modeling approaches is highly implausible.⁸ The IIA assumption basically states that the unobserved component associated with each government alternative is uncorrelated with the unobserved components for the other alternatives. The likelihood that IIA holds in the context of government formation where there can be tens, hundreds, or even thousands of alternatives that are often similar is extremely implausible. This is important because if the assumption of IIA is violated, then estimates from models requiring this assumption will be inconsistent, and the substitution patterns we estimate across potential governments will be incorrect.

In previous work we addressed these problems by introducing the mixed logit (Train 1998, McFadden & Train 2000, Glasgow 2001) to the study of the choice of the prime ministerial party and the choice of government (Glasgow, Golder & Golder 2011, Glasgow, Golder & Golder 2012). As with another common choice for modeling government formation, the conditional logit, the mixed logit treats each government

⁸The conditional logit model relies on the assumption of IIA.

formation opportunity as the unit of analysis, with each potential government treated as a choice alternative. However, the mixed logit also allows for random coefficients, which addresses our substantive concerns with unobserved heterogeneity and our methodological concerns with IIA violations.

Before addressing the fourth characteristic of government formation that we wish to take into account, we provide a description of the mixed logit model which allows us to capture the first three characteristics. Substantively, we want to specify a model where the effects of the independent variables are allowed to vary across government formation opportunities. For example, we might want to allow for the possibility that the effect of the presence of the largest party in a potential government might vary depending on whether the other parties in the potential coalition feel that this party will be easy to work with – a large ally would be a positive, but a large party with a recalcitrant leader would be a negative. This is something that is very difficult to observe, let alone measure. We can allow the effects of such independent variables to vary across formation opportunities through a random coefficients setup in our mixed logit model, where the independent variables have a mean effect β that is adjusted upward or downward by some amount η_i in each government formation opportunity i .

If we could observe this adjustment for each formation opportunity, then the probability that government j is selected in formation opportunity i would be the familiar conditional logit probability, with each probability adjusted by adding the constant term η_i to β :

$$P_{ij} = \frac{e^{x_{ij}\beta + x_{ij}\eta_i}}{\sum_{k=1}^K e^{x_{ik}\beta + x_{ik}\eta_i}} \quad (1)$$

Given that η_i is a function of the unobserved or unmeasured factors that affect government choice, it is not actually observed. Thus we specify a joint probability distribution $g(\eta|\Omega)$ for η , where Ω are the fixed parameters of the distribution g – this specifies the distributions of our random coefficients. We can then obtain the unconditional probability that a potential government is selected by integrating the term in Eq. (1) over all possible values of η weighted by the density function of η as given by g :

$$P_{ij} = \int \left[\frac{e^{x_{ij}\beta + x_{ij}\eta_i}}{\sum_{k=1}^K e^{x_{ik}\beta + x_{ik}\eta_i}} \right] g(\eta|\Omega) d\eta \quad (2)$$

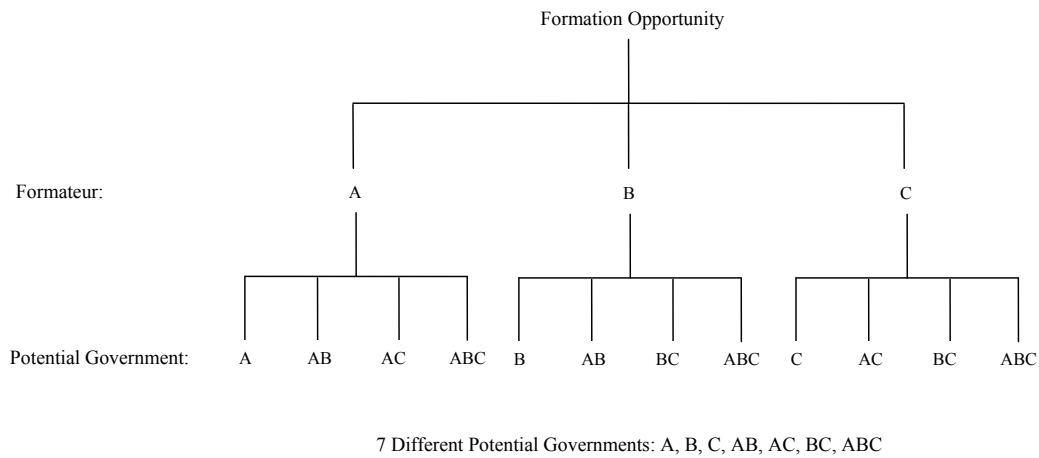
In this mixed logit model, the choice probabilities are a mixture of conditional logit probabilities, each with

different values for the η s and a weight determined by the mixing distribution g . Estimating this mixed logit gives us β and Ω – the means and covariance matrix of our random coefficients. Note that while η varies across government formation opportunities, it does not vary across potential governments in a single formation opportunity. This introduces correlation across potential governments into the factors that affect the probability that a cabinet will enter office, thereby relaxing the IIA assumption, even if the covariance matrix of the random coefficients Ω is diagonal.

Mixed logit models are extremely flexible and researchers can specify any distribution they wish for the η s. In general, MXL models cannot be estimated through standard maximum likelihood techniques because the integral for the choice probabilities in Eq. (2) has no closed-form solution. Instead, they are estimated through maximum simulated likelihood. For each formation opportunity, a value for η_i is drawn from $g(\eta|\Omega)$ and used to calculate \hat{P}_{ij} , the conditional choice probability in Eq. (1). This process is repeated R times and the integration over $g(\eta|\Omega)$ is approximated by averaging over the R conditional choice probabilities for each formation opportunity. A simulated log-likelihood function is then created from these simulated probabilities and is maximized with conventional maximum likelihood techniques. In our estimates below we use 200 Halton draws to calculate the conditional choice probabilities. The use of quasi-random sequences such as Halton draws allows for a better coverage of the interval over which the integration is to be performed (for a given number of draws) than if we were to draw randomly, greatly increasing the speed of estimation (Train 2009, 228).

Finally, we wish to account for the fact that the government formation process is sequential and nested in nature – a formateur is initially chosen who then tries to form a government that contains her own party. We illustrate this two-step government formation process in Figure 1 for a government formation opportunity in a country with three parties, A, B, and C. In the first step, one of the three parties is chosen as the formateur. The formateur then chooses one of the four possible governments that include his or her own party. Figure 1 indicates that although there are seven potential governments that differ in terms of their party composition (A, B, C, AB, AC, BC, ABC), there are actually twelve different ways that these governments can form (that is, twelve formateur-coalition pairs). For example, coalition AB can result from a process where formateur A chooses AB or a process where formateur B chooses AB; the prime minister is from party A in the former case and from party B in the latter case. This is an important point given the

Figure 1: Sequential Nature of the Government Formation Process



significance of being prime minister in a parliamentary democracy. For politicians (and voters) who care about office and policy, a coalition AB with formateur A will not be seen as interchangeable with a coalition AB with formateur B.⁹ This is something that an empirical model of the government formation process should ideally recognize.

Not only does Figure 1 illustrate the sequential nature of the government formation process, but it also highlights the fact that the choice of the formateur will likely be influenced by the characteristics or party composition of the potential governments available in the second stage. Although this strategic aspect of formateur selection is something that is explicitly recognized by a few recent models of the government formation process where the formateur is endogenously chosen (see, e.g., Bassi (2013)), it is ignored by previous empirical analyses of the choice of formateur (Warwick 1996, Diermeier & Merlo 2004, Mattila & Raunio 2004, Isaksson 2005, Bäck & Dumont 2008, Glasgow, Golder & Golder 2011).

While estimating a mixed logit model on potential government data represents an advance over pre-

⁹As an example, consider the 2005 government formation process in Germany. During negotiations over the formation of a new government, it soon became apparent that the only viable option for a majority government was a “grand coalition” between the CDU/CSU and the SPD. Despite this, there was a considerable delay in the formation of this coalition government with the leader of the CDU, Angela Merkel, and the leader of the SPD, Gerhard Schröder, both insisting that they should be Chancellor. What made this government formation process particularly interesting was that Schröder claimed that he should be Chancellor on the grounds that the SPD was the largest *party*, whereas Merkel claimed that she should be Chancellor on the grounds that the CDU/CSU together formed the largest single *group* in the Bundestag. The point here is that the two party leaders clearly thought that it mattered whether the grand coalition would be led by the CDU/CSU or the SPD.

vious empirical strategies, this approach still does not address the sequential nature of the government formation process. One possibility would be to specify a nested logit with a formateur selected first, and the formateur then selecting a coalition from the set of all coalitions that includes the formateur party.¹⁰ The nested logit relaxes the IIA assumption across nests, but maintains the IIA assumption within nests, and allows the choice in the second level (the choice of coalition) to depend on the choice in the first level (the choice of formateur).

As a first cut at estimating a model of government choice, we specify a mixed logit in a way that approximates the substitution patterns of a nested logit, by specifying a dummy variable for each nest and estimating a random coefficient on each of these dummy variables (the mean of one dummy variable must be constrained to zero) (Train 2009, 167). This will capture the substitution pattern typically assumed when specifying a nested logit – that substitution within nests is greater than substitution across nests. That is, this specification assumes that coalitions led by party A tend to be more similar to each other than coalitions led by party B. Adding additional random coefficients to this model can also change the substitution patterns within nests, allowing sets of coalitions within a nest to be correlated. This is the mixed logit specification we use below. Estimating this mixed logit should allow us to distinguish between formateur-level and coalition-level effects, and allow the set of potential governments in the second level to influence the choice of formateur in the first level.

This model should also allow us to evaluate a number of additional hypotheses about the government formation process that cannot be tested in the standard conditional logit or mixed logit framework. For example, we plan to explicitly examine how the selection of the formateur influences the overall party composition of the government. We want to evaluate whether certain factors influence the choice of formateur, the choice of the government, or both. For instance, does having the largest seat share mean that a party is more likely to join a coalition, does it mean that party is more likely to be selected as formateur and form a coalition including itself, or both? In the next section, we begin to test some of the hypotheses outlined

¹⁰One might think that a fully structural model of the government formation process like those found in other areas of political science (Signorino 1999, Signorino & Tarar 2006) would provide an even closer fit between theory and empirics. Unfortunately, we do not believe that it is possible to construct such a model of government choice. The problem is that one cannot simply transform the illustrative tree in Figure 1 into a ‘game-tree’ that applies to all government formation opportunities because the number of parties, and, hence, the number of branches, varies both within and between countries. Although Diermeier, Eraslan and Merlo (2003) present a structural model of government formation, their model is not designed to, and is incapable of, predicting the identity or party composition of the government. In sum, we believe that the model that we propose comes as close as is currently possible to a fully structural model of government choice.

earlier linking ideological, institutional, and ‘size’ variables to the choice of formateur and government.

4 Empirical Analysis

4.1 Data and Specification

To create the data set to test our hypotheses, we began with the set of countries that are members of the Council of Europe.¹¹ Of the 47 member countries, we excluded seven on the grounds that they are not parliamentary, that is, the government cabinet cannot be removed by the legislature by a vote of no confidence.¹² This leaves us with 40 countries that enter the data set when the post-WWII era begins or when the country democratizes (for example, Spain and Portugal enter in the 1970s, and most eastern European countries enter in the 1990s).¹³ We build on a couple of existing data sets, extending each through 2012 and then adding additional countries. For 17 western European countries through 1998, we used the governments identified by the Comparative Parliamentary Democracy Data Archive project (Müller & Strøm 2000, Strøm, Müller & Bergman 2003, Indriðason 2005).¹⁴ For 11 eastern European countries through 2010, we used the governments identified by Conrad & Golder (2010). We updated the information for these 28 countries through December 31, 2012, and gathered data on governments in 12 additional countries. From this, we generated a data set with all potential governments in each formation opportunity.¹⁵ We have information on the seat share of all of the parties in each legislature, as well as ideological positions for most of them; the ideology data comes from the DPEG project of Benoit, Herzog & Caulfield (2013).¹⁶ From this information, we can

¹¹The Council of Europe is a human rights organization open to all countries in the geographic region commonly associated with Europe. All member states in the Council of Europe member have signed the European Convention on Human Rights. (Within this region, the only state that is not a member is Belarus; although it applied for membership in the 1990s, its government does not meet the CoE’s criteria for democratic legitimacy.)

¹²We omit Andorra, Azerbaijan, Bosnia and Herzegovina, Cyprus, Monaco, San Marino, and Switzerland.

¹³The countries are Albania, Armenia, Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France (4th and 5th Republics), Germany, Georgia, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, (TFYRO) Macedonia, Malta, Moldova, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Russia, Serbia, Slovak Republic, Slovenia, Spain, Sweden, Turkey, Ukraine, and the United Kingdom.

¹⁴For more information, see <http://www.erdda.se/>.

¹⁵As we mentioned above, if parties A, B, and C were elected to the parliament, then the potential governments in the government formation opportunity following the election comprise, A, B, C, AB, AC, BC, and ABC.

¹⁶The Database of Parties, Elections, and Governments (DPEG) from Benoit et al. provides logit scales created from the left-right measures provided by the Comparative Manifesto Data project. See Lowe et al. (2011) and Benoit et al. (2009) for a discussion of these measures, and of using text to discern party policy generally. Measuring party ideologies on a right-left policy dimension is often based on the absolute quantity of “right” versus “left” statements, or quasi-sentences, in a party’s campaign manifesto, referred to as R and L, respectively. Lowe et al. (2011, 131) suggest that using a measure based on R/L provides a better expression of the policy position rather than one based on R + L. In particular, they suggest that a good measure for considering

determine the number of parties in each potential government, as well as whether a potential government would be a single-party majority government, a minimal winning coalition, a minority government, a surplus majority government, contain the largest legislative party, contain the party with the median legislator, or contain the party of the previous prime minister.

We ignore all selection opportunities where the successful formateur (prime minister) is non-partisan or where the government itself was nonpartisan. This led us to exclude 51 formation opportunities. An additional 31 formation opportunities are omitted because we have no observation for the party of the previous prime minister. After these omissions, we are left with 699 government formation opportunities and 147,653 potential coalitions.

We need to consider the nested structure of our data, specifically the fact that overlapping sets of coalitions can be grouped under potential formateurs. In the model below we specify nests for the seven largest parties in the formation opportunity. In our data there were no examples of a party smaller than the seventh largest party becoming the formateur, so we cannot define nests for parties smaller than this (the dummy variables on the eighth through fourteenth largest parties as formateur would perfectly predict zero, and would thus have infinite negative coefficients). Defining nests by party size allows us to define the dummy variables that define these choices in a general way that works across different countries and elections.

In order to distinguish between different formateurs leading the same coalition of parties we expand the data based on each potential government described above to be data based on each potential formateur-coalition pair. A particular coalition of parties, say AB, will be counted as one government if the prime minister is from Party A and a different government if the prime minister is from Party B. That is, we have the set of all possible coalitions that could have the largest party as the prime minister, another set that has the second largest party as prime minister, and so on. The party composition of each set of coalitions overlaps – for instance, if the formation opportunity has parties A, B, and C, the coalition ABC will appear three times,

“proportional changes on a symmetrical left-right scale” is the empirical logit: $\theta^{(L)} = \log \frac{R+.5}{L+.5}$, which can also be expressed as $\log(R + .5) - \log(L + .5)$. This logit scale “has no predefined end points: given enough sentences, it is possible to generate positions of any level of extremity. [...] We should note that although $\theta^{(L)}$ is defined as a (logged) ratio, it offers interval not ratio level measurement. In particular, $\theta^{(L)} = 0$ should not automatically be identified as a substantively centrist policy position. In the absence of an external anchor, e.g., to policy outcomes, a centrist position would be some function of the mean or median position on an issue of the parties contesting the election. How this position will be expressed in R, L terms will depend on historically contingent country-level factors.”

in nests A, B, and C. This expands our data from 147,653 coalitions to 507,112 formateur-coalition pairs.

We were able to estimate a mixed logit on this many formateur-coalition pairs in less than an hour with Stata 12.0 on a Windows machine. We did consider an alternative “big data” estimation technique, where we would expand our 500,000+ observations by the number of Halton draws, and treat each formateur-coalition-random draw set as an observation. The reason for doing this would be to avoid looping over the 500,000+ observations to create the log-likelihood with the Halton draws. This would have yielded 100,000,000 “observations,” which is probably too much data to hold in memory for most software packages. We could estimate a model in this way by reading on some of the data, updating the log-likelihood for those observations, and then discarding that data and moving on to the next batch. Ultimately this approach was not necessary, as Stata was about to hold the data in memory and was sufficiently fast in creating the log-likelihood function for the mixed logit.

For this preliminary test of our nested mixed logit model, we chose a basic specification that includes only some of the covariates we plan to use in later iterations. Thus we are not testing all of the hypotheses laid out earlier. We test only some of the government coalition hypotheses at this time. For the choice of formateur, we include the dummy variables that define our seven formateur nests, as described above.

To capture coalition size effects we include four variables. We include *Coalition Size*, measured by legislative seatshare, and also include *Coalition Size*² (divided by 100 to rescale the variable) to capture the idea that larger coalitions are more likely to get into government, but that the benefits to size are decreasing as size increases. We also include a dummy variable for *Government Contains Largest Party* to capture any additional advantage these coalitions might have. We also include a measure of the number of parties in the coalition. We also test hypotheses related to government type, so that we can see the effect of being a *Minimal Winning Coalition* or a *Minority* coalition compared to a surplus majority coalition (the omitted category).

We include two measures of the ideological composition of the government. A dummy variable indicates whether the potential government contains the median party. We also include a measure of the seatshare-weighted distance between the potential formateur and the other coalition partners. Note that this measure will vary across the same potential government depending on the identity of the formateur – for example, if party A is large and party B is small, the weighted distance from the formateur will be larger if

B is the formateur than if A is the formateur. This suggests that the probability that a coalition forms will depend on the identity of the formateur, which is a hypothesis we could not test with simple coalition-level data.

We also include measures of previous experience in government. Dummy variables indicate whether the potential coalition includes the party of the *Previous Prime Minister* or whether the potential formateur-coalition pair is the incumbent. We also have a dummy variable indicating whether the potential government contains at least one incumbent party – if the previous government does not re-form, we expect these coalitions to be disadvantaged.

We define our nests for the seven largest parties with seven dummy variables. The coefficients on these dummy variables are specified as normally distributed random coefficients in order to capture the correlation across the choice alternatives within each nest, which allows choice alternatives within each nest to be more similar to each other than alternatives in other nests. This is analogous to the substitution pattern that a nested logit is meant to capture. In order to identify the model we restrict the distribution on the dummy variable for nest 1 (largest party as formateur) to be $N(0,1)$.

4.2 Results

The results from estimating the mixed logit model described above are presented in Table 1. At the coalition level the results from this model are sensible, and in line with previous work. Larger coalitions are advantaged, with diminishing returns to scale, and coalitions with fewer parties and minimal-winning coalitions are more likely to form. Coalitions that contain the median party or the previous prime minister are more likely to form, as is the incumbent government, while non-incumbent coalitions that contain incumbent parties are less likely to form.

The dummy variables on formateur nests reveal that governments are most likely to form with the largest party as formateur. None of the standard deviations on the nest coefficients are statistically significant, which suggests that correlations within nests are not very strong.

Table 1: What Determines the Choice of Formateur and Government?

Independent Variable	Mean	Std. Dev.
Seatshare	0.16*** (0.02)	
(Seatshare ²)/100	-0.12*** (0.01)	
Government Contains Largest Party	-1.48*** (0.22)	
Number of Parties	-0.97*** (0.107)	
Minimal Winning Government	0.60*** (0.15)	
Minority Government	-0.21 (0.21)	
Government Contains Median Party	0.50*** (0.12)	
Weighted Distance to Formateur	-1.19*** (0.19)	
Government Contains Prev. PM Party	0.84*** (0.18)	
Incumbent PM-Govt	3.47*** (0.13)	
Incumbent Parties	-1.47*** (0.20)	
Party Dummy Variables		
Party 1	0	1 <i>constrained</i>
Party 2	-1.87*** (0.21)	0.02 (0.27)
Party 3	-2.26*** (0.24)	0.09 (0.50)
Party 4	-2.88*** (0.31)	0.01 (0.83)
Party 5	-2.85*** (0.42)	0.29 (0.88)
Party 6	-2.53*** (0.46)	0.32 (1.00)
Party 7	-3.75*** (0.74)	0.05 (1.92)
Formation Opportunities		699
Potential Governments		507,112
Log Likelihood		-2040.82

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$ (two-tailed).

'Potential Governments' are formateur-coalition pairs.

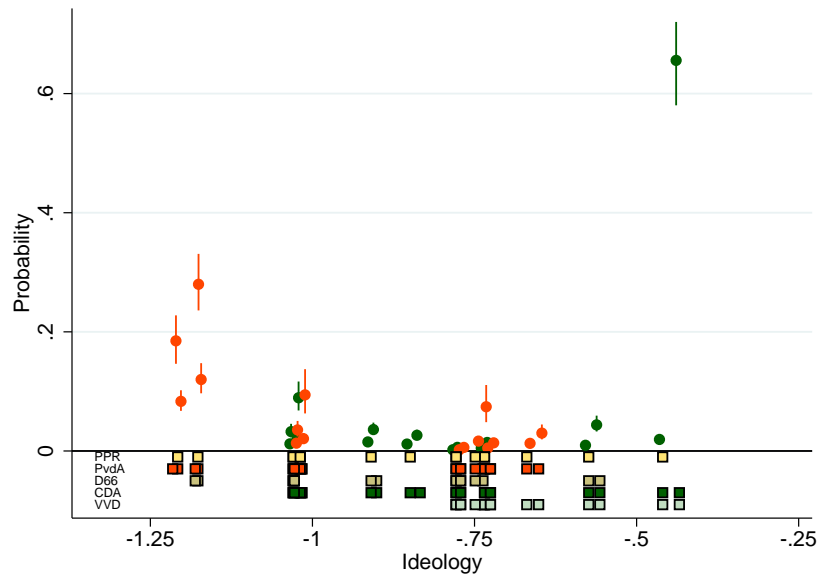
One new result is that, unlike many previous models, the dummy variable on largest party is *negative* and statistically significant. That is, conditional on the identity of the formateur, largest party status is actually a disadvantage. The real advantage of largest party status is in the likelihood of becoming formateur – if for some reason the largest party does not become formateur, it is less likely to become a part of the government, most likely because it would carry more influence than the prime ministerial party.

Another new result is on the weighted distance to the formateur. As expected, formateurs tend to seek out a governing coalition composed of parties that are ideologically similar to the formateur's own ideal point. As a further demonstration of the importance of formateur identity in government formation, we calculated the predicted probabilities for governments in a hypothetical case, varying the identity of the formateur.

Our hypothetical case based on the government formation opportunity resembling the one that took place in the Netherlands following the 1981 election. We base our hypothetical case on a Dutch government formation opportunity because it is widely recognized that Dutch elections are representative of the types of elections that occur in multi-party parliamentary democracies (Rose & McAllister 1986), and because we wish to follow in a long line of studies that have used Dutch elections to demonstrate methodological advances in the use of discrete choice models (Alvarez & Nagler 1998, Schofield et al. 1998, Quinn, Martin & Whitford 1999, Glasgow & Alvarez 2005). Although there were 10 parties in the Dutch legislature in 1981, we only have ideological information for five parties. The *Christen-Democratisch Appel* (CDA), the *Democraten 66* (D66), and the *Partij van de Arbeid* (PvdA) were all centrist parties, with the CDA slightly to the right and the PvdA and D66 slightly to the left. The *Volkspartij voor Vrijheid en Democratie* (VVD) was more ideologically distinct and clearly on the right, while the *Politieke Partij Radikalen* (PPR) was clearly to the left.

In Figure 2 we consider the probabilities of various governing coalitions forming with either the CDA (largest party) or the PvdA (second largest party) as formateur. That is, we present the probabilities for two sets of 15 governments each, once with the CDA as the prime minister, and one with the PvdA as the prime minister. These potential governments are presented in ideological order from left to right. The five parties are listed at the bottom of the graph, with colored squares indicating which parties are members of each potential government. For each potential government the median probability and 95% confidence

Figure 2: Probabilities of Governments Conditional on Choice of Formateur, Netherlands 1981



Note: The results presented here are for a government formation opportunity resembling the one that took place in the Netherlands in 1981. The five parties in this hypothetical scenario are shown at the bottom, with grey squares indicating which parties belong to each potential government. The potential governments are presented in ideological order from left to right, based on the seat-share weighted average of the ideological scores. The ideological positions of some potential governments have been shifted slightly for clarity of presentation. Mean predicted probabilities for the baseline case where the data take on the values observed in the real-world formation opportunity (circles) and a counterfactual case that changes the largest party from the CDA to the PvdA (crosses) are presented. Probability estimates are based on simulations using 1,000 draws from the estimated coefficient vector and variance-covariance matrix.

interval are presented (standard errors are calculated by calculating the conditional probabilities 1000 times). The probabilities for the CDA as formateur are presented in green, while the probabilities for the PvdA as formateur are presented in orange.

An examination of Figure 2 reveals the importance of the identity of the formateur in determining the composition of the government. Conditional on the CDA being the formateur, the most likely coalition is the incumbent CDA-VVD coalition. However, if the PvdA were to become the formateur, the most likely outcome is a PvdA-D66 coalition, with the PvdA alone as the next most likely result. If the CDA was not the formateur, the penalty for being an incumbent party not in the incumbent coalition and the penalty for being largest party and not being formateur greatly reduce the chance that the CDA would be in the government.

5 Conclusion

In this paper we presented a new approach to empirically modeling the government formation process that allows us to treat the choice of the formateur (the putative prime ministerial party) as influencing, and being influenced by, the choice of the government coalition. This approach matches theoretical descriptions of the government formation process more closely than has previously been possible. It also allows us to test new hypotheses that could not be tested previously. In future iterations we will test all of the hypotheses and determine whether particular factors matter more for the choice of the government cabinet composition or for the choice of the formateur. We will also be able to examine whether these factors affect the government formation process in western and eastern Europe in the same way, or if there are differences across the two regions. For example, our preliminary results suggest that largest party status only matters because it affects the choice of formateur. In later versions of this paper, we will be able to examine these kinds of results more closely. We will also be able to explore in more depth the role played by unobserved heterogeneity in the government formation process.

References

- Alvarez, R. Michael & Jonathan Nagler. 1998. "When Politics and Models Collide: Estimating Models of Multiparty Elections." *American Journal of Political Science* 42:55–96.
- Amorim Neto, Octavio & Kaare Strøm. 2006. "Breaking the Parliamentary Chain of Delegation: Presidents and Non-Partisan Cabinet Members in European Democracies." *British Journal of Political Science* 36:619–643.
- Ansolabehere, Stephen, James M. Snyder Jr., Aaron B. Strauss & Michael M. Ting. 2005. "Voting Weights and Formateur Advantages in the Formation of Coalition Governments." *American Journal of Political Science* 49:550–563.
- Austen-Smith, David & Jeffrey Banks. 1988. "Elections, Coalitions, and Legislative Outcomes." *American Political Science Review* 82:405–422.
- Axelrod, Robert. 1970. *Conflict of Interest*. Chicago: Markham.
- Bäck, Hanna & Patrick Dumont. 2008. "Making the First Move: A Two-Stage Analysis of the Role of Formateurs in Parliamentary Government Formation." *Public Choice* 135:353–373.
- Baron, David P. 1991. "A Spatial Theory of Government Formation in Parliamentary Systems." *American Political Science Review* 85:137–165.
- Baron, David P. & Daniel Diermeier. 2001. "Elections, Governments and Parliaments in Proportional Representation Systems." *Quarterly Journal of Economics* 116:933–967.
- Baron, David P. & John Ferejohn. 1989. "Bargaining in Legislatures." *American Political Science Review* 83:1181–1206.
- Bassi, Anna. 2013. "An Endogenous Model of Government Formation." *American Journal of Political Science* 57:xx–xx.
- Benoit, Kenneth, Alexander Herzog & Darren Caulfield. 2013. "DPEG: Database of Parties, Elections, and Governments."
- Benoit, Kenneth, Michael Laver & Slava Mikhaylov. 2009. "Treating Words as Data with Error: Estimating Uncertainty in Text Statements of Policy Positions." *American Journal of Political Science* 53:495–513.
- Bergman, Torbjörn. 1995. *Constitutional Rules and Party Goals in Coalition Formation*. Umeå: Umeå University Press.
- Conrad, Courtenay Ryals & Sona N. Golder. 2010. "Measuring Government Duration and Stability in Central Eastern European Democracies." *European Journal of Political Research* 49:119–150.
- De Swaan, Abram. 1973. *Coalition Theories and Government Formation*. Amsterdam: Elsevier.
- Diermeier, Daniel & Antonio Merlo. 2004. "An Empirical Investigation of Coalitional Bargaining Procedures." *Journal of Public Economics* 88:783–797.
- Diermeier, Daniel, Antonio Merlo & Hulya Eraslan. 2003. "A Structural Model of Government Formation." *Econometrica* 71:27–70.
- Fréchette, Guillaume, John H. Kagel & Massimo Morelli. 2005. "Gamson's Law versus Non-Cooperative Game Theory." *Games and Economic Behavior* 51:365–390.
- Glasgow, Garrett. 2001. "Mixed Logit Models for Multiparty Elections." *Political Analysis* 9:116–136.
- Glasgow, Garrett, Matt Golder & Sona N. Golder. 2011. "Who 'Wins'? Determining the Party of the Prime Minister." *American Journal of Political Science* 55:937–954.
- Glasgow, Garrett, Matt Golder & Sona N. Golder. 2012. "New Empirical Strategies for the Study of Parliamentary Government Formation." *Political Analysis* 20:248–270.
- Glasgow, Garrett & R. Michael Alvarez. 2005. "Voting Behavior and the Electoral Context of Government Formation." *Electoral Studies* 24:245–264.
- Indriðason, Indriði. 2005. "A Theory of Coalitions and Clientelism: Coalition Politics in Iceland 1945–2000." *European Journal of Political Research* 44:439–464.
- Isaksson, Guy-Erik. 2005. "From Election to Government: Principal Rules and Deviant Cases." *Government and Opposition* 40:329–357.
- Kang, Shin-Goo. 2009. "The Influence of Presidential Heads of State on Government Formation in European Democracies: Empirical Evidence." *European Journal of Political Research* 48:543–572.
- Kaysner, Mark A. 2005. "Who Surfs, Who Manipulates? The Determinants of Opportunistic Election Timing and Electorally Motivated Economic Interventions." *American Political Science Review* 99:17–28.

- Laver, Michael. 1998. "Models of Government Formation." *Annual Review of Political Science* 1:1–25.
- Laver, Michael & Kenneth A. Shepsle. 1996. *Making and Breaking Governments: Cabinets and Legislatures in Parliamentary Democracies*. New York: Cambridge University Press.
- Laver, Michael & Norman Schofield. 1998. *Multiparty Government: The Politics of Coalition in Europe*. Ann Arbor: University of Michigan Press.
- Laver, Michael, Scott de Marchi & Hande Mutlu. 2011. "Negotiation in Legislatures over Government Formation." *Public Choice* 147:285–304.
- Leiserson, Michael. 1968. "Factions and Coalitions in One-Party Japan: An Interpretation Based on the Theory of Games." *American Political Science Review* 62:70–87.
- Lowe, William, Kenneth Benoit, Slava Mikhaylov & Michael Laver. 2011. "Scaling Policy Preferences From Coded Political Texts." *Legislative Studies Quarterly* 26:123–155.
- Lupia, Arthur & Kaare Strøm. 1995. "Coalition Termination and the Strategic Timing of Legislative Elections." *American Political Science Review* 89:648–65.
- Mattila, Mikko & Tapio Raunio. 2004. "Does Winning Pay? Electoral Success and Government Formation in 15 West European Countries." *European Journal of Political Research* 43:263–285.
- McFadden, Daniel & Kenneth Train. 2000. "Mixed MNL Models for Discrete Response." *Applied Econometrics* 15:447–470.
- Morrelli, Massimo. 1999. "Demand Competition and Policy Compromise in Legislative Bargaining." *American Political Science Review* 93:809–820.
- Müller, Wolfgang C. & Kaare Strøm, eds. 2000. *Coalition Governments in Western Europe*. Oxford: Oxford University Press.
- Peleg, Bazalel. 1981. "Coalition Formation in Simple Games with Dominant Players." *International Journal of Game Theory* 1:11–13.
- Quinn, Kevin M., Andrew D. Martin & Andrew B. Whitford. 1999. "Voter Choice in Multi-Party Democracies: A Test of Competing Theories and Models." *American Journal of Political Science* 43:1231–1247.
- Riker, William. 1962. *The Theory of Political Coalitions*. New Haven: Yale University Press.
- Rose, Richard & Ian McAllister. 1986. *Voters Begin to Choose: From Closed-Class to Open Elections in Britain*. London: Sage Publications.
- Schleiter, Petra & Edward Morgan-Jones. 2009. "Constitutional Power and Competing Risks." *American Political Science Review* 103:496–512.
- Schleiter, Petra & Edward Morgan-Jones. 2011. "Who's in Charge? Presidents, Assemblies, and the Political Control of Semi-Presidential Cabinets." *Comparative Political Studies* 44.
- Schofield, Norman. 1993. "Political Competition and Multiparty Coalition Governments." *European Journal of Political Research* 23:1–33.
- Schofield, Norman. 1997. "Coalition Politics and Representative Democracy." *European Journal of Political Research* 31:183–192.
- Schofield, Norman, Andrew D. Martin, Kevin M. Quinn & Andrew B. Whitford. 1998. "Multiparty Competition in the Netherlands and Germany: A Model Based on Multinomial Probit." *Public Choice* 97:257–293.
- Signorino, Curtis S. 1999. "Strategic Interaction and the Statistical Analysis of International Conflict." *American Political Science Review* 93:279–297.
- Signorino, Curtis S. & Ahmer Tarar. 2006. "A Unified Theory and Test of Extended Immediate Deterrence." *American Journal of Political Science* 50:586–605.
- Smith, Alastair. 2003. "Election Timing in Majoritarian Parliaments." *British Journal of Political Science* 33:397–418.
- Smith, Alastair. 2004. *Election Timing*. USA: Cambridge University Press.
- Strøm, Kaare. 1990. *Minority Governments and Majority Rule*. Cambridge: Cambridge University Press.
- Strøm, Kaare, Ian Budge & Michael J. Laver. 1994. "Constraints on Cabinet Formation in Parliamentary Democracies." *American Journal of Political Science* 38:303–335.
- Strøm, Kaare & Stephen M. Swindle. 2002. "Strategic Parliamentary Dissolution." *American Political Science Review* 96:575–91.
- Strøm, Kaare, Wolfgang C. Müller & Daniel Markham Smith. 2010. "Constraints on Cabinet Formation in Parliamentary Democracies." *Annual Review of Political Science* 13:517–535.

- Strøm, Kaare, Wolfgang C. Müller & Torbjörn Bergman, eds. 2003. *Delegation and Accountability in Parliamentary Democracies*. Oxford: Oxford University Press.
- Tavits, Margit. 2009. *Presidents with Prime Ministers: Do Direct Elections Matter?* New York: Oxford University Press.
- Train, Kenneth. 1998. "Recreation Demand Models with Taste Differences over People." *Land Economics* 74:230–239.
- Train, Kenneth E. 2009. *Discrete Choice Methods with Simulation (Second Edition)*. New York: Cambridge University Press.
- Van Deemen, A. M. A. 1989. "Dominant Players and Minimum Size Coalitions." *European Journal of Political Research* 23:1–33.
- Warwick, Paul V. 1996. "Coalition Government Membership in West European Parliamentary Democracies." *British Journal of Political Science* 26:471–499.
- Warwick, Paul V. & James N. Druckman. 2001. "Portfolio Salience and the Proportionality of Payoffs in Coalition Governments." *British Journal of Political Science* 38:627–649.
- Warwick, Paul V. & James N. Druckman. 2006. "The Portfolio Allocation Paradox: An Investigation into the Nature of a Very Strong but Puzzling Relationship." *European Journal of Political Research* 45:635–665.