

Coalition Formation and Polarization

Indridi H. Indridason*
University of Iceland

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Abstract

Societal conflict generally centers on conflict between groups. Recent scholarship has explored how societal cleavages influence conflict and how such cleavages can be characterized to capture the potential for conflict. Polarization is often cited as the prime culprit in this context. In this paper I examine how polarization influences the formation of cabinet coalitions in 17 parliamentary democracies.

*Department of Political Science, University of Iceland, Oddi v/Sturlugötu, 101 Reykjavík, Iceland. Email: ih@hi.is. I would like to thank Michael Laver and David Stasavage for useful advice. I am grateful to Lanny Martin, Randy Stevenson, Torbjörn Bergman, Kaare Strøm, Wolfgang C. Müller, Michael Laver, Kenneth Benoit, Paul Warwick, and Andrea Volkens for making their data available and for answering my numerous questions.

1 Introduction

The study of coalition formation has long attracted the attention of scholars of parliamentary systems. Coalition formation plays an important role in how parliamentary democracies function as it determines how the outcomes of elections map into governments, and subsequently, policy outcomes. The question of what factor determine what coalition form is therefore of great interest to scholars and citizens in parliamentary democracies. Scholars may be interested in coalition formation because they like to know how different institutions influence policy outcomes or because they are concerned with democratic representation. Citizens, on the other hand, should benefit from understanding coalition formation because they are likely to care not only about the vote share of their most favored party but also which coalition forms. Recent work has shown that which coalitions are likely to form influences the voters decision when they go to the polls (Aldrich, Blais, Indridason & Levine 2004, Aldrich, Blais, Indridason & Levine *forthcoming*).

The formation of cabinets in parliamentary systems takes place in the context of party politics. Each party advocates certain policies and elections determine the size of each party. The party system will, thus, reflect underlying social cleavages to some degree. However, institutional factors, most importantly, electoral systems serve to distort the extent to which the party system mirrors the societal cleavages. How much of a distortion these institutional factors create has long been a matter of debate but recent research supports the idea that it is the interplay between the number of cleavages and institutions that determines what the party system will look like (Neto & Cox 1997, Clark & Golder 2006).

The structure of the party system is likely to have an impact on the formation of coalitions. While some cleavages are important and are likely to prevent parties from cooperating, other cleavages will be less salient and unlikely to deter parties from cooperating with one another. Rather than study explicitly how cleavages influence coalition formation, scholars have generally focused the ideological proximity of the parties on a fixed number of issue dimensions. Focusing on the ideological positions of the parties is a simple way to characterize how different, or how alienated from one another, the parties are and, consequently, how likely they are to form a coalition together (conditional on support).

Although scholars have sought to go beyond the insights provided by

the literature focusing on the size of the coalition (e.g., Riker 1962), and to incorporate insights about the importance of the ideological proximity of parties, it has not considered how the shape of the party system as whole influences coalition formation. Empirical models that consider ‘polarization’ have generally operationalized polarization as the greatest ideological distance between any two parties (within the coalition and the opposition). It is clear that ideological distance is at best a rough measure of polarization because it, e.g., does not take account of the fractionalization of the party system or the size of the most extreme parties. I discuss these limitations in greater detail below.

The purpose of this paper is to examine in detail how party system characteristics influence coalition formation. To offer a fuller account of the effects of the party system I employ Esteban & Ray’s (1994) polarization index. I use the polarization index in two different ways. First, I argue that Esteban & Ray’s (1994) polarization index offers a closer fit with the theoretical concept of polarization than the ‘traditional’ approach of taking the greatest ideological distance between any two parties. In this context, polarization offers a more appropriate test of existing hypotheses about the influence of party ideology on coalition formation. Second, I consider whether the polarization of the party system affects the formation of coalitions in ways that are not captured by focusing on the polarization within either the coalition or the opposition. While our theories of coalition formation have become increasingly sophisticated and our understanding of how considerations of size and ideology influence which coalition forms, little process has been made in explaining why patterns of coalition formation vary greatly across countries. Considering party system characteristics, such as polarization, may be helpful in explaining these patterns as they focus our attention on factors that vary across countries and may, thus, be helpful in explaining the observed patterns.

I begin by offering a (very) brief review of the main insights the literature has offered into the process of coalition formation. I then discuss how polarization influences coalition formation and polarization can be expected to interact with the attributes of (potential) coalitions. The hypotheses are then tested by examining coalition formation in a sample of 17 countries over a sixty year period.

2 Coalition Theory & Polarization

The literature on coalition formation can, with some simplification, be divided into two strands of theorizing. The first, going back to Riker (1962), takes office-seeking as its primitive assumption about the behavior of politicians. This assumption leads to some basic predictions about the form that coalitions ought to take. In particular, we should expect to observe minimal winning coalitions as the political parties have little desire to share the spoils of office (implying the *minimal* part) unless they need to in order to stay in the governing coalitions (implying the *winning* part). Thus, if politicians are office-seeking, we should neither expect to see minority nor surplus coalitions.

The second strand assumes, instead, that politicians are primarily motivated by concerns about policy (e.g., Axelrod 1970). The immediate implication is that we should expect to see coalitions formed by parties with similar ideology. Parties that differ greatly in their views about the kinds of policies to implement will find it difficult to settle their differences in a manner that is to everyone's satisfaction. Thus, under the assumption of policy-seeking parties, we ought to see ideologically connected coalitions but not coalitions with a large ideological range (i.e., consisting of parties with highly differing views about policy). This line of reasoning can further be extended to argue that the coalition should include the party containing the median legislator (because of its strong bargaining position) and that a coalition is more likely to form if the ideological divisions within the opposition are large.

In reality, neither of these assumptions is likely to accurately describe the preferences of parties. Rather, both assumptions capture important elements of the parties' concerns, i.e., that politicians care both about policy and office and that the hypotheses derived from both assumptions have some validity. Martin & Stevenson (2001) and Weesie & van Roozendaal (2000) take this view and test hypotheses derived from both assumptions. In short, they find support for both the policy-seeking and the office-seeking hypotheses.

As formal approaches to coalition formation have made clear, the outcome of the coalition bargaining process can be expected to depend on the ideological locations of the political parties as well as their legislative size.¹ That is, the factors that determine whether two (or more) parties eventually forms a coalition does not depend solely on their policy preferences but also on the

¹The clearest exposition that emphasizes these factors is Laver & Shepsle (1996).

locations of the other parties in the ideological space. The reason is that in making the decision to form a particular coalition, each party weighs the payoffs associated with the coalition against the benefits of forming coalition with some other party (or parties). One of the challenges to testing theories of coalition formation empirically is thus to develop measures that capture the relevant aspects of the party system. Such measures will generally have to take account of both the ideological positions of the parties as well as their sizes.

2.1 Measuring Polarization

The measure of polarization developed by Esteban & Ray (1994) appears well suited for this task. The measure was derived using an axiomatic approach that aimed at capturing of the general intuitions invoked by the word ‘polarization’. Generally speaking we would expect polarization to reach maximum when society (or a party system) is divided into two groups that are far apart ideologically (or whose members feel a high degree of alienation towards the members of the other group). Esteban & Ray’s (1994) axioms essentially concern how changes in size or location of group (parties) in a multi-group (multi-party) situations should influence the degree of polarization, and, to the extent that potential for conflict is related to polarization, the degree of conflict within society.

Esteban & Ray’s (1994) measure differs markedly from the commonly used measures of polarization used within the political science discipline. Within political science, polarization is often operationalized as the ideological distance between the two most extreme parties.² It is, therefore, worthwhile briefly considering the axioms offered by Esteban & Ray and compare the measure with the ‘extreme position’ measure so often employed in the political science literature. As we shall see, the ‘extreme position’ measure satisfies none of Esteban & Ray’s axioms.

Figures 1-3 depict the three axioms.³ In each figure π_i denotes party i ’s size, which is also represented by the line (density) at the party’s ideological

²This measure should immediately give anyone who studies multi-party systems a pause. A possible reason for the popularity of this measure may have something to do with the preponderance of research on polarization in U.S. politics where, in the context of two party competition, the measure is likely to be well behaved.

³The figures are adopted from Esteban & Ray (1994).



Figure 1: Axiom 1

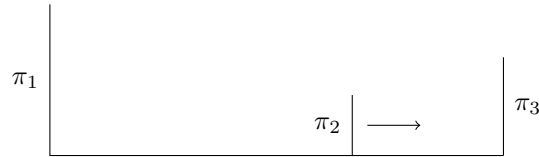


Figure 2: Axiom 2

position. The arrows indicate transfers of members of one party to another (or to a new location). Each of the three axioms stipulates that polarization is increasing in the change indicated by the arrows.

In figure 1 two parties on the right of the political spectrum “merge” at the average of their ideological position. The average distance between the members of the left party and the right parties remains the same as before and after the change but now the right is more cohesive than before. Intuitively, then, polarization should increase. In contrast, the ‘extreme position’ measure would decline as the rightmost party moves towards the center and the distance between party 1 and party 3 decreases.⁴

In figure 2 party two, a center-right party, moves (slightly) to the right. Intuitively polarization is seen as increasing here because the right becomes more cohesive and the gap between the left and the right is increasing. The ‘extreme position’ measure remains unchanged as it only changes when the distance between the two most extreme parties changes.

Finally, in figure 3 some members of the center party join the left and the right parties (in equal numbers). The left and the right parties are assumed to be equidistant from the center party. This is the most intuitive of the axioms – polarization is clearly increasing in this example. Yet, again, the ‘extreme position’ measure remains constant.

⁴See Esteban & Ray (1994) for a more detailed discussion of the axioms.

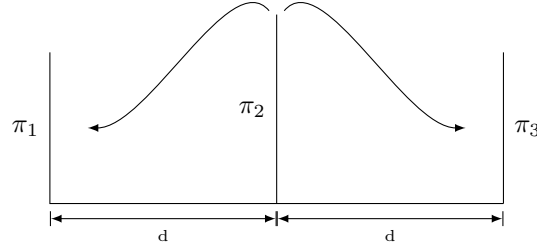


Figure 3: Axiom 3

The statement of the above three axioms in Esteban & Ray (1994) is weaker than what is implied in the discussion above. The point here was simply to demonstrate how the ‘extreme position’ measure fails to capture the degree polarization of party systems. Indeed, the measure could be considered extremely poor as it doesn’t satisfy *any* of Esteban & Ray’s axioms. Thus, even if we don’t subscribe to all three of Esteban & Ray’s axioms, there can be little doubt that the ‘extreme position’ measure is inappropriate for a variety of circumstances.⁵ For the precise statement of the axioms and a detailed discussion I refer to Esteban & Ray (1994).

Esteban & Ray (1994) demonstrate that the only measure satisfying the three axioms will be of the following form:

$$P = K \sum_{i=1}^n \sum_{j=1}^n \pi_i^{\alpha+1} \pi_j |y_i - y_j| \quad (1)$$

where n is the number of parties, π_i is the size of party i and y_i is the ideological location of party i . Thus, $|y_i - y_j|$ is the absolute ideological distance between parties i and j . There are two ‘free’ parameters. K is simply a scalar and, as such, doesn’t matter. The parameter α can take values in the range $(0, \alpha^*)$ where $\alpha^* \simeq 1.6$. An additional axiom considered by Esteban & Ray (1994) further restrict the range of α to $(1, \alpha^*)$.⁶ A high value of α indicates a greater sensitivity to polarization whereas, in the limit, when $\alpha = 0$ the measure is equivalent to the Gini inequality coefficient.

⁵There are some additional problems with the measure that I address below.

⁶The fourth axiom stipulates that the transfer of members from a small extreme party to a larger party will not decrease polarization.

2.2 The Effects of Polarization on Coalition Formation

Coalition formation is influenced party system characteristics. I have argued that the commonly used measures of the influence of party ideology on coalition formation fails to capture how ideology influences coalition formation. In part, taking a fuller account of the party system characteristics simply requires substituting Esteban & Ray's polarization measure for the 'extreme position' measures in the standard empirical framework for estimating the effects of ideology. It is, however, possible that the effects of polarization are more subtle and the remainder of this section is dedicated to deriving several hypotheses about these effects.

The motivation for much of the research on polarization is that the degree of polarization has implications for the degree of conflict and cooperation within society.⁷ The basic idea rests on the notion that closely knit groups are more likely to act in unison and to perceive other clearly defined groups as a competitor or as a threat. In contrast, a society whose members belong to many small groups is less likely to experience conflict because any given group neither represent a threat to others nor considers itself capable of achieving its ends through conflict. Naturally, the precise formulation of these arguments will depend on the subject under study.

Polarization is somewhat unlikely to lead to violent conflict in established parliamentary democracies but it may nevertheless influence political conflict, if only to reduce the scope for consensual politics. One would, for example, expect coalition formation in highly (bi)polarized societies to take a particularly simple form. Suppose the party systems consists of two groups of parties; one clustered on the left of the political spectrum and the other on the right with a substantial distance between the two blocs. This is a scenario that most of us would consider highly polarized. The scope for forming coalitions is highly limited in these circumstances because of the parties' ideological preferences – a coalition including parties from both blocs is unlikely to form. The outcome would, thus, be that the bloc of parties holding the majority of the seats in the legislature forms a coalition. The coalition bargaining would therefore only involve parties on one side of the ideological

⁷I phrase my discussion here in terms of parties, rather than groups, and preferences, rather than values or measures of alienation of one group from another. It is worth noting, however, that much of the literature on polarization addresses issues such as income polarization (e.g., Keefer & Knack 2002), religious polarization (e.g., Montalvo & Reynal-Querol 2003), and ethnic polarization (e.g., Montalvo & Reynal-Querol 2005).

spectrum.

It is important to note that polarization does not imply the formation of a majority coalition. The bargaining between the parties will essentially revolve around the division of seats in the cabinet (a high degree of polarization implies a low degree of policy disagreement within the cluster). The parties' bargaining strength depends in part on their outside options but they will only be marginally relevant since the parties cannot credibly threaten to form a coalition with parties on the other side of the political spectrum. Thus, polarization may actually increase the frequency of minority coalitions – the “opposition” parties have nowhere to go if one of the parties insists on forming a minority coalition.⁸

Polarization may also influence coalition formation for other reasons. Jozwiak & Schneider (2006) find that cabinet duration is influenced by the degree of polarization, i.e., greater polarization leads to shorter cabinet duration. As the payoffs of forming a cabinet coalition are really a stream of payoffs over the tenure of the cabinet. Concerns over the durability of the cabinet should influence the parties' decision to enter a particular coalition, i.e., a party may prefer a coalition with a low payoff and long life expectancy to a coalition with a high payoff but short life expectancy if the party's payoffs are a function of its time in office.⁹

In the remainder of this section I consider several of the main hypotheses that theories of coalition formation have offered and consider whether the degree of polarization in the party system is expected to interact with the relevant variables.¹⁰ Each hypothesis comes in two parts. The first part

⁸The outcome of the bargaining, and the likelihood of a minority coalition, would depend on the parties' expected benefits of being a part of the coalition and the cost of delaying the formation of a coalition. The formation of minority coalitions could be modeled as a war of attrition in this context.

⁹Similarly, analysis of cabinet duration should take account of the fact that parties are forward looking when coalitions are formed, i.e., the analysis is likely to be subject to selection bias. To the best of my knowledge, there are no formal analyses that consider coalition formation and duration simultaneously.

¹⁰It may be helpful to note at the outset that the empirical analysis employs a conditional logit model. In the conditional logit model each coalition formation opportunity consists of a number of potential coalitions that may form. Associated with each potential coalition is number of covariates, e.g., whether the coalition is a minority coalition or if it contains the median party. The conditional logit model estimates how each of the covariates influences the likelihood of each potential coalition forming. Thus, the (party system) polarization measure cannot be entered directly into the model as it is constant

states the prediction offered by existing theories of coalition formation. The second part describes how party system polarization alters the prediction (i.e., whether we expect polarization to increase or decrease the effect).

The first set of hypotheses concerns the parties' ideological positions. Coalitions that are ideologically heterogenous are less likely to form because they require their members to make greater compromises.¹¹ Other things equal, parties should prefer to join ideologically compact coalitions. Polarization will have two kinds of effects on the likelihood of coalition forming. For illustrative purposes consider a bi-polar multi-party system, i.e., suppose there are two blocs (or clusters) of parties. Suppose that party system polarization increases because the two bloc of parties move further apart ideologically. First, consider a potential coalition that contains party L (from the left bloc) and party R (the right bloc). In this scenario, the ideological heterogeneity of the coalition should become more important, i.e., there is a greater incentive to form a within bloc coalition. The second effect occurs when we consider a coalition between parties belonging to the same bloc, e.g., R_1 and R_2 . In this scenario, the ideology of the coalition would matter less because the alternative, to form a coalition with a party from the other bloc, has become an even less desirable outcome. The two effects thus operate in different directions. In sum, when the degree of party system polarization gets increasingly greater it will come to dominate the effects of the ideological heterogeneity within the coalition.

Hypothesis 1 *Coalitions are less likely to form if they are ideologically heterogenous. The effect of the coalition's ideological composition will decrease as party system polarization increases.*

A similar hypothesis can be advanced about the ideological composition of the opposition. Laver & Schofield (1990) advance this argument specifically about minority coalitions but it can reasonable be assumed to apply to any type of coalitions. Laver & Schofield's (1990) intuition was that if a minority

across all the potential coalitions within each formation opportunity. Instead we are interested in considering whether polarization influences the estimates for a given covariate, e.g., whether the influence of being a minority coalitions has bigger or smaller influence as party system polarization changes.

¹¹The term *ideologically heterogeneous* is deliberately vague because there are more than one way to take account of the ideological composition of the parties in the coalition. These issues are discussed in greater detail below.

coalition forms when its opposition is ideologically heterogeneous, toppling them would require parties that are opposed ideologically to reach a compromise over policy. This argument still applies to majority coalitions, albeit with less force as multi-party coalitions will also be susceptible to defections by their own members.¹² Parties that face an ideologically heterogeneous opposition should be more stable and, thus, be more likely to form. Increased party system polarization should reduce the effect of the opposition's ideological composition for the same reasons as above – a high degree of party system polarization will tend to dominate the coalition formation process.

Hypothesis 2 *Coalitions facing an ideologically heterogeneous opposition are more likely to form. The effect of the opposition's ideological composition will diminish as party system polarization increases.*

The importance of party ideology affords certain parties favorable status. In particular, the median party in the legislature is likely to be included in the coalition as any coalition excluding the median party will have to include parties to its left and its right. The position of the median party should be strengthened further when there is a high degree of party system polarization as any coalition that will form is likely to form around the blocs of parties that share similar policy preferences.

Hypothesis 3 *Coalitions that include the median party are more likely to form. As party system polarization increases, the greater the likelihood that the median party is included in the coalition.*

Most legislatures are majoritarian institutions. To implement its policies, a coalition cabinet needs to have majority support in the legislature. Minority coalitions are, therefore, less likely to form, although it is important to note that a cabinet's *supporting coalition* in the legislature need not correspond to the cabinet coalitions, i.e., the latter may be a subset of the former. In some instances, parties outside the cabinet declare their support for the coalition while in other cases there is no such declaration and/or the cabinet may build legislative coalitions around individual legislation. But at the very least, minority governments must rely on parties outside the cabinet coalition to protect it from votes of no confidence. This is important when we consider

¹²This is, of course, also true of multi-party minority coalitions.

what effect party system polarization has on the likelihood of a minority government. Minority governments should be most likely to form when a non-cabinet party lends the government its support. A non-cabinet party would only do so in circumstances in which it cannot benefit from bringing the government down. Those circumstances are most likely to occur when the support party is not interested in forming a coalition with other non-cabinet parties and no cabinet party has an incentive to form a coalition with the support party (which may include other parties). These conditions are more likely to be fulfilled when the party system is highly polarized and polarization will, therefore, make minority governments more likely.

Hypothesis 4 *Majority governments are more likely than minority governments.¹³ The likelihood of minority government increases as party system polarization increases.*

The early contributions to coalition theory suggested that coalitions should be minimal winning (Gamson 1961, Riker 1962). The reasoning is similar to why minority coalitions should be unlikely to form but refines the argument further to exclude super-majority coalitions. Forming a coalition involves dividing the spoils of office and including parties that aren't pivotal to the coalition's majority in the legislature implies that the spoils will unnecessarily be divided between more parties. That is, excluding a superfluous party allows a division of the spoils that benefits the remaining parties. It is unclear whether party system polarization should influence the likelihood of a minimal winning coalition. When the degree of polarization is high, the incentive to form a coalition of parties within a given 'bloc' of parties increases. I have argued above in this scenario minority coalitions will be more likely for a lack of outside opportunities. Similar logic might apply with respect to minimal winning coalitions, i.e., the incentive to shed 'surplus' parties may increase as polarization increases because the 'surplus' parties have nowhere to go.

Hypothesis 5 *Minimal winning government coalitions are more likely to form. The likelihood of minimal winning coalitions forming increases as party polarization increases.*

¹³This hypothesis appears first in the shape of an assumption about the coalition formation process, which does not really receive due attention until with Strøm (1984).

Coalitions containing few parties are more likely to form than coalitions containing many parties. There are two reasons why this is the case. First, the transaction cost of negotiating a coalition agreement increases as the number of parties increases. Second, large coalitions are likely to be less stable because the potential for policy disagreement increases (cite). Party system polarization should reinforce this effect for the same reason that minority coalitions are more likely in highly polarized systems, i.e., in a highly polarized system the majority bloc does not have to fear defection in the legislature by the bloc's members. Thus, there is little incentive to build a surplus (or even a majority) coalition to guard against defections.

Hypothesis 6 *A coalitions composed of few parties are more likely to form than coalitions containing many parties (Leiserson 1968). **The likelihood of a coalitions containing many parties decreases as party system polarization increases.***

Several scholars (e.g., Peleg 1981, van Deeman 1989) have argued that the largest party is likely to be included in the government coalition. One reason why this should be the case is that larger parties wield disproportional bargaining power, i.e., are pivotal actors in more potential coalitions, and may also be favored by the coalition formation protocol as leaders of large parties are more likely to be appointed formateurs (Diermeier & Merlo 2000). It is not obvious how party system polarization affects the inclusion of the largest party in government. On one hand, polarization may benefit the largest party because it creates an added incentive to take advantage of the (hypothesized) formateur advantage. On the other hand, the incentive to form a coalition with ideologically similar parties might dominate in a highly polarized system, i.e., if the bloc of parties that the largest party belongs holds a minority of the seats in the legislature.

Hypothesis 7 *Coalitions containing the largest legislative party are more likely to form. **The effect of party system polarization indeterminate.***

The hypotheses above do not represent an exhaustive list of the hypotheses that the literature has introduced. Martin & Stevenson (2001), e.g., discuss several additional hypotheses about the effects of institutions on coalition formation as well as alternative characterizations of the parties'

bargaining positions. The fact that these hypotheses are not considered here is not intended to imply that they are unimportant. Rather, the hypotheses discussed above concern some of the central insights in the literature and have in addition been shown to be empirically relevant. It thus appears a reasonable first approximation to consider these hypotheses.

3 Empirical Test

Methods

Before describing the data it is useful to briefly review the methods used. The above hypotheses are tested using a conditional logit model (McFadden 1974). The conditional logit model allows us to model the choice of a particular outcome from the set of possible outcomes. Each government formation opportunity defines a choice set which consists of all the possible coalitions that might form. The number of potential governments varies from country to country (and across time if new parties appear or old ones disappear) as the number of potential governments depends on the number of parties.¹⁴ Each government formation opportunity, thus, gives rise to a number of observations (potential governments) The dependent variable is an indicator of whether a given potential government actually formed with the constraint that only one government can form. Each potential government has certain characteristics, e.g., it might be a minority coalition, minimal winning or a surplus coalition. The aim is to estimate how the potential government's characteristics influence the likelihood of it actually forming.

The main advantage of the conditional logit model is that it allows alternative specific variables without the problems associated with traditional regression methods. That is, the results are not sensitive to the different number of observations contributed by each country. In the conditional logit

¹⁴For clarification, let us suppose there are three parties, {A, B, C}. The potential coalitions are all the possible subsets of {A, B, C} other than the empty set, i.e., {A, B, C}, {A, B}, {A, C}, {B, C} as well as the three potential single party coalition. Each of these coalitions contributes one observation to the data set.

model the probability of individual i choosing alternative j equals:

$$p_{ij} = \frac{e^{x'_{ij}\beta}}{\sum_{k=0}^{m_i} e^{x'_{kj}\beta}} \quad (2)$$

where x is a vector of the covariates, β the vector of the coefficients to be estimated and m_i the number of alternative coalitions in government formation opportunity i .

The conditional logit model does not allow the estimation of choice specific effects in a simple manner – it is easy to verify from (2) that covariates that do not vary within the choice set simply cancel out. Generally, the model can be “tricked” into considering choice specific effects by interacting the variable of interest with dummy variables for each of the choices. However, since potential coalitions cannot be compared in a meaningful way across countries, “tricking” the model in this manner makes little sense.¹⁵ The hypotheses about party system polarization were presented in terms of interactions with the potential coalitions’ characteristics. This is modeled by interacting the variable measuring party system polarization with the other independent variables but note that party system polarization does not enter independently into the model.

Data

I test the hypotheses using data on coalition formation from 17 parliamentary democracies between 1945 and 2006.¹⁶ The majority of the data on coalition formation and the composition of the legislature comes from Müller & Strøm (2001). The data in Müller & Strøm (2001) covers the Western European parliamentary system from the end of the second World War until the late 1990s. The dataset was augmented by data gathered by the author to bring the dataset up to date.¹⁷ There were a total of 394 coalition formation opportunities, i.e., instances in which a coalition was formed or renewed. Each

¹⁵As a practical matter, interpretation of the results would also be somewhat of a challenge as the number of choices is in the thousands in some cases.

¹⁶The countries are Austria, Belgium, Denmark, Finland, (West) Germany, Greece, Iceland, Ireland, Italy, Luxembourg, The Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, and the UK.

¹⁷In addition, the augmented dataset contains information on coalition formation in New Zealand since 1996.

coalition formation opportunity gives rise to a number of *potential coalitions*. The set of potential coalitions represents all the possible permutations of party coalitions.¹⁸ The total number of potential coalitions in the dataset is 200556. Each observation contains information on the independent variables identified in the seven hypotheses, all of which have a fairly straightforward operationalization.

The variables MINORITY COALITION, MINIMAL WINNING, and LARGEST PARTY are dichotomous variables indicating whether the potential coalition, respectively, was a minority coalition, was a minimal winning coalition, or contained the largest legislative party. The NUMBER OF PARTIES is simply the number of parties in the potential coalition.

The independent variables measuring the ideological divisions within the potential government and the potential opposition were constructed using several expert surveys on party positions (Laver & Hunt 1992, Benoit & Laver 2006, Warwick 2006) and the rank ordering of parties provided in Müller & Strøm (2001). Using expert surveys as estimates of the parties' ideological positions is not without problems. Each survey contains only a subset of the parties that have been elected to the countries' legislatures because they have generally focused on the parties that were active when the survey was administered. However, taken together, the surveys cited above provide a much improved coverage of the set of parties that have been present in the legislatures. Benoit & Laver's (2006) survey is taken as the baseline – if their survey contains an estimate of a party ideology it is used. Because there is not necessarily a one-to-one relationship between the measures, I obtain ideological estimates for the parties missing in Benoit & Laver (2006) in two steps. First, I regress Benoit & Laver's measures on Laver & Hunt's (1992) and Warwick's (2006) measures for the parties that were included in all the surveys.¹⁹ I then use the regression to predict the ideological positions of the parties that are missing in Benoit & Laver (2006).²⁰

Combining the expert surveys in the manner solves most of the problems

¹⁸Suppose there are three parties, {A, B, C}. The potential coalitions are all the possible subsets of {A, B, C} other than the empty set, i.e., {A, B, C}, {A, B}, {A, C}, {B, C} as well as the three potential single party coalition. Each of these coalitions contributes one 'observation' to the data set.

¹⁹The correlation between the three measures is high – insert exact numbers.

²⁰An analogous method is used when there exists only one measure of a party's ideological position.

but there still remain several, usually minor, parties that do not appear in any of the surveys. However, Müller & Strøm (2001) provide an ordering of the parties along the left-right spectrum. This ordering can be used to estimate the parties' ideological position in a simple manner. To do so I simply assume that the parties' position is the average of the ideological positions of the adjacent parties in the ordering given by Müller & Strøm (2001).²¹ These measures will naturally not be close to perfect but it is an attempt to incorporate the available information in some manner.²² The fact that the missing information concerns smaller parties that are unlikely to play an important role in the coalition formation process is also helpful.

The information on the parties' policy positions is then used, along with information on the parties' seat shares, to identify the median party in the legislature. The variable `MEDIAN PARTY` is an indicator variable that takes the value one when the potential coalition includes the median party.

Hypotheses 1-2 addressed the effects of ideologically heterogeneity in the potential coalition and its opposition. Ideological heterogeneity can mean several things. Traditionally, the literature has simply focused on ideological divisions within the coalition or opposition, i.e., the ideological distance between the most dissimilar parties in the coalition. There are reasons to believe that ideological division fails to capture some of the relevant effects of the distributions of the parties' ideological positions and size. First, it only considers the parties at the extremes of a given coalition (or opposition). It is likely that it are not only the extremes that matter but also what the preferences of the other parties. Second, the measure may be too sensitive to the decision which parties are included in the analysis. Smaller extremist parties that have little effect on the coalition formation process because of their size may lead to biased estimates of the influence of ideology.²³

²¹If two or more adjacent parties were not included in any of the surveys I assume that the parties are evenly spaced across the distance between the closest parties for which ideological estimates exist. If the parties are at the beginning or the end of the ordering I assume that their ideological position equals the most extreme party for which a survey exists.

²²The alternative is to leave the parties out of the analysis, which can hardly be considered a good option.

²³Minor parties have often be excluded in empirical studies. Martin & Stevenson's (2001) analysis, e.g., considers 220 formation opportunities that constitute about 33 thousand potential coalitions. In contrast, the present study includes 394 formation opportunities and over 200 thousand potential coalitions. The higher ration of potential coalitions to

These deficiencies of ideological divisions as a measure suggest that Esteban & Ray's (1994) measure of polarization may be useful to account for the ideological heterogeneity of the coalition and its opposition. That is, intra-coalition polarization (GOVERNMENT POLARIZATION) can be calculated by considering the seat shares of the coalition parties (as a percentage of the coalition's total) and their ideological positions. Intra-opposition polarization (OPPOSITION POLARIZATION) can similarly be calculated. The party system polarization (P_{ER}) is calculated using information on all the parties in the legislature. In calculating the Esteban-Ray polarization measures I assume that $\alpha = 1$. In principle, the polarization measure provides a solution to the two problems with ideological divisions. First, the polarization measure takes account of the distribution of all the parties in the coalitions (opposition). Second, smaller parties have relatively little effect on the measure.

A priori, it appears that the polarization measures have certain advantages over the ideological division measure. That doesn't, however, imply that the polarization measure is superior. Whether that is the case depends on whether polarization is theoretically relevant, i.e., whether it captures the incentives facing the parties. Unfortunately, the theoretical literature has not yet provided an answer to this question. Below I hypothesize informally about how intra-coalition and intra-opposition polarization might influence coalition formation.

I begin, however, by examining in a simple manner whether the polarization measures are a reasonable substitutes for the traditional ideological division measures. The variables GOVERNMENT DIVISION and OPPOSITION DIVISION are defined as the absolute policy distance between the most distant pair of parties in the potential government and potential opposition.

Results

Table 3 presents the result of three simple models of government formation that include the primary covariates (i.e., they exclude the interactions with party system polarization). Models 1 and 2 allow us to compare how the different measures of ideological heterogeneity fare. The results are largely in line with expectation, i.e., greater GOVERNMENT DIVISION and GOVERNMENT OPPORTUNITIES is due to the inclusion of more minor parties.

ERNMENT POLARIZATION translate into a lower likelihood of the potential government forming. The signs of the coefficients of OPPOSITION DIVISION and OPPOSITION POLARIZATION are in line with expectations but in both instances they fail to reach levels of statistical significance. The fit of the model using the polarization measures is slightly worse. The third model includes both the specifications of ideological heterogeneity, which serves as a rough guide as to whether the two variables are capturing the same variation in the data (which one might expect from the first two models). Interestingly, the signs of the polarization measures are now reversed and all four variables are now statistically significant at the 90% level. This suggests that the polarization measures are explaining variation that the ideological divisions measures do not capture. In other words, the ideological locations of the parties and/or their sizes do appear to influence the likelihood of a potential government forming. For this reason, I proceed to test hypotheses 1-7 using both measures.

Hypotheses 1 and 2 must be revisited before we turn to the estimation. In particular, the failure to anticipate that the two measures of ideological heterogeneity might capture different incentives facing the parties requires reexamination of whether the hypotheses can reasonably be expected to hold for both measures.

First, consider why the two measures, ideological divisions and polarization, might produce different effects. Ideological divisions are likely to gauge how certain aspects of the parties' ideologies influence coalition formation. That is, in forming a coalition *all* the parties involved must agree to some government policy or platform.²⁴ Reaching such an agreement will, other things equal, be most difficult for the coalition parties that have the most dissimilar policy preferences. Ideological divisions are likely to accurately capture this aspect of the bargaining and it appears reasonable that ideological divisions outperform polarization here. Polarization, however, captures other aspects of the coalition's ideological composition that may also be relevant to the likelihood of formation, namely, in very basic terms, the fact that coalition bargaining may involve other parties than those at the extremes of the coalition.

There are several ways to think about how the size and ideological loca-

²⁴It may be more accurate to describe such an agreement as an incomplete contract because it inevitably will not cover all the contingencies that might arise during the tenure of the government.

TABLE 1: POLARIZATION VS. IDEOLOGICAL DIVISION

	(1)	(2)	(3)
NUMBER OF PARTIES	-.529*** (.092)	-1.098*** (.079)	-.445*** (.098)
MINORITY COALITION	-1.129*** (.247)	-1.170*** (.247)	-1.048*** (.252)
LARGEST PARTY	1.378*** (.169)	1.301*** (.166)	1.348*** (.170)
MINIMAL WINNING	.863*** (.175)	.963*** (.169)	.859*** (.175)
MEDIAN PARTY	.821*** (.156)	.981*** (.153)	.850*** (.156)
GOVERNMENT DIVISION	-.330*** (.027)		-.385*** (.044)
OPPOSITION DIVISION	.029 (.024)		.060* (.032)
GOVERNMENT POLARIZATION		-1.481*** (.181)	.498* (.273)
OPPOSITION POLARIZATION		.109 (.164)	-.388* (.222)
NO. POTENTIAL GOVERNMENTS	200566	200566	200566
LOG LIKELIHOOD	-1202.809	-1253.638	-1199.899

Levels of significance: *** – 99%, ** – 95% * – 90%

tion of such ‘interior’ parties may influence the coalition formation process. First, ideology alone doesn’t determine whether a party will find a coalition feasible. Rather, as bargaining theory has made clear, the party’s bargaining position determines his willingness to accept policy compromises. The ‘interior’ parties should therefore not always be expected to be silent partners in the bargaining between the extremes. Second, the left-right continuum considered here may perhaps best be considered a latent ideological dimension, i.e., the parties’ locations on the latent dimension may be seen as describing their general disposition (or a good predictor of behavior) towards economic policies but that their actual location may vary across actual issues or policies. Thus, the bargaining complexity may increase with a greater diversity of policy preferences within the coalitions and, for example, increase the likelihood of breakdown of negotiation.²⁵

Government polarization, when we control for ideological divisions (of the extreme parties), should then be expected to increase the likelihood of a coalition forming. High degrees of government polarization indicate that the potential coalition parties are divided into groups that have similar preferences, which may reduce bargaining complexity as well as reduce the potential for future conflict.²⁶ A symmetric argument applies to within the opposition. Higher opposition polarization suggests that the opposition is more ‘coalitionable’ and the likelihood of the potential government forming should, therefore, decrease.

Hypotheses 1-2 suggested that party system polarization should reduce the overall effect of ideology within the coalition and opposition. These predictions apply equally to the polarization and ideological division measures of the potential government and opposition’s ideological heterogeneity.

Figure 3 presents the results of the conditional logit model when party system polarization is included as a covariate (as an interaction). For comparison, the first model does not contain the party system polarization interactions. The second model, interacts party system polarization with the

²⁵This discussion is framed in terms of the potential governments but since the opposition is seen here as a potential alternative government (or subset of one) an analogous argument can be applied to opposition polarization.

²⁶This may sound a little odd as normally we assume that polarization increases the potential for conflict. Suppose that the coalition parties experience policy shocks or some random events. Parties that are ideologically similar may respond to these shocks in a similar manner whereas ideologically dissimilar parties may have different views.

TABLE 2: EFFECTS OF PARTY SYSTEM POLARIZATION

	(1)	(2)	(3)	(4)
MINORITY COALITION	-1.048*** (.252)	-1.464 (.890)	-1.868** (.943)	-1.078*** (.256)
— P_{ER} *MINORITY		.458 (1.014)	.959 (1.081)	
MINIMAL WINNING	.859*** (.175)	-.114 (.607)	-.269 (.618)	-.013 (.463)
— P_{ER} *MINIMAL WINNING		.981 (.669)	1.173* (.682)	.855* (.467)
NUMBER OF PARTIES	-.445*** (.098)	.112 (.278)	.296 (.340)	.401* (.227)
— P_{ER} *NO. PARTIES		-.659** (.324)	-.857** (.398)	-.985*** (.257)
LARGEST PARTY	1.348*** (.170)	-.177 (.702)	.038 (.764)	-.190 (.619)
— P_{ER} *LARGEST PARTY		1.693** (.771)	1.484* (.838)	1.727** (.681)
MEDIAN PARTY	.850*** (.156)	.872*** (.157)	.007 (.713)	.884*** (.157)
— P_{ER} *MEDIAN PARTY			.998 (.790)	
GOVERNMENT DIVISION	-.385*** (.044)	-.394*** (.046)	-.369** (.149)	-.381*** (.046)
— P_{ER} *GOV'T DIVISION			-.014 (.164)	
OPPOSITION DIVISION	.060* (.032)	.056* (.034)	.339*** (.115)	.330*** (.113)
— P_{ER} *OPPOSITION DIVISION			-.300*** (.116)	-.287** (.113)
GOVERNMENT POLARIZATION	.498* (.273)	.661** (.288)	.358 (.962)	.548* (.291)
— P_{ER} *GOV'T POLARIZATION			.232 (.987)	
OPPOSITION POLARIZATION	-.388* (.222)	-.408* (.229)	-2.060** (.857)	-2.154** (.845)
— P_{ER} *OPPOSITION POLARIZATION			1.735** (.846)	1.816** (.828)
NO. POTENTIAL GOVERNMENTS	200566	200566	200566	200566
LOG LIKELIHOOD	-1199.899	-1186.552	-1182.131	-1183.135

Levels of significance: *** – 99%, ** – 95% * – 90%

size characteristics of the potential governments. The third column contains the full model. As party system polarization is interacted with quite a large number of variables a high degree of multicollinearity is unavoidable. Multicollinearity makes it difficult to draw inferences about the effects of the variables. In the final model I thus strip the model of some of the interactions that appeared statistically insignificant in the full model.²⁷

In sum, there is some, albeit not very strong, evidence in favor of the hypotheses. Starting with the size variables, in most instances only the coefficients of the constituent variable or the interaction reaches statistical significance. In most cases it is, however, the interaction term that appears to provide a better fit with the data. Party system polarization increases the importance of the coalition being minimal winning and including the largest party while making larger coalitions less likely.

The result with respect to the ideological composition of potential governments (and oppositions) are similarly mixed. Party system polarization appears to have little effect on the importance of the potential government's ideological characteristics. However, it does seem to matter quite a bit for the effects of the potential opposition. Moreover, the results are generally supportive of the hypotheses advanced above. A high degree of OPPOSITION DIVISION increases the likelihood of the potential government forming but the importance of the ideological divisions declines as party system polarization increases. This stands to reason, as explained above, because at very high degrees of party system polarization, coalitions will form within their respective blocs of parties – i.e., the ideological differences within the opposition will cease to matter because (most of) the opposition parties form a separate bloc of parties when party system polarization is very high. OPPOSITION POLARIZATION has the opposite effect, i.e., as opposition polarization increases (controlling for ideological divisions) the opposition becomes better able to act cohesively and the potential government becomes less likely. The hypothesized effect of increased party system polarization was that the effect of OPPOSITION POLARIZATION would become less prominent (following the same logic as with OPPOSITION DIVISION). This also appears to be the case.

²⁷This should not be interpreted as an attempt to solve the multicollinearity problem. The only solution is finding more data.

4 Conclusions

In this paper I have considered the role of party system polarization on coalition formation. The results suggest that party system polarization may play some role in coalition formation but the results are perhaps not as strong as one might have expected. Previous research has shown that party system polarization does influence government duration (Jozwiak & Schneider 2006) and, if parties care about how long they stay in office at all, this ought to influence the types of coalitions that form. A part of the problem is that the inclusion of party system polarization in the model creates a high degree of multicollinearity that makes it difficult to draw strong inferences.

A secondary goal of this paper was to examine whether Esteban & Ray's (1994) measure of polarization was a suitable substitute for the commonly used measure of ideological division. The answer to this question is no. Ideological division captures a crucial element of the bargaining situation, i.e., the fact that if the parties on the extremes of the coalition cannot agree then the coalition will not form. In contrast, government polarization may discount this fact too much if the 'extreme' parties within the coalition are small. On the other hand, polarization does appear to capture aspects of the bargaining situation that ideological division does not capture. It may, therefore, be useful to employ both the measures in future research.

The biggest shortcoming of this paper is that it lacks a comprehensive formal treatment of whether and how polarization is related to the process of coalition formation and the parties bargaining strength. Polarization may very well suited to the study of conflict but one might also argue that there are different kinds of conflict. Polarization may, thus, possibly be a guide measure of the tensions that exist within society and be good at predicting outbreaks of violence. It is not as obvious whether polarization is as well suited to study what is essentially the settlement of conflict within stable, democratic institutions. However, Esteban & Ray's (1994) polarization measure provides a convenient way to summarize 'party systems' and, intuitively, it seems likely to have some implication for the settlement of political disagreements. It is, therefore, worthwhile to consider in greater detail, and more formally, whether this is indeed the case.

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