Beating around the Bliss-point. A Model of Coalition Formation and Coalition Agreement with Goal-Diverse Parties

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Abstract

We present a model of coalition formation and coalition agreement for multiparty polities. This paper predicts both coalition formation and where in a two-dimensional space the resulting coalition agreement should be located. We assume parties are goal-diverse, meaning that parties differ in how they value office pay-offs and divergence from their policy bliss-points. Parties negotiate on a policy position in two-dimensions (left-right and progressive-conservative). Our model incorporates aspects of cooperative, non-cooperative game theory and bounded rationality. The model's predictions of coalition formation and coalition agreement are validated against actual bargaining processes over the formation of Dutch cabinets in the period 1971-2003.

Introduction

In non-majoritarian parliamentary democracies parties are often condemned to forming multiparty coalition governments, forced to share cabinet offices and compromise on policies with competitors. A question of both scholarly and journalistic interest is: which parties will join a coalition and what policies will that coalition government pursue? In predicting the outcomes of bargaining over coalition formation and coalition policies, the assumptions about the goals parties pursue and the rules of the bargaining process make or break the model.

The model we present in this paper starts with the fundamental notion that in multiparty, multidimensional political contexts, parties differ in the goals they pursue. This goal-diversity works out in two ways in our model. First, parties value office pay-offs differently, that is to say some parties have stronger (or weaker) preferences to become part of the government. Second, they differ in the way they attach importance to the multiple dimensions that define the political competition within the polity. This means that for party X it may be easier to compromise on a policy issue than it is for party Y, because party X finds the ideological dimension (say left-right) wherein the policy issue is located of less importance than it finds other ideological dimensions (say progressive-conservative).

Our model resembles the Dutch case, with a two-dimensional political space and a variety of different parties that need to negotiate in order to get majority coalitions. Existing models do take aspects of goal-diversity into account, by for example modeling parties as both policy-oriented and office-oriented (Sened, 1996) or by *a posteriori* evaluating parties' office-seeking and policy-seeking motivations (Shikano and Linhart, 2010). However, we argue that these models fall short of modeling and defining *a posteriori* a full set of goal-diverse behaviors that emerges in multiparty polities.

Our model incorporates the formal rules of the coalition formation process without specifying bargaining completely. By doing so it takes a middle road between cooperative and non-cooperative game theoretic models. Our model does not yield a precise point prediction of the coalition agreement, but it

does provide a definite prediction about the parties in the coalition and a set of possible outcomes of the coalition agreement.

All model parameters related to party preferences are determined *a priori* based on party platforms and expert surveys. Because the parameters are not estimated using data on observed coalitions a clean test of the model is possible by comparing the models predictions with data on formed coalitions and their coalition agreements. We validate our simulated results against coalition formation and coalition agreement in the Dutch case in the period 1971-2003.

Theory

The Diverse Goals Parties Have

Parties bargain to obtain a policy position for a coalition that is most favorable to them. We assume parties to be goal-diverse, meaning that they differ in the relative importance they attach to the different policy dimensions and in how strongly they desire to be in office. These assumptions about the preferences of political parties extend the assumptions used in previous models (Sened, 1996, Shikano and Linhart, 2010).

The first models of cabinet coalition formation assumed that parties are interested in either policy *or* office pay-offs and that political competition takes places on a single ideological dimension (Axelrod, 1970, de Swaan, 1973, Riker, 1962). These were overly restrictive assumptions: some parties pursue office-seeking goals, while others maximize votes or access to policy(Müller and Strøm, 1999). Also, in most polities political competition takes place on several distinct ideological dimensions such as left-right, progressive-conservative, religion-secularism, centralization-decentralization (Laver and Benoit, 2006, Laver and Hunt, 1992). In more recent models, parties compete in two-dimensional ideological spaces (Laver and Shepsle, 1996, Baron, 1991, Austen-Smith and Banks, 1988, Schofield, 1995) or are motivated by both policy and office pay-offs (Sened, 1996, Shikano and Linhart, 2010). In this paper we assume two political dimensions: a socio-economic left-right dimension and a socio-cultural

progressive-conservative dimension. However, we stress that this choice is determined by the case we validate our mode against, which is the Dutch case.

There are reasons to believe that parties do not care equally about both ideological dimensions. Especially multiparty systems have a variety of parties that find their origins in very different political cleavage structures (Lipset and Rokkan, 1967). Social democratic parties developed in response to the economic cleavage that emerged between the working-class and the property class. Left-libertarian parties emerged from the development of a post-material cleavage (Kitschelt, 1988). If we assume that economic left-right and cultural progressive-conservative are the two dimensions of political conflict, the social democratic party is probably more concerned with getting an optimal policy position on the economic left-right scale than on the progressive-conservative scale, and vice versa for the left-libertarian parties. The main reason for this is that issues that do not tally well with the original ideological goals of a party will never be as salient for the party as the original goals of the party are.[1]

Obviously, in coalition negotiations between such parties it matters how much each party is willing to compromise on each dimension, and we do not assume parties are equally willing to compromise on all dimensions of political conflict. The relative importance a party attaches to different policy dimensions can be deduced from a party's manifesto in a manner similar to that used to deduce a party's bliss point.

This aspect of coalitional politics changes the nature of the game. Some parties may be very flexible on one dimension, and willing to accept far-reaching compromises on issues associated with that dimension as long as they can participate in the cabinet. This explains why sometimes ideologically-close parties fail to reach a compromise on a coalition agreement, whereas at the same ideologically-distant parties do succeed in the formation of a coalition. In the first case, parties were unwilling to compromise on a salient political dimension, while in the other case a compromise was possible, because one of

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[1] Arguably, this could be the case if a party "reinvents" itself by fundamentally changing its ideological position and its party organization. However, such changes are also fundamentally rare.

the parties could compromise on one dimension, because it did not care as much about that dimension.

Another important variable in our model is that not all parties care equally about office pay-offs. Especially in non-majoritarian contexts, many parties never join a coalition and are strongly dedicated to a policy program, they are, paradoxically, unable to carry out. Also, some parties have internal decision-making rules that hinder the ability of the party leadership to join coalitions. In a recent paper, Schumacher et. al (2010), show that parties with a weak party organization are more responsive to losing office than parties with a strong organization. The former type of parties will be much less tolerant of a coalition agreement that deviates from the party's optimal position as they value office pay-offs much less than they value the purity of particular policy pursuit (Müller and Strøm, 1999).

In Sened's (1996) model parties strike coalitions on the basis of policy motivations, however to overcome the problem of finding an optimal policy position for all coalition parties a party may receive office side-payments in exchange for a compromise on policy issues. Shikano and Linhart (Shikano and Linhart, 2010) add to Sened's model that not all parties are alike in valuing office and policy pay-offs. From the coalition agreements on the German state level, they deduce how much each coalition party valued office and policy pay-offs in the negotiations. Müller and Strøm (Müller and Strøm, 1999, Strøm, 1990) argue that within-country differences in the values parties attach to office and policy appear because of the between-party differences in party organization.

In contrast with Shikano and Linhart, we determine the values parties attach to office and policy *a priori* on the basis of an expert survey (Laver and Hunt, 1992). This allows us to predict coalition formation and agreement outcomes, rather than understanding office and policy *a posteriori*.

The preferences of the parties modeled in our model can be summarized as follows: Parties care about the policy position of the cabinet in a two dimensional, left/right, progressive/conservative space. The relative importance placed on deviations from the party's ideal point is allowed to be different for

the two dimensions. Besides valuing policy parties value being in office, but the perceived benefit of being in office differs between parties.

The Bargaining Process

Much controversy in the literature about coalition formation revolves around the question how to formulate a solution concept for the bargaining game. Non-cooperative models require the author to explicitly specify all, often unknown, bargaining procedures (Austen-Smith and Banks, 1988, Baron, 1991, Baron and Ferejohn, 1989). This requires a great amount of stylization and the solutions of these models are highly sensitive to the modeling choices. For example, in Baron's (1991) model of coalition formation the specified procedure appears plausible, but it grants a huge and arguably, unrealistic advantage to the party that is allowed to make the first proposal. The primary proposer can choose all other parties and only has to offer them the same utility as their outside option. This outside option can be very low, especially when the party receiving the proposal is unlikely to get to make a proposal herself.

Cooperative models of the coalition formation process (e.g. Sened, 1996) take the exact opposite approach, remaining agnostic about the bargaining process, they merely specify conditions on the final outcome of the model. The problem with this approach is that cooperative game theories most widely accepted solution concept, the core, generally does not exist in coalition formation games (McKelvey, 1979; Schofield, 1978). As a solution to this problem the concept of the uncovered set has been developed (Miller 1980; McKelvey 1986).

The core relies on a positive criterion: the outcomes in the core are better for all actors included in the coalition than what any actor outside the coalition could offer them. In spatial bargaining models parties outside the ruling coalition are almost always worse off than those inside. Such parties can gain by offering one of the parties in the coalition a slightly better deal if it joins them in a coalition. In general every coalition allows for such a deviation, resulting in an empty core.

The uncovered set on the other hand relies on a negative criterion: it posits a reason why all covered outcomes should be disregarded, not why all uncovered outcomes should be considered. Covered outcomes (x) are those for which another outcome (y) can be found that fulfills two criteria: 1) a majority prefers outcome y over outcome x and 2) outcomes that are majority preferred over y are also majority preferred over x.[2] Under this definition uncovered outcomes are clearly more plausible than covered outcomes, but why all points within the uncovered set are equally plausible is not specified.

In this paper we borrow elements from the non-cooperative and cooperative game theory traditions. We impose an empirically observed structure of rules on the bargaining process model. However, not all formal and informal rules that affect rational decision-making of actors in a bargaining process can be known to the researcher. Face to face bargaining is not the highly structured process of offers and counter offers that constitutes bargaining in non-cooperative games. We therefore do not specify the bargaining process completely but use the known rules of the bargaining process to help predict the outcome of the coalition formation process. The exact rules and their implementation in the model are discussed in the next section.

In this bargaining game an actor's outside option is of pivotal importance. Therefore, it is imperative that parties have beliefs about the policy that possible other coalitions would implement. Given that the policy implemented by a coalition depends on the policies that could be implemented by the outside options, it is difficult to form such beliefs. As coalitions are all outside options for other coalitions it is possible to specify a system of equations in order to solve the policies implemented by different coalitions. However this system would be incredibly difficult to solve and may not even have a unique solution. Given these difficulties we do not think it is possible that parties form beliefs in such a way. We therefore assume bounded rationality, meaning that parties form beliefs about coalition and outside-option pay-offs in a similar way as empirically-oriented political scientists determine the policy positions of observed coalitions. Parties assume a coalition implements the policy in each dimension is the

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[2] There are some issues concerning ties which will be discussed later.

weighted average of the parties in the coalition where the weights depend on the parties seats and the relative importance of the policy dimension.

The model

We will now specify our model formally.[3] The basis of our model is a parliament consisting of a set of parties. Each party (i) has 5 characteristics: its number of seats in the parliament (z_i), its ideal points on the left-right (x_i*) and progressive-conservative (y_i*) $\left(-50 \leq x_i*, y_i* \leq 50\right)$ policy dimensions, the relative importance of the left-right dimension (α_i, $\left(0 \leq \alpha_i \leq 1\right)$) and its propensity for office seeking (γ_i $\left(0 \leq \gamma_i \leq 1\right)$).

Given this set of parties there is a set of all possible combinations of parties, i.e. all possible coalitions. From this set of coalitions we take all minimal winning coalitions, which is 75 + 1 seat in the Dutch case. This set is labeled RC denoting the set of reasonable coalitions. The requirement of the set is minimum-winning coalitions because there is generally no reason to include more parties in the coalition than the minimum required to achieve a majority (Riker, 1962). In some special circumstances coalitions may include more parties. In the case of The Netherlands a motivation for such an oversized coalition can be the desire to change the constitution which requires a two-third majority. Regrettably our model would be unable to predict such a coalition in a systematic way.

Parties' preferences are specified by a utility function which implements the policy by the coalition in the left-right (x) and progressive-conservative (y) dimensions and the set of parties in the coalition (c) as arguments. The utility function is specified as follows:

$$U_i\left(x, y, c\right) = -\alpha_i \left|x - x_i*\right| - \left(1 - \alpha_i\right)\left|y - y_i*\right| - \gamma_i \Gamma I_c\left(i\right)^4$$

($I_c\left(i\right) = 0$ iff $i \in c$ and 1 otherwise.)

The first two terms of the utility function specifies a party's utility from a particular government policy. The third term models a party's office-seeking

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[3] Appendix A shows the algorithm used to implement the model.

motives. If the party is not part of a coalition it suffers disutility, the size of which depends on γ_i, capturing the relative extent to which party i is office seeking and Γ capturing the extent to which being in office is seen as desirable in general.

As can be seen from the utility function the utility of parties in our model does not depend on the Euclidian distance between the implemented policy (x, y) and the parties ideal point (x_i^*, y_i^*) but separate on the distance between policy and ideal point in each dimension. We assume a parties' utility from a government policy depends on the α_i weighted Manhattan (or city-block) distance between (x, y) and (x_i^*, y_i^*).

Euclidian preferences are the standard assumption in spatial voting models. They are the natural type of preferences when we view the two policy dimensions as a field in which all actors have an ideal point. However it is questionable whether this is the most natural perspective on the policy space which is not so much a field but a representation of multiple independent policy dimensions.

Euclidian preferences assume that the marginal utility in one dimension is affected by the position in both dimensions. If one views both policy dimensions as independent it is not natural to assume such influence of one dimension of the marginal utility in the other dimension. Assuming actors care differently about distance in both dimensions brings this difference even more to the forefront because it is not clear how to implement caring differently about both dimensions in a Euclidian utility function.

Parties form a preference ordering $\succ$ over coalitions. In order to determine this ordering a party needs to form beliefs about the policy that will be implemented by each coalition. As explained earlier each party believes a coalition will implement the policy that is the average of the ideal points of the parties in the coalition weighted by the relative importance of policy dimensions and seats. These beliefs are called g(c):

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[4] Γ is the same for all parties and at all periods in time. It represents the system propensity for office seeking.

$$g(c) = E(x, y|c) = \left\langle \frac{\sum\limits_{i \in c} \alpha_i z_i x_i{}^*}{\sum\limits_{i \in c} \alpha_i z_i}, \frac{\sum\limits_{i \in c} (1-\alpha_i) z_i y_i{}^*}{\sum\limits_{i \in c} (1-\alpha_i) z_i} \right\rangle$$

Given these beliefs the expected utility of party i for each coalition in RC can be calculated to determine i's preference ordering.

In our model some parties enter formal negotiations, the outcome of which is determined by the preferences of the parties in the coalition and their outside options. The way in which the model determines which parties will enter the negotiations is based on formal negotiation procedures in The Netherlands. After the elections the leader of each party in the Dutch parliament has a private meeting with the Monarch and they talk about the formation of a government. In this interview the party leaders inform the Monarch which coalition they prefer to see governing the country. Based on this round of talks the Monarch orders an *informateur* to start negotiations. This *informateur* receives orders to look for the possibility to form a certain coalition. Generally this is the coalition that received most support in the talks between the Monarch and the party leaders. We model this process by having each party vote for its most preferred coalition in RC. Parties of the most popular coalition, in terms of combined seats of the parties preferring that coalition, then enter formal negotiations with the appointment of a *formateur*

To determine the outside options of the parties the model examines which coalition will enter formal negotiations if this negotiation fails. That is the coalition that receives most votes when the coalition currently under negotiation is removed from the set of possible coalitions. We call this coalition the outside coalition *co*. For each party their outside option is the utility they expect from coalition co minus a penalty for breaking of negotiation, λ.[5] This penalty can be seen as a drop in voter confidence and/or a loss in terms of time the government is in power. Formally the outside option of party i is the utility level:

$$U_i(g(co), co) - \lambda$$

We do not further specify the negotiation process as this is up to the parties involved and does not follow any particular set of formal or informal rules

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[5] This parameter is the same for all parties and at all periods in time.

or procedures. We do assume that no party will agree to an outcome of which the utility is lower than the utility it expects if the negotiations break of, i.e. its outside option. The set of policies for which each party in the coalition gets a higher utility than its outside option is called the negotiation space. If the negotiation space is empty the negotiations fail. In that case the coalition that was being negotiated is removed from RC and the formation process restarts with this new RC. Otherwise the coalition agreement is assumed to lie somewhere in the negotiation space.

Data and Operationalization of variables

Our model needs input from seven variables. We take the relative number of seats for each party (Z) after an election (Woldendorp et al., 2000). The ideological positions of parties on the left-right and the progressive-conservative scale are calculated with the Comparative Manifesto Group data (Budge et al., 2001, Klingemann et al., 2006).[6] This dataset classifies how much attention parties pay to 56 different issues in their electoral manifestos. By adding and subtracting relevant categories one can create party positions in policy spaces. First, we coded the different categories into left or right and progressive or conservative issues. If a category could not be assigned we dropped it. Second, we use the Franzmann-Kaiser (Franzmann and Kaiser, 2006) procedure of adding and subtracting issues to derive left-right and progressive-conservative issues (see appendix A). The bottom-line of this procedure is that we calculate the relative attention for left and right (and progressive and conservative) issues by taking the absolute percentage of attention to left (or any other set of) issues and subtract that by the system mean attention for left issues, this value is then subtracted from the relative attention for right issues. This way, we can deduce which parties are relatively more left-wing (or right-wing) in a party system. This allows us to create dimensional policy spaces. Also, the actual coalition agreement data we use to compare the predictions of our model are taken from

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[6] Not all elected parties are included in the Comparative Mainfesto Group dataset. However, the excluded parties were extremely small, have not been in office in their entire history, and more importantly have never been seriously considered for office. These parties are the Communist

the data of the Comparative Manifesto Dataset (Budge et al., 2001). Using the same methods, coalition agreements were coded, which allows us to place them in our two policy spaces. Both dimensions are scaled between -50 to 50.

The alphas, the relative importance of the left-right and progressive-conservative scale, are calculated by taking the attention to left-right issues as a proportion of the total attention to both left-right and progressive-conservative issues. This measure indicates how much a party values the left-right dimension over the progressive-conservative dimension. The relative importance of the latter dimension is therefore, 1- alpha.

The payoff from being in office (i.e. part of the ruling coalition) depends on two parameters. The first is the extent to which the party involved has a tendency to seek office (γ). This parameter is estimated based on an expert survey that rates all parties on a scale from 0 to 20 (Laver and Hunt, 1992), where a higher score indicates a greater tendency for office seeking. We rescale this value to lie between 0 and 1 by dividing the party score by 20 to get the γ value for that party. The expert survey data we use were collected at the start of the 1990s, which means that our office-seeking parameter (γ) is fixed over time.

Theoretically, office-seeking behavior is explained by the extent to which party leadership behavior can be constrained by party activists. If a party has no system of internal checks and balances, the party leadership is unconstrained in its pursuit for the prestige and income that is associated with office. Such party organization parameters are mostly fixed over time and as a consequence it is not problematic for our model that our office parameter is also fixed (Bille, 2001, Lundell, 2004). A more important problem is that not all parties existed at the time of the expert survey. For those parties that merged or disintegrated in the time before or after the survey we took the office-seeking parameter of the original party that was included in the expert survey. This procedure does not work for three parties as they were entirely new to the system: the Socialist Party (SP), the List Pim Fortuyn (LPF) and Liveable Netherlands (LN). For these parties we first imputed the mean value of all observations. Later, we tried

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Party (CPN), Pacifist-Socialist Party (PSP), the radical protestant RPF, GPV and SGP parties and the extreme right Centrum Democrats (CP'86 and CD).

several different values for these parties but found no essentially different results.

The second parameter that incorporates office seeking into the model is Γ, which represents the value attached to office within the polity as a whole. The actual utility a party gets from being in office is given by γ times Γ. As Γ is not a party specific parameter it cannot be obtained from party specific data. Another parameter λ, the disutility a party suffers when a negotiation breaks down, also has this characteristic. We therefore determine the value of both of these parameters by estimating them based on an aspect of the coalition formation data that we do not intend to estimate, the number of renegotiations. We ran the model with a range of values for both Γ and λ and used those values for which the difference between the number of renegotiations in the actual coalition formation process and the number of negotiations predicted by the model was smallest. We found that for λ all values larger than 1 yielded essentially the same predictions. The same holds for Γ as long as values are not larger than 50. Different values for λ and Γ within this range have little effect on the predictions of our model.

Simulation

Coalition formation

In table 1 we present the predicted coalitions of the model and the actual coalitions that were formed. We only predicted coalition formation for those coalitions formed directly after elections. In two cases a coalition was formed, after a previous coalition fell apart without having new elections.[7] These were so-called caretaker governments that take care of business until the next elections. These were only short-lived cabinets that were restricted from proposing any significant policy changes. Therefore they are excluded from our analysis.

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[7] This was the minority CDA-D66 cabinet van Agt 3 which took over after the PvdA stepped out of the van Agt 2 cabinet and the Biesheuvel 2 cabinet, which had the same composition as Biesheuvel 1 without DS'70.

This leaves us with 11 cabinets with a varying number of parties. The model had an almost accurate prediction of the two first cabinets, Biesheuvel 1 and den Uyl 1. Both cabinets were five party coalitions and in each case we predicted four of the five parties in the coalition correctly. In the case of Biesheuvel 1 we inaccurately predicted that D66 should be part of the coalition, as the other liberal party, the VVD, was part of that coalition. In the case of den Uyl 1 we included the Christian-Democratic party CHU in the model, while in reality the other Christian-Democratic party the KVP was in the coalition. The cause of this error can be partly attributed to the fact that in both instances the inaccurately placed parties were in fact very close to each other's policy bliss points. In other words, the inclusion of the other party would only mean a very small deviation from the eventual coalition agreement position.

Then in 1977 a period starts where the effective number of parties on the legislative level is much lower compared to the period before 1977. As a consequence, we move from 5-party cabinets to 2-party or 3-party cabinets. Our model accurately predicted the van Agt 1 CDA-VVD coalition. This shows that our model does not bias, as others, to the largest party in the system as in 1977 the PvdA won the election. It consequently got into a series of very difficult negotiations with the CDA but failed to reach agreement just as our model predicted. The point is that the CDA had a very strong outside option, namely the CDA-VVD cabinet, which gave it a strong bargaining position, despite the fact they had fewer seats in parliament than the PvdA. For van Agt 2 our model predicted a CDA-PvdA government, while the actual coalition included D66. This has to do with our restriction to minimal-winning coalitions as the actual van Agt 2 government was an oversized majority cabinet. In a separate analysis we loosened the minimal-winning restriction and predicted a CDA-PvdA-D66 cabinet, however this gave more inaccurate predictions in other time points. For the three Lubbers cabinets, we inaccurately predicted Lubbers I and III, but accurately predicted Lubbers II. In this period the VVD took an extreme right-wing economic position, distancing itself from the political centre and the CDA. As a consequence our model predicted two CDA-PvdA coalitions and only one CDA-VVD coalition, while in reality there was only one CDA-PvdA coalition and

two CDA-VVD coalitions. Our model does not predict the so-called "purple cabinets" of PvdA-D66-VVD referred to in the table as Kok 1 and Kok 2. Instead, the model predicts for Kok 1 a PvdA-D66-CDA coalition. Given that there were at least three out of five negotiation rounds that election that included the CDA, it is not a wholly inaccurate prediction. However, Kok 2 is a wholly inaccurate prediction. However, the actual cabinet PvdA-D66-VVD was an oversized coalition, which our model could not have predicted. In this case the three parties were contemplating changes in the constitution, so it was necessary to form such a coalition in order to get a two-thirds majority that is constitutionally required. For Balkenende 1 and 2 the model predicts the first two parties right, but inaccurately includes the Socialist Party (SP) as the third party in both coalitions. In conclusion, only 2 cabinets are predicted completely correct, however in 5 multi-party cabinets there was only one party in the cabinet that was inaccurately predicted. In other words, we correctly predicted the core of the cabinet parties.

--- Table 1 about here ---

Actual and Predicted Coalition Agreement

Now, we move to discuss the predicted and actual position of the coalition agreement. It is important to realize that our predicted coalition agreement is only an indication as we do not explicitly model this part of the bargaining process. To get a point prediction we assume that parties settle on the average of the most preferred point of bargaining parties within the negotiation space, weighted for the number of seats and the relative importance of policy dimensions.

Although the coalition agreement and the party positions are derived using the same methodology, there are some empirically observed differences between what parties say in their election manifestos and what they say in their coalition agreements. To give one example, one of the issues that is coded by the Comparative Manifesto group is welfare state limitation. In party manifestos the

welfare state limitation issue is almost a structural zero, meaning that parties almost never mention the issue in their election manifesto. However, in the Dutch coalition agreements the average attention to welfare state limitation is 3% and given that the methodology distinguishes 56 different issues that degree of attention is not marginal. The difference is understandable as welfare state limitation is unpopular with voters, so no party dares to discuss it during election time. However, when elected the issue is apparently back on the table. More generally, empirical researchers have shown that coalition agreements tend to have a right-ward bias (Debus, 2008, Laver and Budge, 1992). Debus (2008) shows that in some cases the coalition agreements' left-right position is positioned even to the right of the most right-wing party in the cabinet. Our model necessarily predicts a position that is somewhere within the boundaries of the party positions, and given the right-ward bias we should expect an error in our prediction. This is in fact what we see if we observe table 2. This table presents the actual and predicted left-right positions of the coalition agreement. For the first two cabinets, of which we at least correctly predicted the core of the parties, there is a consistent right-ward bias of between -6 and -17. Lubbers I and III have extreme biases because we predicted the wrong coalition, while the bias of the correctly predicted Lubbers II coalition also falls between -6 and -17. However, the Kok and Balkenende cabinets do not show any particular bias.

--- Table 2 about here ---

A similar error in prediction applies to the coalition agreement's position on the progressive-conservative scale. Our results show a consistently positive bias, meaning that the actual agreement is more progressive than the predicted agreement. Again, we observe that parties write down different things than they promised. We find that on average coalitions are 8 points more biased to progressive issues than in the agreements we predicted. Some of the high and low points in the prediction are caused by the inclusion of the empirically incorrect parties.

--- Table 3 about here ---

Negotiation space and uncovered set

As a final test of our model, we evaluate the negotiation space against the uncovered set. Both concepts denote an ideological space in which parties that formed a coalition could find common agreement. In theory, a coalition agreement should lie in both areas. In almost all cases coalition agreements fall inside the negotiation space, but not in the uncovered set. However, the uncovered set is a subset of the negotiation space in all but one of the 11 cases studied. On the one hand this may be an indication that the concept of the uncovered set has too stringent rationality assumptions of its actors. On the other hand, our negotiation space may simply be unrealistically big, an issue we return to in the discussion. Now, we briefly evaluate three cases: Den Uyl, Lubbers 2 and Kok 1.

Figure 1 presents the formation of the eventual Den Uyl cabinet, which our model largely predicted as well. This is an exceptional election as the PvdA drafted a pre-election policy program with PPR and D66. As a response the KVP, CHU and ARP (forerunners of CDA) also came with a combined election manifesto. We observe in figure 1 that the negotiation space and the uncovered set are approximately the same size. Only in this case we observe that the uncovered set moves outside of the negotiation space. In comparison to the negotiation space the uncovered set covers a more conservative area. As a consequence that model would probably have predicted a KVP-ARP-CHU-VVD cabinet. However, the actual coalition agreement only lies in the negotiation space and not in the uncovered set. Nevertheless, it is difficult to evaluate the value of that conclusion as we observed that the actual coalition agreement positions are biased against the election manifesto positions of the parties involved.

--- Figure 1 about here ---

Figure 2 shows the formation of the eventual Lubbers 2 cabinet, which we accurately predicted. Our negotiation space is rather large, especially compared to the extremely small area of the uncovered set. In fact, all parties bliss points lie in the interior of the negotiation space. As the distance CDA-VVD is the smallest, that is the coalition that emerges. The coalition agreement shows both a right-wing and a progressive bias. On the one hand, one may conclude that the VVD was able to pull the CDA rightwards on the economic left-right dimension that is most salient for the VVD. On the other hand, as the rightwards bias is systematic, we cannot draw any firm conclusions about which party pull the other where to.

--- Figure 2 about here ---

Figure 3 presents the Kok 1 formation in 1994. Again, we see a small uncovered set, and a rather large negotiation space. The predicted coalition agreement falls exactly on the border of the negotiation space, close to the position of D66. Not surprisingly, our model predicted a coalition of D66, PvdA and CDA, however in reality the more rightwing VVD was the third partner in the Kok 1 coalition. Here, we observe a different bias of the actual coalition agreement, especially on the progressive-conservative scale.

--- Figure 3 about here ---

Discussion

Our model is an attempt to use the observed regularity in coalition bargaining processes to guide predictions, without needing to specify the bargaining process completely. We allow parties to have diverse preferences on several different dimensions. Parties differ in their bliss point, the relative importance of policy dimensions and office seeking tendency. All parameters of the model are established a priori rather than being estimated in order to optimize our predictions.

The predictions of our model receive mixed results. In general the core of the cabinet is correctly predicted, but the complete cabinet is not. The negotiation space of the cabinet usually contains a large area of the bargaining space, but it does contain the position of the actual coalition agreement on all occasions. The uncovered set is always a subset of the negotiation space. Although this suggests a more precise prediction the actual coalition agreement does not always lie within the uncovered set. This suggests that the rationality conditions used in that model may be too stringent.

The large area covered by the negotiation space predicted by the model does suggest room for improvement. In our opinion the parties' beliefs about the outside option is an area that needs closer examination. The model assumes parties have correct beliefs about the parties that will enter formal negotiations when the current negotiations fail. However it may well be that parties have more optimistic beliefs. They might for example overestimate the probability that they will be included in future negotiations. Such overoptimistic beliefs would improve parties outside options and thereby decrease the negotiation space.

Leaving modeling issues aside, the empirically observed difference between the actual coalition agreement and the actual party policy positions does not make it easier to predict a coalition agreement from party policy positions.

To conclude, more modeling and measuring remains to be done.

Table 1. The model's predicted coalitions

| Cabinet	Predicted coalition	Real coalition
Biesheuvel 1	ARP, KVP, CHU, DS70, D66	ARP, KVP, CHU, DS70, VVD
Den Uyl 1	PvdA, PPR, D66, ARP, CHU	PvdA, PPR, D66, ARP, KVP
Van Agt 1	CDA, VVD	CDA, VVD
Van Agt 2	CDA, PvdA	CDA, PvdA, D66
Lubbers 1	CDA, PvdA	CDA, VVD
Lubbers 2	CDA, VVD	CDA, VVD
Lubbers 3	CDA, VVD	CDA, PvdA
Kok 1	PvdA, D66, CDA	PvdA, D66, VVD
Kok 2	PvdA, CDA, Groenlinks	PvdA, D66, VVD
Balkenende 1	CDA, LPF, SP	CDA, LPF, VVD
Balkenende 2	CDA, VVD, SP	CDA, VVD, D66
No. of parties correctly predicted	18/28	

Table 2. The model's predicted coalition agreement on the left-right dimension

| Cabinet	Predicted left-right position	Real left-right position	Prediction error
Biesheuvel 1	-2.53	-14.81	-12.28
Den Uyl 1	12.67	7.50	-5.17
Van Agt 1	-15.14	-32.20	-17.06
Van Agt 2	7.11	0.77	-6.34
Lubbers 1	8.62	-15.84	-24.46
Lubbers 2	-4.81	-13.50	-8.69
Lubbers 3	-7.02	2.60	9.62
Kok 1	-2.49	1.92	4.41
Kok 2	4.71	1.60	-3.11
Balkenende 1	-0.18	5.83	6.01
Balkenende 2	-4.71	-7.94	-3.23

Table 3. The model's predicted coalition agreement on the progressive-conservative dimension.

| Cabinet	Predicted prog-con position	Real prog-con position	Prediction error
Biesheuvel 1	-1.17	15.58	16.75
Den Uyl 1	9.62	18.46	8.84
Van Agt 1	-6.45	0.78	7.23
Van Agt 2	-0.51	8.10	8.61
Lubbers 1	3.81	4.41	0.60
Lubbers 2	-2.40	7.20	9.60
Lubbers 3	-1.03	8.50	9.53
Kok 1	1.78	8.35	6.57
Kok 2	0.14	8.28	8.14
Balkenende 1	-3.39	9.21	12.60
Balkenende 2	0.15	6.16	6.01

Figure 1. Party position, coalition agreement position, uncovered set and negotiation space of Den Uyl (1972).
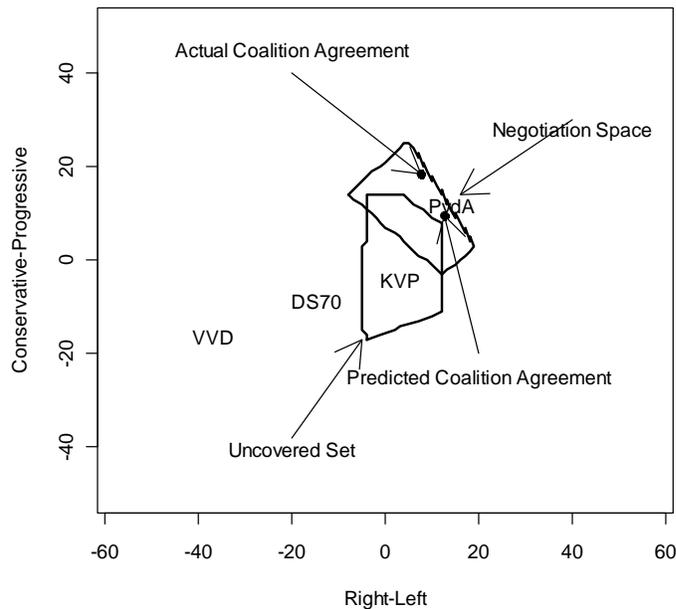
Figure 2. Party position, coalition agreement position, uncovered set and negotiation space of Lubbers 2 (1986).
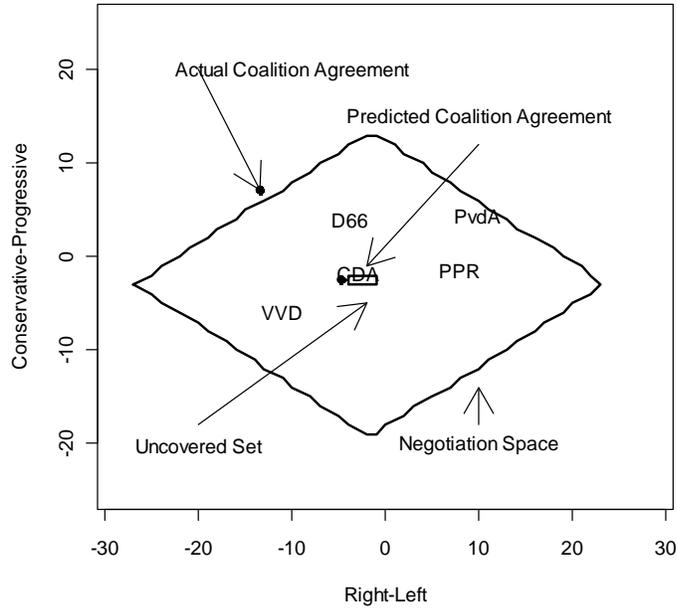
Figure 3. Party position, coalition agreement position, uncovered set and negotiation space of Kok 1 (1994).
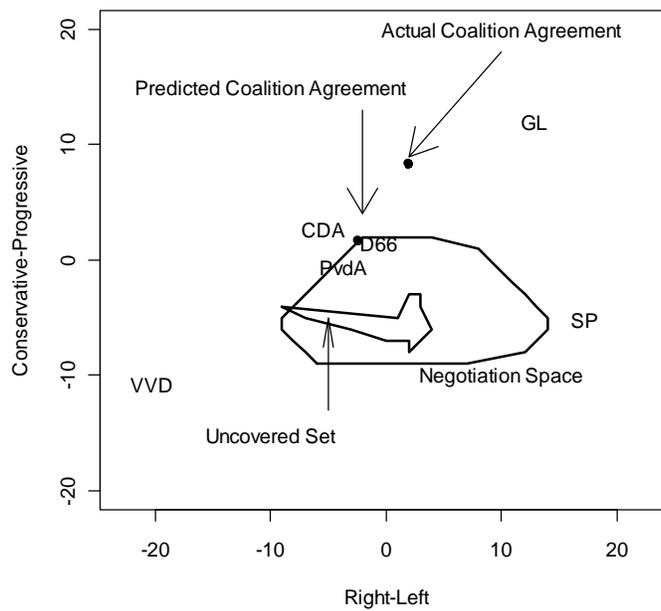
Appendix A. Measuring Party Positions

We apply the Franzmann-Kaiser method (2006)to calculate the left-right and progressive-conservative position of Dutch political parties from 1970-2003. We use raw data from the Manifesto Research Group (Budge et al., 2001, Klingemann et al., 2006).

1. Determine which issues shape political competition by regressing the issues over party dummies. If parties take significantly different positions on this issue include it in a scale, otherwise not.

2. Determine which issue belongs to a left, right, progressive or conservative position.

3. Sum all left and right issues and subtract left from right, proceed similarly of progressive-conservative.

4. Take the election mean of both scales, and subtract the party score from 3 from this mean score.

5. Similarly, one takes the same issues from the coalition agreement and add them together to create a left-right score and a progressive-conservative score for the coalition.

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