



ELSEVIER

Available online at www.sciencedirect.com

SCIENCE @ DIRECT®

Electoral Studies 24 (2005) 245–264

Electoral
Studies

www.elsevier.com/locate/electstud

Voting behavior and the electoral context of government formation

Garrett Glasgow^{a,*}, R. Michael Alvarez^b

^a*University of California, Santa Barbara, Department of Political Science,
Santa Barbara, CA 93106, USA*

^b*California Institute of Technology, Division of Humanities and Social
Sciences, Pasadena, CA 91125, USA*

Abstract

Most studies of parliamentary elections only examine specific parts of the electoral process—generally either voter behavior, or party behavior in the post-election, coalition-formation process. However, there are substantive gains to be made by considering the election process as a whole: considering voting behavior and coalition formation together allows us to determine not only how individual characteristics influence vote choice, but how the distribution of these characteristics influences the distribution of executive authority. Combining models of voting behavior and models of coalition formation in a single empirical study can yield a more complete understanding of the link between individual voter behavior and resulting governing coalitions. This approach is demonstrated with an application to the Dutch 1994 parliamentary election.

© 2004 Elsevier Ltd. All rights reserved.

Keywords: Parliamentary coalition formation; Mixed logit; Counterfactual analysis; Economic voting; Religious affiliation; Dutch elections

1. Introduction

How does individual voting behavior determine control of a government through parliamentary elections? Surprisingly little research has examined this question. Most studies of parliamentary elections only examine specific parts of the electoral process—generally either voter behavior, or party behavior in the post-election,

* Corresponding author. Tel.: +1-805-893-5304; fax: +1-805-893-3309.

E-mail addresses: glasgow@polsci.ucsb.edu (G. Glasgow), rma@hss.caltech.edu (R.M. Alvarez).

coalition-formation process. However, there are substantive gains to be made by considering the election process as a whole: considering voting behavior and coalition formation together allows us to determine not only how individual characteristics influence vote choice, but how the distribution of these characteristics influences the distribution of executive authority. Combining models of voting behavior and models of coalition formation in a single empirical study can yield a more complete understanding of the link between individual voter behavior and resulting governing coalitions.

Most empirical studies of electoral behavior apply statistical models to survey data to test hypotheses about voting behavior (Alvarez and Nagler, 1995; Lacy and Burden, 1999; Schofield et al., 1998). Some studies go as far as calculating estimated vote shares for the parties or candidates in the election, but few consider how vote shares become seats and how this helps determine possible governing coalitions. In a sense, the most interesting question related to voting behavior is how this behavior influences the ultimate outcome of an election. While we have a fairly complete understanding of how various factors influence voting behavior, we have paid little attention to how these factors influence the ultimate outcome of the election—that is, who gains or maintains political power. In many electoral systems the correspondence between vote share and political power is not obvious. In particular, the relationship between voting behavior and political power in proportional representation (PR) elections where no party is able to form the government by itself cannot usually be determined through a model of voting behavior alone. In order to understand how factors influencing voting behavior also influence the ultimate outcome of the election, we must also study the rules that aggregate votes into seats and the coalition-formation process.

Linking empirical analysis of voting behavior to coalition formation can also contribute to theoretical analyses of the coalition-formation process. Constraints that are beyond the control of parties can dramatically influence which coalitions form (Strøm et al., 1994); for example, changes in electoral demography or the global economy are difficult or impossible for political parties to control, and they will have an exogenous influence on the number of seats each party wins. As the relative size or weight of parties (how many seats each party holds) has a crucial impact on the formation of governments (Laver and Shepsle, 1996; Martin and Stevenson, 2001), changes in the electoral context that influence voting behavior but are beyond the direct control of the parties could influence the government-formation process. Those studies that have examined the impact of changing seat distributions on coalition formation have made no effort to link these seat changes to voting behavior. For example, Laver and Shepsle (1996) examined how changing party seat shares would influence government duration, but changes in party seat shares were implemented as random shocks. While this approach can help show how changing party seat shares can affect government formation in general, it does not provide a precise understanding of how factors that influence voting behavior might influence or constrain the formation of particular governments.

Thus, there is a gap in our empirical understanding of the process of government formation. Studies of electoral conditions and voting behavior do not examine how

voting behavior determines the distribution of political power. Meanwhile, studies of government formation do not examine how changes in electoral conditions or voting behavior would influence the kinds of coalitions that can form. Filling this gap requires a model that links voting behavior under different electoral conditions to the number of seats won by political parties, and then determines how these seat shares affect the formation of a governing coalition.

This paper integrates these two different empirical approaches to the study of government formation. We first specify and estimate an empirical model of voting behavior using individual-level survey data, and use this model to predict vote shares for each party in the election. From these vote shares we calculate the number of seats each party would win. We then use these predicted seat shares as inputs in models of coalition formation. Next, we perform counterfactual analyses, changing electoral conditions to match historical data from different elections and changing the electoral rules that aggregate votes into seats. Changing the basic context under which an election is held affects voting behavior, which affects vote and seat shares, and ultimately influences coalition formation. Changing the electoral rules serves to alter the way voter preferences are translated into seats. Our approach allows us to test theories of how the basic electoral context and electoral rules influence eventual government formation. For example, we can determine if improved economic conditions would have made specific government coalitions more likely, under different institutional arrangements for translating party vote shares into governing coalitions.

Few have considered the link between voting behavior and government coalition formation in a PR system. Austen-Smith and Banks (1988) tied voting behavior to coalition formation in a formal model of a three-party PR system, and found that the likelihood of a party's inclusion in the governing coalition is not monotonically related to its vote or seat share. This reinforces our contention that we cannot learn how factors that influence voting behavior will influence the ultimate outcome of an election by examining voting behavior alone. However, the model proposed by Austen-Smith and Banks depends on voters conditioning their votes on which governing coalition is expected to form. Strategic behavior of this sort assumes that voters are well informed about the expected vote shares of the parties running in an election and the odds that different sets of parties can form governing coalitions. As this information can be costly to obtain, voters may not exert the necessary effort (e.g., Downs, 1957). Further, past empirical evidence suggests that strategic behavior by voters is infrequent (Alvarez and Nagler, 2000; Blais et al., 2001). Thus, we assume sincere voting in our model.

A previous paper that links voting behavior to government coalition formation with empirical analysis is Quinn and Martin (2002). Quinn and Martin consider a model where the issue positions of Dutch political parties in the 1989 parliamentary election affect each party's vote share and the probability that certain government coalitions form. Assuming sincere voting by individuals, they examine how changing party positions affect party size and the governing coalition.

Our approach is similar to Quinn and Martin's, but less complicated as we focus on electoral circumstances not easily manipulated by parties (the state of the

economy and religious affiliation), rather than party issue strategies. We focus on these factors for three reasons. First, recent empirical work on factors that influence voting behavior demonstrates that contextual factors such as economic perceptions and issue preferences help determine voter behavior (Alvarez and Nagler, 1995; Schofield et al., 1998), but the influence of these factors on the formation of governing coalitions has yet to be examined. Second, the electoral context within which strategic parties might pitch alternative issue positions in order to increase the likelihood of participation in the governing coalition or to maximize parliamentary seats is important. While strategic parties would adjust their issue positions as economic or sociological factors change, these factors will act as constraints on which party strategies may be viable. For instance, if economic perceptions are positive, a party in the incumbent governing coalition may be assured a role in a future government, and be able to adopt issue positions that are not optimal in terms of vote or seat share. However, if economic perceptions are negative this same party will face more constraints on which issue positions will still lead to a role in the government. Our analysis demonstrates how these constraints operate when we assume that party positions remain fixed. Finally, some have argued that parties must maintain electoral reputations, and cannot quickly and dramatically change their positions on issues (e.g., Iverson, 1994). This means that parties may not be able to quickly adjust their issue positions in response to short-term changes in the electoral context. Thus, by studying contextual factors, in contrast to Quinn and Martin's focus on spatial issues, our work complements their analysis and helps open the door to a new set of studies of how voting behavior shapes government formation.

In the following section we describe the empirical strategy we use to determine how different electoral situations would affect coalition formation. The methodology we develop here could be applied to any study of voting behavior and government coalition formation. Section 3 applies this method to governmental formation in the 1994 Dutch parliamentary election. We show that contextual factors are an important factor in determining which governing coalitions are likely to form. We conclude our paper with a discussion of our results and the implications of our research in Section 4.

2. An empirical strategy for the study of voting behavior and coalition formation

Our empirical strategy proceeds in two steps. The first step estimates an empirical model of voting behavior and predicts vote shares for each party. We call this our baseline case, which is the basis for our counterfactual analyses. We perform these counterfactual analyses by altering the distributions of key independent variables (such as economic perceptions) and predicting vote shares again using the same model coefficients. This allows us to determine how vote shares for each party could change under the counterfactual conditions. The second step converts the vote shares for the baseline case and the counterfactual analyses into seats, which are used as inputs in the Laver and Shepsle coalition-formation model (1996). This strategy

could be adapted to use almost any model of voting behavior or government coalition formation.

2.1. *Voting behavior*

The first step requires estimating a model of voting behavior. We are interested in what leads individuals to support a particular party, and how voters might switch support from one party to another under different electoral scenarios. In the terminology of discrete choice models, we are interested in the *substitution patterns* between parties—how voters will substitute one party for another as conditions change.

Estimating *how* voters make this substitution is crucial. While this problem is trivial in a two-party election, in multiparty elections a statistical method that estimates realistic and accurate substitution patterns is required. Multinomial logit (MNL) is a popular choice in estimating models of multiparty elections, but it cannot estimate flexible substitution patterns. MNL has a property known as the independence of irrelevant alternatives (IIA), which forces the ratio of the probability of selecting one party over another to be constant, regardless of changes in the level of support for other parties in the election. This assumption is problematic in studies like ours, since some parties may benefit proportionately more than others from changes in the electoral situation.

Hausman tests for IIA violations (Hausman and McFadden, 1984) are often employed to determine if MNL may be used. If the Hausman test fails to reject the null hypothesis of IIA, this suggests that the substitution patterns (given the model specification and data) do not deviate significantly from those that would be estimated under the IIA assumption. However, since substitution patterns are a major focus of this study, and because there is some uncertainty about the power and performance of the Hausman test (Holly, 1982; Hausman and McFadden, 1984), we prefer models that estimate flexible substitution patterns, despite the additional computational costs. However, in some instances an MNL (or other discrete choice model) may be an appropriate model choice, and MNL could easily be used as the statistical model in the procedure we present below.

We use a mixed logit model (Glasgow, 2001; McFadden and Train, 2000) in our research below.¹ Mixed logit (MXL) does not assume IIA and thus allows for flexible substitution patterns, enabling us to determine if a decline in support for one party will benefit some parties more than others. A mixed logit model can be specified that will estimate a wide variety of substitution patterns—McFadden and Train (2000) demonstrate that MXL can be specified to approximate any discrete

¹ Various methodological tools have been advanced for studying substitution patterns using discrete choice data, most commonly the multinomial probit (MNP) model (Alvarez and Nagler, 1995; Lacy and Burden, 1999; Schofield et al., 1998). However, MNP is often difficult to estimate (e.g., Horowitz, 1991). Further, the simulations we performed below (involving multiple random draws from the multivariate normal distribution of the parameter estimates) were unstable when working with an MNP. This was because some of the random draws for the correlations between parties were close to 1 or –1, leading to estimation problems.

choice model derived from random utility maximization (to an arbitrary degree of closeness).²

Using the mixed logit coefficients, we estimate the vote share of each party under different circumstances. We first estimate each party's vote share under the actual circumstances of the election. The predicted probability for each individual in the data set voting for each party is calculated, and these probabilities are summed across individuals to generate predicted vote shares. In order to produce standard errors on these predicted vote shares, we take 1000 random draws from the multivariate normal distribution of the mixed logit coefficients (using the coefficients and the covariance matrix of the coefficients), calculate 1000 predicted vote shares using each of these 1000 draws as the vector of coefficients, and calculate the mean and standard deviation of the 1000 predicted vote shares.

Vote shares are also estimated for the different electoral scenarios examined in the study. This is done by creating alternative data sets with the characteristics of voters changed to match a scenario of interest (Alvarez and Nagler, 1995). For instance, if we wished to examine a counterfactual situation where economic perceptions were more positive than the actual circumstances of the election, we would create a new variable for the counterfactual economic perceptions, with some individuals set to have more positive economic perceptions. Counterfactual vote share predictions would then be generated using coefficients and data from the original model, but replacing the old economic perceptions variable with the new counterfactual variable. This is where flexible substitution patterns are important—some parties might benefit more than others from a change in the electoral situation—and through this counterfactual analysis we can determine if substitution occurs in the decision-making process of the electorate under the counterfactual conditions.

Obviously, depending on the electoral system being studied, it may not be possible to include every political party represented in the parliament in the model of voting behavior (for instance, if there are too few respondents who report voting for some

² The mixed logit model assumes that the unobserved portion of utility for an alternative has two parts—an independently and identically distributed (IID) extreme value component (ϵ) and another portion (η) that depends on data Z and is assumed to follow a general distribution $g(\eta|\Omega)$. Estimation of the mixed logit involves estimating a vector of coefficients β and Ω (the variance of η). Larger elements in Ω indicate greater variance in the error term associated with the corresponding element in Z . Under MXL the probability that individual i selects alternative j is given by:

$$P(j) = \int_{\eta} \left[\frac{e^{X\beta + Z\eta}}{\sum_k e^{X\beta + Z\eta}} \right] g(\eta|\Omega) d\eta \quad (1)$$

Examination of Eq. (1) reveals the choice probability is a mixture of MNL probabilities, with the weight of each particular MNL probability determined by the mixing distribution g (thus the term “mixed logit”). In this study we specify a mixed logit model that estimates the same substitution patterns as an MNP by placing the alternative-specific constant terms in Z , and specifying g as a multivariate normal distribution. Estimation of Ω then gives us the variances and covariances of the normally distributed unobserved portions of utility, just as in an MNP. As with MNP, an MXL is more costly to estimate than an MNL. Estimating MXL involves solving integrals that generally do not have a closed-form solution, so these models are usually estimated with a simulated maximum likelihood technique.

minor parties). In this instance we assume that individuals who voted for one of the parties included in the model will continue to vote for one of these parties under all electoral scenarios. In this paper we further assume that individuals who cast a vote would continue to vote under the other electoral scenarios we examine, although it would not be too difficult to include abstention as an alternative choice (Lacy and Burden, 1999).

The end results from this step are predicted vote shares (and standard errors) for each party under the actual conditions of the election, and a variety of counterfactual conditions.

2.2. Government coalition formation

The second step is to determine how these counterfactual changes in voting behavior influence the formation of a governing coalition. There are two points where the distribution of political power can diverge from the distribution of vote share. The first is in the allocation of seats to parties, and the second is during the coalition-formation process. We consider both.

We begin by estimating the number of seats allocated to each party according to the vote shares predicted in the first step of our model. We do this by starting with the total number of votes cast for all of the parties included in the voting behavior model, and use the predicted vote shares to allocate votes to each party for each of the 1000 simulations for each electoral scenario. The seat allocation procedure used in the nation under study determines the expected number of seats each party should win under each electoral scenario, taking into account seat allocation rules, vote thresholds for representation, and so on. At this point, counterfactual analyses of the seat allocation rules can also be considered. For each electoral scenario, we produce 1000 different estimates of the number of seats each party would win.

Next, these estimated seat totals from each simulation are used as inputs into a model of coalition formation to see how changing seat shares alter the equilibria of these models. In this paper we examine how changes in the predicted seat shares affect equilibrium portfolio allocations using the Portfolio Allocation model (Laver and Shepsle, 1996). This model begins by assuming that parties have ideal points within a multidimensional policy space. The model then assumes a strong set of institutional rules, most importantly that ministers have dictatorial control over the policy dimension associated with their ministry. Thus, rather than bargaining over a continuous multidimensional space, parties bargain over a set of “lattice points”, which represent different cabinets (different combinations of party control over policy dimensions). An equilibrium in this model is a cabinet that is preferred by some legislative majority to every other alternative cabinet. Obviously, parties that control one policy dimension in equilibrium are in a strong position to negotiate the formation of the government, since no majority prefers allocation of portfolios different to the equilibrium portfolio. The end result is a breakdown of the equilibrium portfolio allocations across the 1000 simulations for each electoral scenario. Although this model does not enable us to make precise predictions about

which parties would form a governing coalition, we can determine which are in a relatively strong negotiating position.

3. An empirical model of government formation

In this section we apply the empirical strategy described earlier to the 1994 Dutch parliamentary election, though our empirical strategy could be used to study government formation in any parliamentary setting. We selected this case for three reasons. First, seats are allocated in the *Tweede Kamer* through proportional representation, and coalition governments are nearly inevitable. Thus, this is a case where the results of an empirical model of voting behavior are not likely to reveal the ultimate outcome of the election. Second, the Dutch parliamentary election studies (DPES) produce high quality survey data, using survey instruments with a rich collection of political, economic, and social variables (Anker and Oppenhuis, 1997). Third, this case is interesting substantively, as the 1994 election represents a dramatic shift in Dutch politics. It resulted in the formation of the first government since 1917 that did not include a centrist confessional party. Instead the Labour Party (the PvdA) and the Liberals (the VVD) joined with the Democrats '66 (D66) to form the “Purple Coalition” government (the “Purple” refers to the blending of the blue associated with the conservatives and the red associated with the socialists). Until this election an alliance between the Leftist PvdA and the conservative VVD was considered inconceivable. In this paper we examine how different economic and religious conditions could have changed the level of support for the four largest parties in the 1994 *Tweede Kamer* (Second House) election, changing the likelihood of the formation of various governing coalitions.

One possible influence on government formation was the poor state of the economy in 1994. Table 1 presents perceptions of the impact of government policies since the last election on the general economy, employment, and personal finances, and compares them to perceptions in 1989, the year of the election that led to the incumbent CDA/PvdA government. These percentages were calculated using the DPES from 1989 (Anker and Oppenhuis, 1994) and 1994 (Anker and Oppenhuis, 1997).

Clearly, perceptions of the economy were more negative in 1994. A vast literature on economic voting has linked the state of the economy to support for incumbent

Table 1
Economic perceptions in 1994 as compared to 1989 (in percentages)

Economic perception	Positive	Neutral	Negative
1994 General economy	16.8	51.7	31.5
1989 General economy	55.0	33.6	11.4
1994 Employment	10.0	36.7	53.4
1989 Employment	34.1	37.1	28.8
1994 Personal finances	12.9	50.9	36.2
1989 Personal finances	21.6	47.9	30.5

parties (Lewis-Beck and Paldam, 2000). The CDA and the PvdA formed the governing coalition after the 1989 election, and were thus in a position to be blamed by voters for Dutch economic woes. Thus, the state of the economy may have been an important factor in the decline of the CDA and the PvdA and the rise of the Purple Coalition. Below we determine how support for each party and the possibility of different coalitions would have changed if the state of the economy had been different in 1994.

Another possible influence on government formation was the steady decline in religious adherence in the Dutch electorate (Gladdish, 1991, pp. 42–47; van Holsteyn and Irwin, 2000). In fact, three smaller confessional parties merged into the CDA in 1980 in an effort to stem their declining electoral support (Gladdish, 1991, pp. 54–56). Perhaps the increasing secularization of Dutch society weakened the CDA to the point that it was no longer a pivotal player in coalition formation, contributing to the formation of the Purple Coalition.

Three religious affiliations are regarded as important in Dutch politics: two Protestant denominations (the Dutch Reformed and the Orthodox Calvinists) and the Roman Catholics. Here we consider the percentage of individuals identifying themselves as belonging to each of these denominations in 1967 (when the confessional parties were relatively strong) compared to the percentages in 1994, using the DPES from 1967 (Netherlands Institute for Public Opinion Research, 1969) and 1994 (Anker and Oppenhuis, 1997). In 1967, 28.9% of individuals identified themselves as Dutch Reformed, 8.9% identified as Orthodox Calvinist, and 36.2% identified as Catholic. By 1994 these numbers had declined to 15.5% Dutch Reformed, 5.6% Orthodox Calvinist, and 26.3% Catholic. It is clear that Dutch society was less religious in 1994 than in the recent past. Below we determine how support for each party and the possibility of different coalitions would have changed if the levels of religious affiliation had been different in 1994.

3.1. *Voting behavior in the 1994 Dutch election*

Our empirical analysis of the factors affecting government formation begins with the estimation of our voter behavior model in the 1994 *Tweede Kamer* election, using 1994 DPES data (Anker and Oppenhuis, 1997). The dependent variable in the model is vote choice. As there were few survey respondents who voted for parties besides the CDA, the PvdA, the VVD, or D66, we limit our analysis to voters who selected one of these parties, which accounted for 81.7% of the vote in the 1994 election.

The key to our model is determining the impact of economic perceptions and religious affiliation on voting behavior. For economic perceptions we include the respondent's opinion on the effect of government policies on the economy overall, unemployment, and his or her personal finances over the past 4 years. These variables are coded as 1 for a favorable opinion, -1 for an unfavorable opinion, and 0 for a neutral opinion. For religious affiliation we include dummy variables that indicate if the respondent's religion was Roman Catholic, Dutch Reformed, or Orthodox Calvinist (the baseline category was those who identify themselves as belonging to some other religion, or no religion at all).

The model we specify also includes variables to capture other influences on voting behavior. To examine the impact of issues on vote choice, we include variables that measure the distance between the voter and each political party on a series of issues. The issue distances are calculated as the squared difference between the voter's self-placement on a 7 point scale and the mean placement of all respondents of each party on the same 7 point scale (Alvarez and Nagler, 1995). The scales represent opinions on euthanasia, controlling crime, differences in income, nuclear energy, and the assimilation of ethnic minorities.

We also include a measure of post-materialist values (Inglehart, 1977). This is measured as a dummy variable, coded 1 if a respondent selected "more say in politics" or "freedom of speech" from a list of 4 values as his or her most desirable political value, while it was coded 0 if the respondent selected "maintaining order" or "fight rising prices".

Finally, we include in our voting model the demographic attributes of the voter. Dummy variables indicating females, manual workers, and labor union members are included, as are measures of education (a 5 point scale with higher numbers indicating greater education), urbanization (a 5 point scale with higher numbers meaning residence in a more urban area), and income (a 12 point scale with higher numbers indicating greater income). The age of the respondent in years is also included. This set of factors controls for the impact of these different demographic attributes, most especially the possible impact of class on voting behavior (e.g., Nieuwbeerta et al., 2000).

However, we encountered two problems we needed to solve before estimating our mixed logit model. First, listwise deletion would result in the removal of about 10% of our observations. In order to avoid biases that result from listwise deletion, we used multiple imputation (King et al., 2001).³ Five imputations were used for this data set, producing five imputed data sets each with 1063 observations. In the statistical analysis below, each model was estimated on each imputed data set and the results were combined, accounting for variation within each data set as well as variation across the imputed data sets (King et al., 2001).

Second, the reported vote by survey respondents contained a bias in favor of the VVD and D66 and away from the CDA. The true percentages of the four-party vote were 29.36% for the PvdA, 27.23% for the CDA, 24.44% for the VVD, and 18.97% for D66. However, the percentages of respondents supporting each party in the data used to estimate the model were 29.26% for the PvdA, 22.77% for the CDA, 26.15% for the VVD, and 21.83% for D66. Failure to correct for this bias would lead to inaccurate predictions for vote shares, and thus inaccurate predictions of seat shares and the impact of voting behavior on coalition formation. To correct for this bias, we weight each observation by the true share of the vote received divided by the share of the vote in the 1994 DPES.

³ First, a statistical model is used to create predictions for the distribution of each variable with missing data, conditional on all of the other information in the data set. Then multiple imputations for each missing value are created, resulting in multiple data sets, each with the same values for the observed data and different imputations for the missing data. *Amelia* was used to perform the multiple imputations (Honaker et al., 2001).

The results of estimating a mixed logit model of the 1994 *Tweede Kamer* election are presented in Table 2.⁴ Our empirical results are in line with most explanations of voting behavior in the Netherlands. Increased issue distance from a party reduces the probability that an individual will vote for that party. Positive views of the general economy and personal finances increase the probability than an individual will vote for one of the incumbent parties (the CDA or the PvdA), and positive views of employment help the PvdA. Religious respondents tend to favor the CDA, and younger respondents tend to favor D66.

The goal of estimating this model was to generate predicted vote shares for each party under the different electoral circumstances outlined above. We calculated estimated vote shares for each party using the MXL in Table 2 for our counterfactual economic and religious circumstances. First, we used the actual economic perceptions and religious affiliations in 1994 to calculate a baseline vote share. We then created counterfactual variables for economic perceptions and religious affiliation for different electoral scenarios, replaced the old economic perception and religious affiliation variables in the original model, and generated counterfactual vote shares (reported in Table 3) for the different electoral scenarios represented by these new variables.⁵

Economic perceptions have a large impact on the vote shares of the four major parties. The CDA and PvdA improve their vote shares at the expense of the VVD and D66 as economic perceptions improve under the economic counterfactual. In the religion counterfactual, we see the expected increase in CDA support at the expense of the other three parties in the model, especially the PvdA. When we combine the effects of the economy and religion in our counterfactual analysis, we see strong increases in CDA support, modest increases in PvdA support, and reductions in VVD and D66 vote shares. This is not surprising in light of the other counterfactuals above—the VVD and D66 lose vote share as economic perceptions improve, while the PvdA and D66 lose vote share as religious affiliation increases.

⁴ We also estimated Hausman tests for IIA violations, and the test results did not reject the null hypothesis of IIA. However, we proceed with the estimation of an MXL for the reasons outlined in the previous section. Although MXL imposed additional estimation costs, allowing for flexible substitution patterns is the theoretically correct approach in this study, even if the Hausman tests could not reject the null hypothesis of IIA for our particular specification and data.

⁵ When producing the counterfactual variables for economic perceptions, we randomly reassigned individuals to adjacent categories in the variable in order to match the desired distribution of perceptions for the counterfactual. For instance, to create the counterfactual variable for improved general economic perceptions, some who thought the state of the economy was “poor” would be reassigned to “neutral”, while some who thought the economy was “neutral” would be reassigned to “good”. The counterfactual religious affiliation variable was created by randomly assigning some non-religious individuals to particular religious affiliations. Note this is not the only way a counterfactual variable could be created. Another possibility would be to create a statistical model that predicts which individuals would be most likely to have different perceptions or characteristics, and generate the counterfactual variable accordingly.

Table 2
Mixed logit estimates, 1994 Dutch *Tweede Kamer* election (D66 coefficients normalized to zero)

Independent variables	Coefficient value	Standard error				
Euthanasia	−0.10**	0.04				
Crime	−0.05	0.04				
Income differences	−0.16**	0.06				
Nuclear plants	−0.08**	0.04				
Ethnic minorities	−0.12**	0.05				
	PvdA/D66 coefficients		CDA/D66 coefficients		VVD/D66 coefficients	
Independent variables	Coefficient value	Standard error	Coefficient value	Standard error	Coefficient value	Standard error
General economy	0.67*	0.37	1.45**	0.67	0.51	0.34
Employment	0.66**	0.33	0.01	0.30	−0.14	0.29
Personal finances	0.55*	0.30	0.65*	0.36	0.30	0.26
Catholic	−0.42	0.40	3.45**	1.55	0.91	0.65
Dutch Reformed	0.27	0.48	2.72**	1.19	1.16*	0.67
Orthodox Calvinist	−2.27**	1.09	4.21**	2.07	0.33	0.96
Age	0.06**	0.02	0.07**	0.03	0.04**	0.02
Education	−0.23	0.17	0.11	0.18	0.26	0.20
Post-materialism	0.13	0.29	−0.31	0.37	−0.39	0.36
Gender	−0.01	0.28	−0.40	0.37	−0.25	0.33
Income	−0.09	0.06	0.04	0.06	0.09	0.07
Union member	0.60	0.40	−1.07*	0.61	−1.09*	0.59
Urban resident	−0.08	0.11	−0.14	0.15	0.01	0.12
Manual worker	0.13	0.33	−0.11	0.42	−0.08	0.38
Constant	1.14**	0.53	−0.14	0.58	0.86**	0.42
Covariance of party utilities	Coefficient value	Standard error				
Standard deviation (PvdA–D66)	1.00	–				
Standard deviation (CDA–D66)	0.82	1.12				
Standard deviation (VVD–D66)	0.19	0.73				
Sqrt. Cov. (P–D, C–D)	1.13	1.39				
Sqrt. Cov. (P–D, V–D)	0.80	0.86				
Sqrt. Cov. (C–D, V–D)	2.01	1.27				
Number of observations	1063					
LR χ^2	766.70**					

* indicates statistical significance at the $p < 0.10$ level, and ** at the $p < 0.05$ level, both two-tailed tests.

Table 3
 Predicted vote shares under different counterfactuals

Electoral scenario	PvdA	CDA	VVD	D66
Baseline	28.48 (1.93)	27.45 (2.01)	24.68 (1.65)	19.39 (1.43)
1989 Economy	32.09 (2.74)	31.64 (2.35)	21.85 (2.31)	14.41 (2.04)
1967 Religion	25.15 (1.80)	33.08 (2.16)	24.33 (1.91)	17.44 (1.74)
1989 Economy and 1967 Religion	28.09 (2.34)	38.15 (2.98)	21.02 (2.57)	12.74 (2.25)

Standard errors in parenthesis.

3.2. Government coalition formation

Any analysis of how changing electoral circumstances influenced the outcome of an election is incomplete unless we consider how changing vote shares would ultimately influence government coalition formation. The second part of our analysis considers how vote shares are aggregated into seats, and how the different seat totals that emerge from the counterfactuals influence the likelihood of the formation of different governing coalitions.

The actual seat allocation following the 1994 elections was 37 for the PVDA, 34 for the CDA, 31 for the VVD, 24 for D66, and 24 seats split among six minor parties. In order to estimate how the number of seats allocated to each party would change under different scenarios, we make two assumptions. First, we assume that everyone who voted for one of the four largest parties will still vote for one of those four parties as we vary the electoral circumstances (as we discuss below, the available data constrains our ability to study any more than the four major parties in this election). Second, all those who voted for other parties would continue to vote for those parties.

With these assumptions, we make a seat allocation to each party for each of the 1000 sets of vote shares estimated under each electoral scenario. We begin with the actual number of valid votes cast in the 1994 election (8,974,813), allocate the appropriate number of votes to minor parties, and then allocate the total number of votes for the four major parties (7,327,548) to each party by their estimated share of the four-party vote. We then use these vote totals to allocate seats.

The institutional rule used to aggregate votes into seats is one point at which the political power gained from an election can diverge from vote share. However, the seat aggregation rule in the Netherlands is a particularly pure form of PR, with an electoral threshold of only 0.67% in the *Tweede Kamer*. Seats are allocated in the *Tweede Kamer* by first dividing the total number of valid votes cast by 150 (the number of seats in the *Tweede Kamer*). The resulting number is called the “electoral quotient”, and a party list is allocated one seat for as many times as the electoral quotient is contained in the total number of votes cast for that list. The remaining seats are allocated using the d’Hondt method.⁶ In order to further examine the effect

⁶ This method calculates a ratio of votes to seats for each party. The ratio is calculated as $r_i = v_i / (s_i + 1)$, where v_i is the number of votes for party i and s_i is the number of seats for party i (Cox, 1997, p. 57). Once allocation by the d’Hondt method begins, the party with the highest ratio is allocated one seat. The ratio is recalculated for this party (since s_i is now larger by 1) and again the party with the highest ratio is allocated one seat. This continues until there are no more seats to allocate.

of seat allocation rules on the relationship between vote shares, seat shares, and political power, we also calculate seat shares for all of our counterfactuals using a 3% threshold. Such a minor change in electoral rules would be unlikely to significantly alter voting behavior, especially in light of the infrequency of strategic voting (Alvarez and Nagler, 2000; Blais et al., 2001). However, this higher threshold would prevent three minor parties from winning seats, and is thus likely to increase the seat totals of the four major parties as there would be five additional seats to distribute.

The vote shares presented in Table 3 were used to estimate the number of seats allocated to each party under each electoral scenario (holding the vote shares for minor parties constant), using both the actual 0.67% threshold employed in the Netherlands and a 3% threshold. Table 4 presents the mean and standard deviation of the number of seats won by each of the four major parties in our 1000 simulations across the counterfactuals.

These results reveal that under a 0.67% threshold, factors that influence vote share influence seat share in a similar way. The small electoral quotient used when allocating seats in the *Tweede Kamer* ensures that votes translate fairly directly to seats. As with the vote share counterfactuals, the CDA and PvdA generally gain at the expense of the VVD and D66 as economic perceptions improve, while the CDA gains at the expense of the PvdA and D66 as religious affiliation increases. Under the combined effects of improved economic perceptions and increased religious affiliation, the CDA enjoys strong gains in seat share, the PvdA experiences much smaller gains, the VVD suffers a slight loss, and D66 declines severely. The pattern is similar with a 3% threshold, although seat totals are slightly higher for the four major parties. The CDA and PvdA would gain about 1.5 seats on average, while the VVD and D66 would gain about 1 seat on average. The relative gain of the CDA and PvdA as compared to the VVD and D66 under a 3% threshold does have implications for the formation of governing coalitions, as we demonstrate below.

Of course, the ultimate outcome of the election is determined by which governing coalition would actually form under different electoral circumstances. The results of negotiations to form the government are often unpredictable in the Netherlands, and have prompted some scholars to claim “[i]mportant as they are, elections seldom have a determining impact on the formation of a government. At most the election outcome may deny a majority to a particular combination of parties...” (Andeweg and Irwin, 1993, p. 109).⁷ In 1994, although all four major parties expressed an interest in negotiating, D66 was unwilling to participate in a cabinet with the CDA, which eventually led to the formation of the Purple Coalition (Irwin, 1995).

Thus, while we cannot say with certainty which governing coalitions would form under the different counterfactual situations we examine, we can demonstrate which parties would be in a strong negotiating position given our altered electoral conditions. We use the estimated seat shares under each counterfactual as inputs into the Laver and Shepsle Portfolio Allocation model (1996). For each counterfactual,

⁷ This is one reason we do not consider the possibility that voting behavior is conditioned on which coalition is likely to form, as it is in Austen-Smith and Banks (1988).

Table 4
 Predicted seats under different counterfactuals

Electoral scenario	PvdA	CDA	VVD	D66
0.67% Threshold				
Baseline	35.95 (1.12)	34.63 (1.18)	31.08 (0.97)	24.33 (0.90)
1989 Economy	40.58 (1.58)	40.00 (1.31)	27.46 (1.32)	17.96 (1.18)
1967 Religion	31.69 (1.25)	41.84 (1.08)	30.64 (1.11)	21.83 (1.03)
1989 Economy and 1967 Religion	35.45 (1.73)	48.33 (1.38)	26.40 (1.54)	15.81 (1.31)
3% Threshold				
Baseline	37.38 (1.14)	36.01 (1.23)	32.33 (1.02)	25.29 (0.92)
1989 Economy	42.20 (1.62)	41.59 (1.36)	28.56 (1.36)	18.65 (1.24)
1967 Religion	32.97 (1.11)	43.48 (1.31)	31.85 (1.14)	22.70 (1.06)
1989 Economy and 1967 Religion	36.86 (1.46)	50.24 (1.80)	27.46 (1.61)	16.44 (1.37)

Standard errors in parenthesis.

we examine how the changing seat shares of the parties lead to different equilibria in the Portfolio Allocation model. Equilibrium portfolio allocations in this model depend both on the relative policy positions of the parties and the relative size of each party (in terms of seats held). Our counterfactuals produce estimates of the number of seats held by each party, but we still require a measure of the policy positions of each party in order to determine the equilibrium portfolio allocation. Unfortunately, there is no unambiguously “right” way to determine the set of key policy dimensions for any specific analysis of coalition formation (Laver and Shepsle, 1996, p. 128).

We elected to examine a simple 2-dimensional policy space for the Portfolio Allocation model. The two dimensions we specified were “economics” and “religion”, reflecting the two important factors in Dutch politics we discuss in this paper. Party positions on these dimensions are taken from the mean placement of the parties on two of the 7 point issue scales in the 1994 DPES. We measure positions on the economic dimension with the mean placements on the “income differences” 7 point scale, with higher numbers indicating greater efforts to equalize incomes. We measure positions on the religious dimension with the mean placements on the “euthanasia” 7 point scale, with higher numbers indicating more support for the right of terminally ill individuals to end their own life. We restrict our analysis to the four major parties in the 1994 election, and assume all minor parties vote against all possible cabinets. This assumption simplifies our analysis, and is empirically justified, as with few exceptions only the parties considered here were involved in a governing coalition in the post-war period, and the four major parties generally refused to work with the Green Party, the fifth largest party of the time (Quinn and Martin, 2002).⁸

⁸ The party positions used here were 5.56 and 5.07 for PvdA, 3.61 and 2.88 for CDA, 2.48 and 5.09 for VVD, and 4.44 and 5.32 for D66, on the economic and religious dimensions, respectively.

With these issue positions we can examine how the Portfolio Allocation model's equilibrium changes under our different counterfactuals. We used *Winset* (Laver and Shepsle, 1993) to calculate the equilibrium portfolio allocation in each of the 1000 simulations for each counterfactual.⁹ *Winset* determines which party is predicted to control each portfolio (economics and religion) in equilibrium. Table 5 presents the results of these calculations. The first column lists the counterfactual under consideration, while the next 4 columns list the two parties predicted to hold the two portfolios under consideration. The first party listed in each column is expected to hold the economic portfolio, while the second party listed is expected to hold the religion portfolio. Entries in the table are the percentage of time within each counterfactual that a particular equilibrium was observed in the 1000 simulations.

Under the baseline conditions of the 1994 *Tweede Kamer* election and a 0.67% threshold, the equilibrium of the Portfolio Allocation model in all 1000 of our simulations exists where D66 has control of the “economic” dimension, while the VVD has control of the “religion” dimension. If the policy dimensions and positions we specified in this model are accurate, this means that D66 and the VVD held a strong position in any bargaining over the formation of a government coalition, since no majority preferred a different allocation of portfolios over giving control of the economic dimension to D66 and control of the religion dimension to the VVD. The counterfactual involving economic perceptions reveals that improving perceptions of the economy would have strengthened the bargaining position of the PvdA at the expense of the VVD. Even though the CDA would have gained in vote and seat share with improved economic perceptions, this would not have led to a greater likelihood of joining the governing coalition. However, the counterfactual involving religion did lead to an equilibrium where the CDA controlled the economics dimension in 1.4% of our simulations. A D66/VVD cabinet was the equilibrium in most cases under 1967 religious affiliation, although the PvdA replaced the VVD in a few simulations as religious affiliation increased. The counterfactual for economic perceptions and religious affiliation improved the bargaining strength of the PvdA, who would control the religion dimension in 99.4% of our simulations. Despite the fact that the CDA gained the most votes and seats under this counterfactual, it did not see a proportional increase in control of a policy dimension, and controlled the economic dimension in only 26.5% of our simulations.

The pattern is similar when a 3% threshold is used when allocating seats. As this threshold benefitted the PvdA and CDA most, we would expect them to be more likely to take part in the governing coalition, and we do see a shift towards equilibria

⁹ Another important concept in the Portfolio Allocation model is that of the “strong party”, defined as a party that would be a member of every coalition preferred by a majority to the strong party's ideal point in the policy space. Strong parties are thus extremely likely to be members of the governing coalition. D66 was the strong party in most if not all of the 1000 simulations for each of our counterfactuals (with the exception of the counterfactuals involving 1967 religious affiliation and a 3% threshold). Assuming we have accurately specified the policy dimensions and positions in this Portfolio Allocation model, D66 would have been a crucial player in government-formation negotiations in almost every electoral situation we examine.

Table 5
Equilibrium cabinets in 2-dimensional Portfolio Allocation model under different counterfactuals

Electoral scenario	% of Time equilibrium coalition (Economic/Religion dimensions)			
	D66/VVD	D66/PvdA	CDA/VVD	CDA/PvdA
0.67% Threshold				
Baseline	100.0	0.0	0.0	0.0
1989 Economy	1.7	98.3	0.0	0.0
1967 Religion	92.5	6.1	1.4	0.0
1989 Economy and 1967 Religion	0.5	73.0	0.1	26.4
3% Threshold				
Baseline	95.8	4.2	0.0	0.0
1989 Economy	0.1	99.9	0.0	0.0
1967 Religion	13.9	42.7	9.4	34.0
1989 Economy and 1967 Religion	0.1	4.4	0.0	95.5

involving either the CDA, PvdA, or both. Note that even with a 3% threshold, an improvement in economic perceptions alone would not have led to CDA control of a policy dimension. However, the religion counterfactual benefits the CDA much more under a 3% threshold, with the CDA controlling the economic dimension in 43.4% of the religion only counterfactuals, and 95.5% of the economic and religion counterfactuals. This counterfactual demonstrates the relative impact of electoral institutions on government formation.

Of course, the results we present here are an incomplete picture of how the electoral context of 1994 influenced the formation of the Purple Coalition. For example, some evidence suggests that coalition governments weaken the link between economic performance and voting, since it is difficult to know how much responsibility each coalition member should bear for the state of the economy (Downs, 1957; Lewis-Beck, 1988; Powell and Whitten, 1993). Our results suggest that voters simply blamed both coalition members for the poor state of the economy, but other empirical specifications might examine the question of responsibility in more detail. We also did not specifically consider alternative economic voting models, such as an issue-priority model, where voters support parties that are perceived to be best able to handle specific economic problems (Dorussen and Taylor, 2001; Hibbs, 1987). Further, many scholars feel that the decline in CDA support due to religious factors was not only due to increasing secularization, but also due to changes in the political relevance of religion (e.g., van Holsteyn and Irwin, 2000). Thus, our counterfactuals may understate the effect of changes in religious affiliation on vote support.

Regardless, these results demonstrate that in order to understand how factors influencing voting behavior influence the ultimate outcome of an election, we must also consider the rules that aggregate votes into seats and the coalition-formation process. Economic perceptions were negative in 1994, and the incumbent governing CDA/PvdA coalition lost heavily. However, improved perceptions of the economy

by themselves did not influence the formation of the governing coalition in the way the model of voting behavior would predict. While both the PvdA and CDA gained vote and seat share with improved economic perceptions, only the PvdA was more likely to control a policy dimension. Increasing the level of religious affiliation did increase support for the CDA, enabling it to control a policy dimension in some instances. A minor change in the seat threshold led to an increased likelihood of the PvdA and CDA controlling a policy dimension. None of these results would be apparent when considering a model of voting behavior or a model of coalition formation alone.

4. Conclusion

The method we outline here has broad implications for the study of elections. This paper joins two approaches to the study of parliamentary elections, giving a more complete picture of the relationship between voting behavior and government formation. Similar to other studies of voting behavior in parliamentary elections, we first specify and estimate an empirical model of voting behavior, and use this model to predict vote shares for each party in the election. We then use the calculated vote shares to estimate the number of seats each party would win, and from there determine the equilibrium in a model of coalition formation.

Our approach contributes to the empirical study of voting behavior and coalition formation. First, we demonstrate that understanding the factors that influence voting behavior does not necessarily tell us how these factors will influence the post-election distribution of political power. For instance, in our empirical example the CDA's vote and seat shares would increase with more positive economic perceptions, but this did not mean the CDA was part of the government in the equilibrium of the Portfolio Allocation model.

Second, coalition formation has been the focus of other empirical studies, but these studies do not explicitly link voting behavior to the formation of governing coalitions. With our method it is possible to determine how changes in the electoral context would ultimately impact the kinds of coalitions that could form and the equilibria in models of coalition formation. Most studies of government coalition formation have focused on ideological or policy concerns, and treated party size as given. The analysis here reveals that studying the impact of the electoral context and voting behavior on party size is also important to understanding coalition formation, as these factors may rule out or make possible different party strategies. Thus, these contextual factors shape the set of possible post-election governing coalitions. Our analysis complements the work of [Quinn and Martin \(2002\)](#), and might be profitably combined with their work in the future to study how party strategies adapt to changes in the electoral context. These studies mark the start of a new research agenda in the empirical study of the government-formation process.

This approach may also prove useful in the examination of the dissolution of parliamentary governments, particularly strategic parliamentary dissolutions, a topic that we have not attempted to cover in our analysis (e.g., [Lupia and Strøm, 1995](#)).

Party leaders likely pay attention to exogenous contextual factors that might affect their relative party strength in a likely government-formation process when they consider calling for new elections, even if they do not have control over these contextual factors. Future research might apply an empirical analysis similar to ours to the government dissolution process.

Finally, our research presented here represents a first step in a more unified approach to the study of parliamentary elections. Here we link voting behavior to the equilibria in one model of coalition formation. The next step is to integrate this approach with methods to determine the likelihood of particular coalitions forming, perhaps based on information revealed through voter preferences as well as vote share, and to extend this analysis to multiple cases so that we can examine institutional factors. We leave this to future research.

Acknowledgements

Alvarez thanks the IBM Corporation for their support of his research through their IBM University Matching Grants Program, and the NSF for grant SBR-9709327. Thanks to Gary King for help with *Amelia*, Alex Krycek for his assistance, and Jonathan Nagler for his work on related projects.

References

- Alvarez, R.M., Nagler, J., 1995. Economics, issues and the Perot candidacy: voter choice in the 1992 presidential election. *American Journal of Political Science* 39, 714–744.
- Alvarez, R.M., Nagler, J., 2000. A new approach for modelling strategic voting in multiparty elections. *British Journal of Political Science* 30, 57–75.
- Andeweg, R.B., Irwin, G.A., 1993. *Dutch Government and Politics*. St. Martin's Press, New York.
- Anker, H., Oppenhuis, E.V., 1994. *Dutch Parliamentary Election Study, 1989*. Steinmetz Archive, Amsterdam / Inter-university Consortium for Political and Social Research, Ann Arbor, MI.
- Anker, H., Oppenhuis, E.V., 1997. *Dutch Parliamentary Election Study, 1994*. Steinmetz Archive, Amsterdam / Inter-university Consortium for Political and Social Research, Ann Arbor, MI.
- Austen-Smith, D., Banks, J., 1988. Elections, coalitions, and legislative outcomes. *American Political Science Review* 82, 405–422.
- Blais, A., Nadeau, R., Gidengil, E., Nevitte, N., 2001. Measuring strategic voting in multiparty plurality elections. *Electoral Studies* 20, 343–352.
- Cox, G.W., 1997. *Making Votes Count*. Cambridge University Press, New York.
- Dorussen, H., Taylor, M., 2001. The political context of issue-priority voting: coalitions and economic voting in the Netherlands, 1970–1999. *Electoral Studies* 20, 399–426.
- Downs, A., 1957. *An Economic Theory of Democracy*. HarperCollins, New York.
- Gladdish, K., 1991. *Governing from the Center: Politics and Policy-Making in the Netherlands*. Northern Illinois University Press, DeKalb, IL.
- Glasgow, G., 2001. Mixed logit models for multiparty elections. *Political Analysis* 9, 116–136.
- Hausman, J.A., McFadden, D., 1984. A specification test for the multinomial logit model. *Econometrica* 52, 1219–1240.
- Hibbs, D., 1987. *The Political Economy of Industrial Democracies*. Harvard University Press, Cambridge, MA.
- Holly, A., 1982. A remark on the Hausman specification test. *Econometrica* 50, 749–760.

- Honaker, J., Joseph, A., King, G., Scheve, K., 2001. Amelia: A Program for Missing Data (Gauss version) <http://GKing.Harvard.edu/>, Harvard University, Cambridge, MA.
- Horowitz, J.L., 1991. Reconsidering the multinomial probit model. *Transportation Research B* 25, 433–438.
- Inglehart, R., 1977. *Silent Revolution: Changing Values and Political Styles among Western Publics*. Princeton University Press, Princeton, NJ.
- Iverson, T., 1994. Political leadership and representation in West European democracies: a test of three models of voting. *American Journal of Political Science* 38, 45–74.
- Irwin, G.A., 1995. The Dutch parliamentary election of 1994. *Electoral Studies* 14, 72–76.
- King, G., Honaker, J., Joseph, A., Scheve, K., 2001. Analyzing incomplete political science data: an alternative algorithm for multiple imputation. *American Political Science Review* 95, 49–69.
- Lacy, D., Burden, B., 1999. The vote-stealing and turnout effects of Ross Perot in the 1992 U.S. presidential election. *American Journal of Political Science* 43, 233–255.
- Laver, M., Shepsle, K.A., 1993. Winset Version 4. FTP.TCD.IE. University of Dublin, Dublin.
- Laver, M., Shepsle, K.A., 1996. *Making and Breaking Governments*. Cambridge University Press, Cambridge.
- Lewis-Beck, M.S., 1988. *Economics and Elections: The Major Western Democracies*. University of Michigan Press, Ann Arbor, MI.
- Lewis-Beck, M.S., Paldam, M., 2000. Economic voting: an introduction. *Electoral Studies* 19, 113–121.
- Lupia, A., Ström, K., 1995. Coalition termination and the strategic timing of parliamentary elections. *American Political Science Review* 89, 648–669.
- Martin, L.W., Stevenson, R.T., 2001. Government formation in parliamentary democracies. *American Journal of Political Science* 45, 33–50.
- McFadden, D., Train, K., 2000. Mixed MNL models for discrete response. *Applied Econometrics* 15, 447–470.
- Netherlands Institute for Public Opinion Research, 1969. *Dutch Parliamentary Election Study, 1967*. Steinmetz Archive, Amsterdam / Inter-university Consortium for Political and Social Research, Ann Arbor, MI.
- Nieuwbeerta, P., De Graaf, N.D., Ultee, W., 2000. The effects of class voting in post-war Western industrialized countries. *European Sociological Review* 16, 327–348.
- Powell, G.B., Whitten, G.D., 1993. A cross-national analysis of economic voting: taking account of the political context. *American Journal of Political Science* 37, 391–414.
- Quinn, K.M., Martin, A.D., 2002. An integrated computational model of multiparty electoral competition. *Statistical Science* 17, 405–419.
- Schofield, N.J., Martin, A.D., Quinn, K.M., Whitford, A.B., 1998. Multiparty electoral competition in the Netherlands and Germany: a model based on multinomial probit. *Public Choice* 97, 257–293.
- Ström, K., Budge, I., Laver, M.J., 1994. Constraints on cabinet formation in parliamentary democracies. *American Journal of Political Science* 38, 303–335.
- Van Holsteyn, J.J.M., Irwin, G.A., 2000. The bells toll no more: the declining influence of religion on voting behaviour in the Netherlands. In: Broughton, D., Ten Napel, H.-M. (Eds.), *Religion and Mass Electoral Behaviour in Europe*. Routledge, London, pp. 75–96.