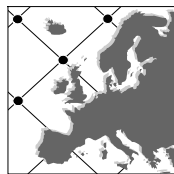


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**Causes and Effects of Coalition Preferences  
in a Mixed-Member Proportional System**

Paul W. Thurner  
Franz Urban Pappi

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Editorial Note:

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## Abstract

This paper adapts features of a model of Brams/Fishburn (1992) on coalition voting to the context of a mixed-member proportional system. We differentiate between a candidate vote which determines the winner of a constituency contest, a party vote which determines the seat shares of the parties in parliament, and a coalition preference for all parties the voter considers acceptable for building a majority government. In contrast to the purely axiomatic contribution of Brams/Fishburn we formulate a descriptive model of choice behavior for a real world political environment. We focus a) on congruence between party/candidate preference and coalition preference b) on congruence between coalition preference and party/candidate vote; c) on congruence between coalition preferences and ticket combinations; d) on sincerity/insincerity of party and candidate vote; e) on causes of ticket splitting. Hypotheses are complemented by information on the voters' expectations. Data base of this paper is a representative national sample conducted during the German parliamentary elections 1998.

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## Introduction \*

There is a renewed interest in the consequences of individuals' preference order in political choice situations with multiple alternatives. Following the tradition of mathematical psychology (Luce, Suppes 1965) this literature not confines itself to a purely axiomatic approach, but tries to link formal theory and empirical testing. In this aim Chamberlin/Cohen/Coombs (1984) use candidate rankings of five presidential elections of the American Psychological Association in order to test the implications of social choice theory. In a series of papers Regenwetter (1997) and coauthors (1998a,b) treat the problem of subset voting or subset choices. Regenwetter/Grofman (1998: 424) define subset voting as „...voting, polling, or other choice situation, in which the participants are presented with a finite set  $\ell$  of alternatives, candidates, products, or brands, and they are asked to choose a subset of any size containing those alternatives that they 'approve' of, i.e. regard as satisfactory“. Using real election data resulting from approval voting they reconstruct underlying preferences of the electorate and test their social choice properties for the Condorcet criterion as well as the concept of the Borda winner.

Whereas Chamberlin/Cohen/Coombs as well as Regenwetter/Grofman focus on the question of how different institutional settings translate citizens preferences into collective choices, Brady/Ansolabehere (1989) investigate the 'nature of utility functions in mass publics' using representative survey data. Accentuating the socialpsychological foundations of the voters' preferences, they examine the conditions leading to differently structured rational choice orderings. A main result is that information and knowledge structure the way voters rank order candidates.

Another research line considers how citizens' preferences under a specific institutional situation translate into individual choices. Thurner/Pappi (1998) examine strategic voting in a simple PR system with a certain threshold barrier. Relying on a representative survey including binary choices on 5 parties they identify the amount of strategic voting, derive hypotheses on factors inducing strategic voting in a given electoral system and they estimate the impact of strategic voting on the parties success/failure within a random utility model.

In the following we would like to make a contribution to the question on how electoral law conditions the choice behavior of voters when faced with multiple parties on which they have a best-to-worst order. Reworking a model of Brams/Fishburn (1992) on coalition voting we first give an informal presentation of the electoral system in view, i.e. a mixed-member proportional (MMP) system. Then we derive questions and hypotheses. In order to reduce the complexity of the informal model and in order to provide a systematic empirical analysis we introduce formal definitions and assumptions. The empirical results are based on a representative survey conducted during the 1998 German national election.

\*We would like to thank Dieter Nohlen and Michael Stoiber for their helpful comments.

## Parties, Candidates and Coalitions

Let us start with an informal presentation of the components that are necessary to describe the electoral system in view<sup>1</sup> as well as the assumed psychological influences on individual choices, induced by the interplay of preferences and institutional formulas. The presentation follows partly Brams/Fishburn (1993). Brams/Fishburn there develop a model of coalition voting, where each voter has a (fractional) party vote for a party list and a coalition vote. In their two-tier-two-vote system<sup>2</sup> they assume for the first tier a simple proportional representation system: majority and minimal majority coalitions are determined by the respective proportion of party votes. Then, assuming a plurality rule a governing coalition is determined by coalition votes. Brams/Fishburn define several features of party and coalition vote, i.e. congruence and sincerity, and derive general results for a suchlike electoral system.

Contrary to Brams/Fishburn, we do not assume the voter to have a coalition vote. However, our assumed voters may have coalition preferences with none the less behavioral implications. Under a MMP system<sup>3</sup>, voters cast two different kinds of votes:

1. A candidate vote for a constituency candidate, which determines the first-past-the-post winners of a multi-constituency contest
2. A party vote for regional party lists –which aggregated to the national level - determines the national seat shares of the parties in parliament.

Every winner of a constituency is awarded a seat. However, the upper national level is the decisive level: The final allocation of seats is on the basis of all of the votes aggregated to the national level. Adjustment seats are provided for those party lists having gained more constituency seats than seats accorded to them by the share of party votes. Only those party lists reaching a national threshold are awarded seats. Figure 1 presents the assumed relationships between a voter's preferences and her/his actual voting behavior:

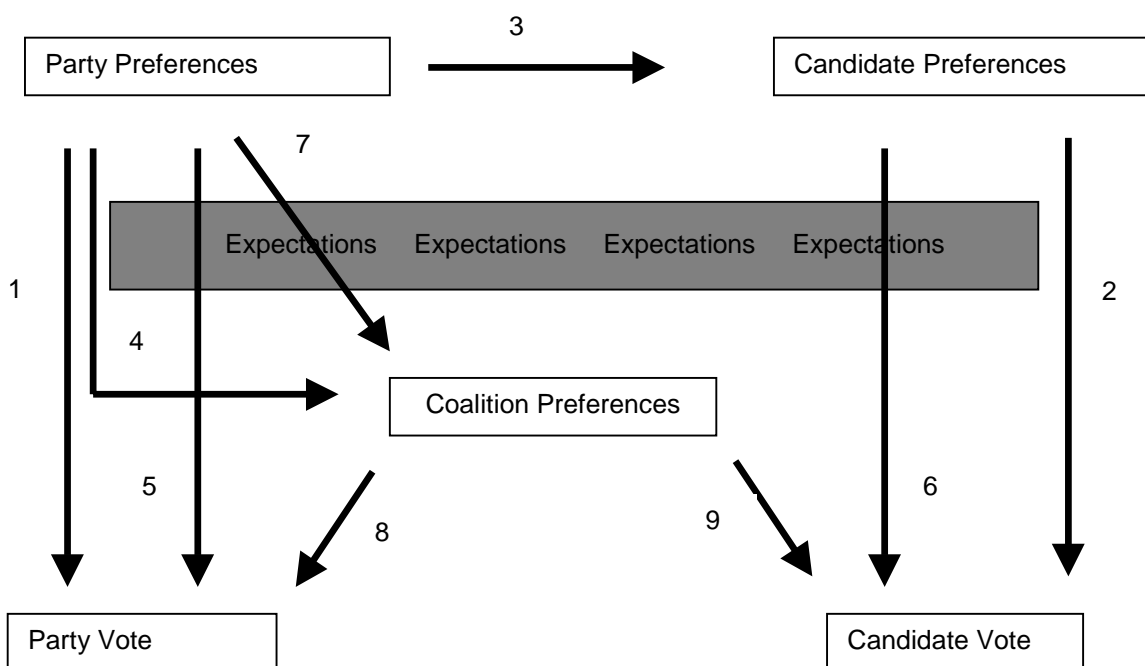
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<sup>1</sup> With minor modifications the framework of our model follows the electoral system of Germany and New Zealand. For a more detailed overview of the German electoral system cf. Nohlen 1996, Cox 1997, Lijphart 1998.

<sup>2</sup> For a comparison of real existing two-tier districting electoral systems, cf. Lijphart 1998: 30 ff.

<sup>3</sup> The denomination 'mixed-member proportional system' has been proposed by New Zealand political scientists (cf. Boston et al., 1996) after the institutional reform of the New Zealand electoral system in 1993 which follows the German design. The term MMP will be also used in the classification of the forthcoming International Encyclopedia of Elections, cf. Nohlen et al (n.d.).

**Figure 1: Assumed influences on party vote and candidate vote in a personalized PR system**



1. **Arrow 1 and 2:** Party preferences and candidate preferences may directly determine party vote and candidate vote without considerations of expectations on how well each party list and each candidate of a constituency are likely to do. Sincerity of these voters may be a consequence of a strong partisan bias and/or candidate bias respectively. Arrow 1 indicates at the same time, that these voters prefer one-party governments.
2. **Arrow 3:** Since electoral systems with a party list system and 'structured parties' (Sartori 1994) subordinate candidates to a strong party discipline, we argue that the preference ordering over party lists strongly determines the voter's candidate preference. In the context of divided government literature the notion of 'nonseparability' of preferences has been introduced in order to describe the interdependence of preferences in two institutional dimensions (Lacy/Niou 1998, Smith et al. 1998). Due to the party list system we expect nonseparable preferences to be dominant in MMP systems. Then, the question is why and when the voter's candidate preference deviates from his party preference.
3. **Arrow 4:** In multiparty systems, governments, in general, are constituted by coalitions. Therefore, some voters have coalition preferences. We call a coalition preference sincere if a voter takes no consideration of expectations when building up his coalition preferences. Following the spatial theory of voting we argue, that voters build up their preference for a multiparty government by minimizing a weighted Euclidean distance over combinations of parties in the policy space and the respective policy bundles.



4. **Arrow 5 and 6:** Voters taking into account information provided by media reports and national and regional polls may be influenced by expectations in their party and candidate vote. A one-party government is preferred (arrow 5) when a voter's expectations give rise to consider a one-party government as possible. As regards expectations over candidates in a constituency, we differentiate between two possibilities: A voter may project expectations on chances of national party lists to the chances of candidates belonging to these parties in a constituency in order to economize on information cost. Second, a voter may build up constituency-specific expectations using low-cost informations provided by local and regional media and polls. We expect candidates with marginal chances to win a constituency to be deserted by tactical voters. Non the less at it may be possible that candidates of a party with only marginal chances on the national level may have chances to win certain constituencies due to a concentration of voter segments attached to that party.
5. **Arrow 7:** Again, following the spatial theory of voting we argue, that voters build up their preference for a multiparty government by minimizing a weighted Euclidean distance over combinations of parties in the policy space. Voters may have strategic coalition preferences, when they believe that their most preferred coalition cannot be realized.
6. **Arrow 8 and 9:** Depending on expectations over party lists, coalition preferences will lead to a specific combination of party vote and candidate vote<sup>4</sup>. Since the probability of influencing the outcome of the election by the candidate vote is even smaller than the probability of influencing the election by a party vote<sup>5</sup>, we expect party vote and candidate vote to be identical. We expect splitters to partition their votes among the parties that constitute their coalition preference. We expect splitters to give their party votes to small parties and to give their candidate vote to large parties.

In order to understand the implications of coalition preferences with regard to party vote and candidate vote, it is necessary to compare coalition preferences with the complete party and candidate preference order of a voter on the one hand, and with their revealed/stated choices on the other hand. Given this informal representation of the voter's choice process in a complex institutional setting, the following questions and hypotheses will be selected for further investigation:

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<sup>4</sup> For an extensive discussion of the interplay of coalition preferences and expectations and their implications for a strategic party vote, see Thurner/Pappi 1998b.

<sup>5</sup> It is the conditional probability that an effective candidate vote is at the same time an effective vote for a party list to win the election.

## Questions and Hypotheses

**Question 1** on the Congruence of Party/Candidate Preference and Coalition Preference:

- a) Do coalition preferences systematically mirror party preferences? (Party Preference – Coalition Preference Congruence)
- b) Do coalition preferences systematically mirror candidate preferences? (Candidate Preference – Coalition Preference Congruence)

**Question 2** on the Congruence of Coalition Preference and Party/Candidate Vote:

- a) How many voters choose a party contained in their coalition preference? (Coalition Preference – Party Vote Congruence)
- b) How many voters choose a candidate the party of which is contained in their coalition preference? (Coalition Preference - Candidate Vote Congruence)

**Question 3** on the Party/Candidate Vote Sincerity:

- a) How many voters vote their first party preference? (Party Vote Sincerity)
- b) How many voters vote their first candidate preference? (Candidate Vote Sincerity)

**Question 4** on Straight Ticket Voting versus Ticket Splitting:

- a) How many voters split their tickets?
- b) Do split combinations correspond to coalition preferences? (Coalition Preference – Ticket Combination Congruence)

In an earlier paper we tested hypotheses for preferential and institutional conditions inducing strategic voting (cf Thurner/Pappi 1998). This time we will have our focus on factors conditioning ticket splitting.

**Hypothesis 1** on the Influence of Party Preference on Candidate Preference ((Non)Separability Hypothesis I):

- a) There is no interdependence between a voter's candidate preference and his/her party preference.

- b) Candidate preferences more often correspond to party preferences than party preferences do correspond to candidate preferences.

Hypotheses 1a and b make reference to the nonseparability assumption of Lacy/Niou (1998) and turn it into a proposition which has to be tested empirically. Null hypothesis 1a states that there is no interdependence between party preference/vote and candidate preference/vote. Hypotheses 1b postulates, that in case that there is a dependence than the direction is from party to candidate.

**Hypothesis 2** on the Influence of Party Preferences on Ticket Splitting (Tie-Induced Splitting):

Ties in first rank of a party preference increase the probability of ticket splitting.

Voters being indifferent between two parties tend to split their votes more often as compared to voters having a unique first party preference.

**Hypothesis 3** on the Influence of Coalition Party Preferences on Ticket Splitting (Coalition-Induced Splitting):

- a) Splitters partition their tickets to the elements of their most preferred coalition.
- b) And as a consequence: Strongly preferring a one-party government decreases the probability of ticket splitting.

Voters with coalition preferences may want to partition their tickets among the coalition parties for purely expressive reasons. Note that this hypothesis does neither assume the voter to know the institutional rules of the electoral system neither to take into account expectations on the voting behavior of the other voters. Voters only feel the need to partition. Consequently, we hypothesize that voters that want to have a single party as governing party do not tend to split their votes.

**Hypothesis 4** on the strategic implication of the two-tier system:

First-ranked parties get more party vote as compared to first-ranked candidates getting a candidate vote?<sup>6</sup>

Hypothesis 4 implies that due to the plurality rule in the constituency the voters desert first-ranked candidates of small parties in order to avoid wasting their vote, whereas due to the PR system on the national tier, voters stay even with small<sup>7</sup> parties.

**Hypothesis 5** on the Influence of Coalition Preferences and Expectations on Ticket Splitting (Strategic Ticket Splitting):

- a) Having a small party in first rank of a party preference order leads to a higher probability of ticket splitting as compared to having a large party in first rank; aa) this effect does not vary depending on which small party is in first rank.
- b) Uncertainty about small parties entry and/or uncertainty about large parties to win a plurality increase the probability of ticket splitting.

Hypothesis 6a assumes a voter who is cognizant of the institutional system: (S)He gives only candidates of large parties her/his candidate vote in a constituency. This effect should be invariable in the case of each of the small parties. Hypothesis 5b states a direct splitting effect if two expectations coincide or occur separately: The voter strongly prefers a two-member coalition and perceives a horse-race between the large parties and/or the entry of the smaller party as being precarious. Then the voter ceteris paribus splits his party vote and candidate vote.

In order to make our approach and hypotheses intersubjectively perceptible, we will provide formal definitions and assumptions.

## Definitions and Assumptions

In the following we adapt the Brams/Fishburn model (1992: 16ff) for the institutional context we chose. We define:

V: set of voters ( $n = 1, \dots, N$ ) with  $n_g, g = (1, \dots, G)$  denoting voter  $n$  in constituency  $g$ ;

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<sup>6</sup> The empirical test will indirectly show us, whether voters understand the institutional design with the party vote determining the seat share and being therefore more important. For an accentuation of the voter's ignorance in this regard, cf. Schmitt-Beck 1993.

<sup>7</sup> The denominations 'small party' and 'large party' is a short-cut for the voters' expectations on how well a party will do in the election, cf. Cox/Shugart 1996: 303.

L: set of party lists ( $j = 1, \dots, J$ );

W: set of candidate sets ( $W_1, \dots, W_g, \dots, W_G$ ), with  $k_{jg}$ ,  $k = 1, \dots, K$  denoting candidate  $k$  of

party  $j$  in constituency  $g$ ;

C: set of coalition subsets: ( $C_1, \dots, C_m, \dots, C_M$ ).

S: set of ticket combinations: ( $S_1, \dots, S_t, \dots, S_T$ )

There are  $J$  party lists competing for  $H$  assembly seats. Each voter has a party vote and a candidate vote.

*Party vote:* Each  $n \in V$  votes for a single element subset  $Y^L \subset L$ . Each party  $j$  of  $L$  receives one nonfractional vote from  $n$ ; the other parties receive no vote from  $n$ . Let  $v_j^L$  be the number of votes for party  $j$ . Then,  $\sum v_j^L = v^L$ , where  $\min(v_j^L) \geq t$  according to a national threshold. The proportion of seats won by party  $j$ ,  $h_j$ , is  $v_j^L / v$  and  $\sum h_j = 1$ . Then, a coalition  $A$  is called a majority coalition "if the

number of party votes it receives is  $v(A) = \sum_{j \in A} v_j \geq \frac{v}{2}$ " (Brams/Fishburn 1992: 17).

*Candidate vote:* Each  $n_g \in V$  votes for a single element subset  $Y^{W_g} \subset W$ . Each candidate  $k_{jg} \in W_g$  receives one nonfractional vote from  $n_g$ ; the other candidates receive no vote from  $n_g$ . Constituency seats are awarded by plurality rule. Let  $v_{k_{jg}}^{W_g}$  denote the number of votes for candidate  $k$  of the  $j$ -th party in constituency  $g$ , then candidate  $k_{jg}$  wins the constituency when  $\sum v_{k_{jg}}^{W_g} > \sum v_{l_{jg}}^{W_g}$  for all  $l \in W_g$ ,  $j \neq l$ .

Let the number of constituency seats won by party  $j$  be denoted  $h_j^W$ . If  $h_j - h_j^W > 0$ , then the first  $h_j - h_j^W$  names on the party list, not having already won constituency seats, are awarded seats (cf. Cox 1997: 288)<sup>8</sup>.

We distinguish between and preferences over actions and preferences over outcomes.

*Party preference:* A preference relation  $R$  on  $L$  is the set of binary relations  $R \subset L^2$ , where  $jPh$  means that  $j$  is preferred to  $h$ , and  $xly$  means that  $j$  is indifferent to  $h$ . The relation of weak preferences can also be stated as  $\langle x, y \rangle \in R$ . Let us assume that each voter  $n$  has a complete and transitive order<sup>9</sup> of parties  $R$ . A choice rule  $F(\cdot) := \{j \mid j \in L \wedge \forall h \in L: \langle j, h \rangle \in R\}$  assigns the best alternative(s) of  $L$  in regard to  $R$  to a nonempty set  $F(L) \subset L$ . This set can be thought of as containing the party chosen by a sincere voter.

*Candidate preference:* Analogously let us assume a preference relation  $R$  on  $W_g$ . A choice rule  $F(\cdot) := \{k \mid k \in W_g \wedge \forall l \in W_g: \langle k, l \rangle \in R\}$  assigns the best alternative(s) of  $W_g$  in regard to  $R$  to a nonempty set  $F(W_g) \subset W$ . This set can be thought of as containing the candidate chosen by a sincere voter.

Outcomes of an election are government coalitions  $C_m$ . Excluding the empty  $C_0$  set and the grand coalition  $C_J$ , and including one-party governments, there are  $2^{J-2}$  possible coalitions. Each voter  $n$  assigns an expected utility<sup>10</sup>  $u_{nm}$  to each outcome  $C_m \in C$ . The utility depends mainly on the voter's preferences over party lists as a guarantee for implementing policies offered during the campaign, and expectations about the seat shares the party lists will receive. Simplifying our informal model and following Cox/Shugart (1996), these expectations can be considered as voter  $n$ 's subjective probability that a randomly selected voter will vote for list  $j \in L$ . Let a nonempty set  $F(C_m) \subset C$  contain the voter's 'most preferred coalition'. The voter's decision problem, then, is to choose a ticket combination  $S$  such that  $EU(C)$  is maximized.

For the analysis we consider the following descriptive features of the voters' choice behavior:

*Congruence and strong congruence between party preference and coalition preference:* Here we focus on the agreement between a voter's ranking of parties and her/his most preferred coalition. In order to analyze coalition preference congruence, we assume that each voter's preference order of parties can be described by an  $J \times 1$  column vector  $\mathbf{d}_n = [d_1, \dots, d_j, \dots, d_J]$ , where  $d_{nj}$  denotes the rank assigned to party  $j$  by voter  $n$ . Ranks for parties in this vector range from 1 (most preferred) to  $J$  (least preferred). For any two parties  $j$  and  $h$  in this vector:

$$d_{nj} < d_{nh} \quad \text{iff} \quad j P h, \quad \text{and}$$

$$d_{nj} = d_{nh} \quad \text{iff} \quad j I h \quad \forall j, h \in L, j \neq h.$$

Any parties perceived as tied will get the same rank in  $\mathbf{d}_n$  depending on the respective position where the tie occurs. We call a most preferred coalition  $F(C_m)$  party preference congruent if  $F(C_m) \neq \emptyset$ , and  $F(C_m)$  contains  $d(j) \in F(C_m)$  whenever it contains  $d(h) \in F(C_m)$  and  $j < h$  (see Brams/Fisburn 1992: 18)<sup>11</sup>, i.e. a most preferred coalition contains no lower-ranked parties without also containing those ranked higher. Note that contrary to Brams/Fisburn we assume weak preference orders. Therefore the definition allows voters to prefer coalition combinations that contain parties that may be tied to other parties not contained in their most preferred coalition set. This is excluded by the definition of a 'strong

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<sup>8</sup> We do not consider in the following the case of surplus seats, i.e. if  $h_j - h_j^W < 0$ .

<sup>9</sup> For the properties of preference relations cf. French 1988.

<sup>10</sup> For more details, see Cox/Shugart 1996, Cox 1997.

<sup>11</sup> An illustrative example may clarify our concept of coalition congruence' The solution set for congruent coalition preferences for a voter with the preference order  $x \succ y \succ z$  would consist of the following coalitions:  $\{(x), (xy), (xyz)\}$ , whereas a coalition  $(xz)$  offends against the definition. As Brams/Fisburn compare coalition vote and party preference, they call this feature 'coalition sincerity'.

coalition congruence' where the voter prefers strongly the parties contained in his most preferred coalition set over all other parties, i.e. a most-preferred coalition consisting of 2 parties containing the first two top-ranked parties:  $F(C_m) = \{d_1, d_2\} > \{d_3, d_4, \dots, d_j\}$ <sup>12</sup>.

*Congruence and strong congruence between party vote and coalition preference:* A voter's party vote  $Y^L$  and his most preferred coalition vote  $F(C_m)$  are

- 1) congruent if  $Y^L \neq \emptyset$  and  $Y^L \subset F(C_m)$  whenever  $F(C_m) \neq \emptyset$ .
- 2) strongly congruent if  $Y^L \neq \emptyset$ , and  $Y^L = F(C_m)$  whenever  $F(C_m) \neq \emptyset$ .

Thus, congruence and strong congruence require that a voter cast one party vote, and that her/his party vote is contained in the set of her/his 'most preferred coalition'. Strong congruence requires, in addition, that all parties accepted within her/his coalition set be included in  $Y^L$ . As a consequence of the nonfractional vote this condition requires that a voter prefer a single-element-coalition and that her/his party vote is contained in this coalition subset.

*Congruence and strong congruence between candidate vote and coalition preference:* Analogously a candidate's vote  $Y^W$  and a most preferred coalition vote  $F(C_m)$  are

- 1) congruent if  $Y^{W_g} \neq \emptyset$  and  $Y^{W_g} \subset F(C_m)$  whenever  $F(C_m) \neq \emptyset$ .
- 2) strongly congruent if  $Y^{W_g} \neq \emptyset$ , and  $Y^{W_g} = F(C_m)$  whenever  $F(C_m) \neq \emptyset$ .

Analogously in this context, congruence and strong congruence require that voters cast one candidate vote, and that her/his candidate vote is contained in the set of her/his 'most preferred coalition'. Strong congruence requires, in addition, that a voter prefer a single-element-coalition and that her/his candidate vote is contained in this coalition subset.

Both party vote congruence and candidate congruence have less strict requirements than the Brams/Fishburn conditions, since the chosen institutional design gives a voter only one nonfractional party vote and one nonfractional candidate vote. At the same time and due to this feature, the conditions required for the definition on strong congruence are, on the contrary, much more demanding.

*Sincerity:* Let us further assume that some voters have probability beliefs about other voters' strategies and about parties' coalition-building strategies. It is assumed that probability beliefs can be described parametrically, where the voting context for  $n$ 's decision is given exogenously and remains fixed and the voters having preferences over lotteries.

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<sup>12</sup> Note that within his topset the voter may be indifferent between the parties of his/her most preferred coalition, f.ex.  $\{d_1=d_2\} > \{d_3, \dots, d_j\}$

*Party Vote Sincerity:* A party vote is called strategic if  $F(L) \cap Y^L = \emptyset$ .

*Candidate vote sincerity:* A candidate vote is called strategic if  $F(W) \cap Y^{W_g} = \emptyset$ .

*Ticket splitting:* A ticket splitting occurs when party vote and candidate are not identical, i.e. if  $Y^L \cap Y^W = \emptyset$ .

*Congruence between ticket splitting combination and coalition preference:* A ticket combination  $S$  is congruent, if  $S_{tn} \neq \emptyset$  and  $S_{tn} = F(C_m)$  whenever  $F(C_m) \neq \emptyset$ .

## Empirical Analysis

In the following we confront our questions and hypotheses with data. Data base is a representative national preelection survey conducted during the 1998 German national election to the assembly<sup>13</sup>. It includes a) questions on binary party preferences; b) a closed form question on the most preferred coalition of a voter; c) stated party vote and candidate vote; d) expectations on the perceived likelihood for each of the small parties to reach the electoral threshold and e) expectations which of the large parties would win the horse-race.

On the base of binary party preferences we extracted the preference order for each voter. However, due to exorbitant survey costs when asking for binary candidate comparisons in each constituency, we cannot provide results for question 1b nor for hypothesis 1b. As regards question 3b (candidate vote sincerity), we are restricted to compare the stated candidate vote with the voter's party ranking. This caveat applies also to hypothesis 4. In the following the candidate vote is always given in terms of the candidate's party affiliation. Concerning coalition preferences, we opted for a closed format question in order to avoid ideosyncratic attitudes. We consider this legitimate since already during the campaign only the coalition combination we actually asked for have been discussed. Party leaders even committed themselves to alternative coalition blocks: a continuation of a CDU/CSU-FDP government versus a new government by a coalition of the SPD and the B90/GREENS.

As regards the hypotheses on expectations we recognize the possibility of biases therein (cf. Uhlaner/Grofman 1986), however we do not intend in this paper to endogeneize expectations but to consider them as given.

For the analysis we consider only respondents with a transitive, complete preference order on the alternative set  $L = \{ B90/GREENS, CDU/CSU, FDP, SPD, PDS \}$ <sup>14</sup>. Distribution of transitive and

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<sup>13</sup> The study has been conceptualized by the authors and financed by the University of Mannheim. Question formats are delivered in the appendix.

<sup>14</sup> CDU/CSU (C): Party cartel of Christian Democratic Party and Christian Social Party; SPD (S): Social Democratic Party; FDP (F): Free Democratic Party; GREENS/B90 (G): Party cartel of the Ecologic Green Party and East German movements; PDS (P): Party of Democratic Socialism.



complete preference order are given in Table 1. About 20 % of the sample have a complete, intransitive order.

**Table 1: Distribution of Preference Orders**

	Percent
Transitive, complete	77.0
Intransitive, complete	20.4
Incomplete	2.6
Total N	1020

Results for question 1a on the congruence between coalition preference and party preference are shown in table 2. According to our definition, a coalition preference is 'party preference congruent' if the preferred coalition subset contains no lower-ranked party without also containing the party ranked higher. Strong congruence requires that the parties contained in the coalition subset should be strongly preferred to all other parties. Strong congruence for a C-F coalition includes the following combinations:  $\{(C) \vee (F) \vee (C \succ F) \vee (F \succ C) \vee (C \sim F)\} \succ (\dots\dots\dots)$ , whereas congruence allows voters also to have parties tied in the preference order that however must not appear in the most preferred coalition set as in the following example:  $(C \succ F \sim G \sim S \succ P)$  where a most preferred coalition (C-S) would constitute a party preference congruent coalition.

**Table 2: (Strong) Congruence between Stated Coalition Preference and Party Preference**

	Congruence	Strong Congr.	N
C-F	76.9	63.4	216
C-S	61.5	49.4	156
S-G	71.5	62.4	263

Given these definitions, the relative low degree of strong congruence and even congruence is a surprising result: Only 2/3 to 3/4 of the stated coalitions are congruent with the voters party preference and only 1/2 to 2/3 are strongly congruent. Coalition combinations to which party leaders committed themselves during the campaign show a higher (strong) congruence. It is not clear whether this precommitment has induced an elite-driven structuring of coalition preferences or whether party elites anticipated coalition preferences of the voters. Not even 50% of the voters strongly preferring the two leading parties CDU/CSU or SPD also indicate a grand coalition C-S as most preferred coalition. This may point to the inherent preference (by voters and/or party leaders) for minimal winning coalitions.

How often is the party voted for contained in a most preferred coalition (Question 2a)? Due to our closed question format it is not possible here to assess the proportion of voters having a strong congruence between party vote and their most preferred coalition, i.e. voters preferring a single party

to build the government. Considering simple congruence and adding up over parties (cf. table 3) leads to the following congruences: 86.6 % (73.6 % + 13.0 % = 86.6 %) of the voters having a C-F-coalition preference choose a party congruent to this preference. Similarly, 84.8 % of the voters having a S-G-coalition preference choose a congruent party. However, only 71.8 % of the voters having a C-S-coalition preference vote for a congruent party, whereas 25 % produce a missing value.

**Table 3: Congruence between Stated Coalition Preference and Stated Party Vote**

Stated Coalition Pref.	Stated Party Vote in %							Total N	Congr
	CDU/CSU	SPD	FDP	B'90/ Greens	PDS	Other	Missing		
C-F	73.6	1.4	13.0	.9	.5	2.8	7.9	216	86.6
C-S	25.0	46.8	2.6	1.3	1.3	3.2	19.9	156	71.8
S-G	1.1	63.5	1.1	21.3	3.8	1.5	7.6	263	84.8
Other	7.9	36.5	1.6	3.2	15.9	11.1	23.8	63	-
Missing	10.3	8.0	2.3	2.3	3.4	1.1	72.4	87	-
HH-Index*	0.58	0.45	0.56	0.76	0.31	0.24	-	-	-
Total N	215	273	38	64	26	23	146	-	-

\* Hirschman-Herfindahl index on the base of column percentages, not included in the table

In order to provide also an impression of the dispersion of party voters over coalition preferences we calculated the Hirschman/Herfindahl-Index on the base of column percentages (not included in table 3). This reveals, that the voters of B90/Greens are most homogenous in descending from a S-G coalition preference. In this aspect, voters of the SPD are the least homogenous as compared to CDU/CSU, FDP and B90/Greens. This is due to the partition of voters in those preferring a grand coalition with the CDU/CSU and a larger segment preferring a coalition with the ecological party. The extreme dispersion of the PDS voters is due to the fact that there has been an explicit exclusion of this party in coalition scenarios by all of the other parties. The reaction of the party leaders of the PDS consisted in an offer of tolerating a S-G coalition. Despite the official refusal of the other parties to build a coalition with the PDS, a majority of their voters want their party to be included in a left party coalition including the PDS.

Table 4 gives results on question 2b: How often is the party of a candidate voted for contained in a most preferred coalition? Here, congruence reaches an even higher level: 90.8 % of voters indicating C-F as their most preferred coalition vote for a candidate of one of these parties. Despite this high overall congruence, internally the distribution of congruent candidate vote highly disfavours small parties: as compared to party vote congruence the FDP loses 9.8 percentage points of candidate votes when voters indicate a preference for a C-F coalition, and the candidate votes for B90/GREENS are reduced by 12.6 percentage points when voters indicate a preference for a S-G coalition. This is a hint that at least tendentially small parties are more often deserted as candidate vote

is concerned as compared to party vote (hypothesis 5a) since candidates of small parties do have no real chance to win a constituency.

**Table 4: Congruence between Stated Coalition Preference and Stated Candidate Vote**

Stated Coalition Pref.	Stated Candidate Vote in %							Total N	Congr
	CDU/CSU	SPD	FDP	B90/ Greens	PDS	Other	Missing		
C-F	86.6	.9	4.2	-	.5	.5	7.4	216	90.8
C-S	26.9	48.1	-	1.3	1.3	1.9	20.5	156	75.0
S-G	1.1	79.1	.4	8.7	2.7	.4	7.6	263	87.8
Other	1.6	41.3	1.6	6.3	15.9	9.5	23.8	63	-
Missing	9.2	13.8	1.1	-	1.1	3.4	71.3	87	-
HH-Index*	0.63	0.48	0.58	0.65	0.35	0.28	-	-	-
Total N	241	323	12	29	21	14	145	785	-

\* Hirschman-Herfindahl index on the base of column percentages, not included in the table

Patterns in the Hirschmann-Herfindahl index are similar to table 2. However, concentration of candidate votes lowers in the case of small parties, whereas it increases in the case of the large parties.

Next, we compare sincere voting for party vote and candidate vote respectively. Considering first sincere voting in the party vote (question 3a): When we take not into account ties in first rank and missings in first rank and party vote respectively we get a mean proportion of 18.5 % strategic party voters. An upper bound proportion is given by around 29.4 % strategic party voters, when counting all missings in the party vote variable as a potential strategic vote.

**Table 5: Proportion of Party/Candidate Sincere Voting**

First Rank	Party Vote		Candidate Vote*	
	With Miss. Miss	Without	With Miss. Miss	Without
CDU/CSU	72.9	83.6	82.7	94.0
SPD	69.2	81.2	81.0	95.4
FDP	58.3	63.6	29.2	33.3
B90/GREENS	67.4	79.5	45.7	53.8
PDS	83.3	83.3	70.8	70.8
Mean Proportion	70.6	81.5	77.3	89.2

\* As compared to the party preference order

N = 785

Considering next strategic voting in the candidate vote: Here we do not have data on the complete candidate preference ordering on the constituency level. Therefore we compared the candidate vote with the first party preference. When not taking into account ties in first rank and missings in first rank and candidate vote respectively we get a mean proportion of 10.8 % strategic candidate voters. An upper bound proportion is given by around 22.7 % strategic candidate voters, when counting all missings in the candidate vote variable as a potential strategic vote. The comparison between party vote and candidate vote shows a higher proportion of sincerity in the case of candidate vote. Of special interest are the large differences between parties: As to be expected from a rational electorate, large parties do much more better in getting a party vote when being ranked as first party preference. However, also the regional party PDS is highly successful in keeping party votes when being ranked in first place. On the other hand, voters of the FDP are to a extremely high degree strategic voters<sup>15</sup>. It can be concluded that large parties are able to hold an extremely high proportion of sincere candidate votes whereas small parties' candidates votes are to a high degree strategic. We interpret this evidence as a hint that at least tendentially, the voter realizes the electoral rule. Note, however, that the PDS constitutes a clear exception to this pattern. This party is able to get the candidate vote in a large proportion of voters having it in first place of their party preference.

Table 6 shows empirical proportions of ticket splitting (question 4a): About 19 % split their tickets. This is in accordance with the development of ticket splitting during the last years as Jesse (1988) has shown using the official elections statistics of the Federal Republic.

**Table 6: Proportion of Ticket Splitting**

	%
Nonsplit	62.9
Split	19.6
Missing	17.5
Total N	785

In order to 'test' hypothesis 1b we relate party vote to candidate vote and vice versa within straight tickets:

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<sup>15</sup> This confirms the results in Thurner/Pappi 1998.

**Table 7: Relations between Candidate Vote and Party Vote within Straight Tickets**

Party	PV/CV* %	CV/PV %
CDU/CSU	78.8	88.4
SPD	76.2	90.1
FDP	58.3	18.4
B90/Greens	65.5	29.7
PDS	71.4	57.7

\* PV: Party Vote, CV: Candidate Vote, N = 477

78% of the respondents indicating a candidate vote for the CDU/CSU give their party vote also to this party cartel. However, 88.4 % of the respondents casting a party vote for the CDU/CSU give their candidate vote to this party cartel. This applies also to the other large party SPD. In the case of the smaller parties, this relation is turned round with the FDP getting an extremely small proportion of candidate votes from respondents casting a party vote for the party. Only in the case of large parties candidate votes more often correspond to party vote. Due to desertion in candidate vote, in the case of small parties party vote more often correspond to candidate vote.

In the following we focus more deeply on the causes of ticket splitting. According to hypothesis 3a split combinations should correspond to coalition preferences. Due to our closed question format we can only calculate congruence for surveyed coalition combinations:

**Table 8: Congruence between splitted tickets and coalition preference**

Ticket Combination	Congruence %	Total N
C-F or F-C	89.3	28
C-S or S-C	72.0	24
S-G or G-S	93.2	42

About 90 % of the respondents having ticket combinations C-F or S-G have a coalition preference with the respective parties, whereas congruence in the case of a ticket combination C-S is significantly lower. Again, this seems to be a hint that voters tend to vote for minimum winning coalitions.

#### *A Causal Model of Ticket Splitting*

In the following the remaining hypotheses will be tested in a causal model in order to be able to compare the relative impact of the identified causes on ticket splitting.

**Table 9: Factors inducing ticket splitting (Binomial Probit)**

Variable	$\beta$	t-Ratio	P-Value
One-way tie in first rank	0.809	2.233	0.0255
F in first rank	0.770	2.613	0.0089
G in first rank	0.542	2.563	0.0103
P in first rank	0.501	1.830	0.0672
Preference of a single party	-0.730	-3.193	0.0014
Entry Uncertainty of F	-0.287	-1.881	0.0600
Entry Uncertainty of G	-0.096	-0.703	0.4822
Plurality Uncertainty of C	-0.316	-1.025	0.3055
Plurality Uncertainty of S	-0.715	-1.366	0.1718
Constant	-0.646	-7.096	0.0000

$2*(LL(N)-LL(0)) = 43.412$ , DoF = 9, P-Value = 0.0000, Pseudo  $R^2 = 6.4\%$   
 Percentage of Correct Predictions: 76.5 %

N=622 including N=147 splitters

The strongest predictor for splitters is a tie in first rank of the party preference. However, only oneway ties in first rank lead to a significant parameter. A model that specifies multiway ties instead of oneway ties in first rank produces an insignificant parameter. This is caused by generally indifferent voters that have no interest in parties and politics at all. 'Preference of a single party' has been specified for voters that strongly prefer one party and, at the same time, have a oneway or multiway tie in second rank of the party preference. The idea behind this hypothesis is that this pattern indicates a strong partisan bias for the respective party which decreases the probability of ticket splitting. This effect is significant and the sign is in the predicted direction. Entry uncertainty and plurality uncertainty with regard to party lists have been specified as uncertainty to assure coalitions S-G and C-F. These uncertainty considerations play no role at all for the decision to split party vote and candidate vote, neither in the case of large parties nor in the case of small parties. Therefore, hypothesis 5b has to be rejected. This is contrary to the explanation of strategic party voting, where expectations proved to be a relevant factor (cf. Thurner/Pappi 1998). However, having a small party (F, G, P) in first rank of the party preference significantly increases the probability of ticket splitting (hypothesis 5a) pointing to the fact that small parties candidates are deserted. Wald tests cannot reject the null hypothesis that these effects do not differ depending on which small party is considered<sup>16</sup>.

## Conclusion

In our paper we adapted a model of Brams/Fishburn on coalition voting to a mixed-member proportional representation system. Due to data restrictions we could not discuss all relevant

questions and hypotheses. However, our results should provide deeper insights into individuals' calculations when confronted with a complex electoral system. Since this is the first time that congruence between party preferences and coalition preferences, between coalition preference and party vote and candidate vote, and between coalition preference and ticket combination has been analyzed, we are not able to assess whether our findings are normal or extraordinary. Only comparisons over time and electoral systems will make possible an evaluation. As strategic voting and splitting is concerned, our results are in line with previous studies (Jesse 1988, Thurner/Pappi 1998). Considering the explanation of ticket splitting, it can be stated that indifferent voters, at least those voters having a one-way tie in first rank, do significantly more often split their vote. Splitting in this electoral system seem also to be a matter of deserting first ranked small parties, since these parties have in general no chance in winning a constituency. Uncertainties of coalition building, however, seem not to be relevant for the decision of ticket splitting. Yet, regarding the high congruence between coalition preferences and ticket split combinations, coalition preferences seem to predetermine splitting combinations.

Results of this research design should provide valide material for an empirically grounded institution-building. With our micro-oriented approach we are able to make generalizable propositions on the effects of naturally occurring electoral systems. An interesting question for future analyses is why rational voters give their candidate vote to the candidate of a small party and whether party preference order determines candidate preference order. Since it is not possible to survey binary comparison on candidates of a representative sample of constituencies, this question should be answered tentatively by auxiliary instruments: do the voters know the institutional rules? Do the voters know their constituency candidates and evaluate them? And if yes: How do they assess the likelihood of a candidate winning the constituency?

## Appendix

### *Binary Party Comparisons*

"In the following I'll give you the names of two parties. Imagine you would have to choose between them: Which of the parties would you prefer?"

CDU/CSU or SPD ?..... There was no direct elicitation of indifferences in order to avoid question format induced ties.

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<sup>16</sup> F in first rank versus G in first rank:  $\chi^2 = 0.228$ ,  $df = 1$ ,  $p=0.520$ ; F in first rank versus P in first rank:  $\chi^2 = 0.270$ ,  $df = 1$ ,  $p=0.684$ ; G in first rank versus P in first rank:  $\chi^2 = 0.041$ ,  $df = 1$ ,  $p=0.899$ .

### *Party and Candidate Vote*

"In the general election to the Bundestag you have two votes. The first vote is for the candidates of a party in the respective constituencies. The second vote is for the list of a party. Would you please tell me, for which party you will vote for with your first vote. For which party will you vote for with your second vote?" Options for party vote as well as candidate vote have been given in terms of party labels.

### *Most Preferred Coalition*

"After the election to the German Bundestag a new government has to be formed. If you had the choice between a coalition consisting of CDU/CSU and FDP, as it already exists, a coalition of the major parties CDU/CSU and SPD, or a new coalition of SPD and the Greens, which one would you favour/decide for?"

### *Expectation on leading major party*

"Which will, in your opinion, be the leading party after the election to the German Bundestag on September 27th, 1998 – CDU/CSU or SPD?" Respondents indicating that both large parties will get around the same vote share have been recoded as being uncertain on which party will get a plurality.

### *Expectation on small parties reaching the entry threshold*

"In the general election for the Bundestag, the result of the smaller parties as well is of importance for coalition building. How probable do you consider the FDP to reach the 5% threshold? What about the Greens/B0? What about the PDS?"

- Absolutely certain
- Relatively certain
- Rather improbable
- Totally improbable

Categories 'relatively certain' and 'rather improbable' have been interpreted as indicating a percentage margin around .5 and the combined category was dummy-recoded for each of the respective parties and used for the threshold insurance hypotheses.



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