Taking Ballots Seriously:
Heterogeneous Ballot Compositions and Vote Choice

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In partially-contested multiparty elections, voters are confronted with different party choices, depending on their constituency. We present a computationally straightforward modeling approach that systematically integrates heterogeneous ballot compositions, which classical models neglect, into the voter utility functions. We illustrate the benefits of the approach in studying British spatial voting behavior, where previous studies tend to simplify the actual choice situation by modeling a single ballot composition, thereby ignoring a substantial part of the electorate. Using 2015 British Election Study data, we simultaneously consider up to seven parties, spread across eight unique ballots, and provide a fully-specified vote model. The results show that both spatial and tactical considerations depend on which party voters evaluate. Whereas spatial proximity substantially impacts voting for the large parties, we uncover the reversed pattern for tactical considerations. These party-specific effects are not found when neglecting ballot composition heterogeneity.

Keywords: Partially-contested elections; ballot compositions; conditional logit; Great Britain; vote choice; spatial voting; tactical voting.
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Introduction

Motivated by different analytical foci and theoretical reasoning, electoral choice in Britain, the archetypical majoritarian system, has been extensively studied in all subfields of voting behavior. Existing studies on spatial voting tend to simplify the actual choice situation British voters face (e.g., Adams et al., 2005; Alvarez et al., 2000; Cho and Endersby, 2003; Endersby and Galatas, 1998; Quinn et al., 1999; Sanders et al., 2011; Whiteley et al., 2013). These studies model only a subset of the actual parties competing in Britain by focusing on the electoral choice between the three traditionally largest parties, namely the Conservatives, Labour, and the Liberal Democrats. However, the exclusion of smaller national and regional parties limits our insights into British spatial voting behavior and party competition. Such a simplification of the choice situation ignores a substantial part of the electorate and downplays the role of minor parties. It pretends that voters do not consider minor parties and that those parties do not affect the electoral success of major parties. This is particularly striking as other parties than the three traditionally largest parties, such as the Scottish National Party or the UK Independence Party, have gained importance in the British electoral landscape.

When electoral researchers studying vote choice in Britain wish to consider more than the three traditionally largest parties, they face a complex choice situation. As other polities, such as Canada or Spain, Britain can be characterized as having partially-contested elections. Britain knows various regional parties that seek solely to represent the voters of these countries, respectively England, Scotland, and Wales.[1] The Scottish National Party competes as an additional

[1]In line with previous studies on spatial voting, we focus on Britain and not the United Kingdom, thereby excluding Northern Ireland. Northern Ireland has a party system that bears very little resemblance to what is on offer in the rest of Britain, owing to the prominent cleavage between unionism and (Irish) nationalism.

option in Scotland and does so from a dominant position in the devolved Scottish Parliament. Only in Wales do candidates of Plaid Cymru compete, which is a nonnegligible force in the devolved Welsh Assembly. In addition, some of the national parties that appeal to all British voters are not listed on the ballot in every constituency. For example, the Greens do not always run in all constituencies in England, Scotland, and Wales, and the UK Independence Party (UKIP) does not compete in every constituency in Scotland. Consequently, British voters cast their votes based on different sets of parties that vary not only across but also within the three countries – a fact that has not been given appropriate consideration so far.

In this paper, we take the heterogeneous sets of parties competing in different countries and constituencies seriously to represent the unique choices British voters have as realistic as possible. We refer to these choice sets as ballot compositions. Relying on the random utility maximization approach, we outline a methodological approach for incorporating heterogeneous ballot compositions into a fully-specified spatial vote choice model. We see three contributions the modeling approach makes to the study of voting behavior in partially-contested multiparty elections:

1. The approach allows researchers to account for differently composed ballots across regions, countries, or individual constituencies. It can model any number of parties and ballots, as long as there are sufficient voters for each party within each ballot composition in the data set.
2. We incorporate three different types of considerations into the vote choice rule. In addition to spatial proximity and nonpolicy factors (e.g., socioeconomic voter attributes), we also include voters' potential tactical incentives provided by the British electoral context.
3. We apply a flexible parametrization for the impact of spatial and tactical considerations on vote choice that allows specifying effects that are specific to every single party contained in the various heterogeneous ballots.

With these three model features, we can study how spatial proximity, tactical considerations, and nonpolicy factors influence voting for each of the parties actually running for office in the constituency voters reside in and how voters comparatively evaluate the parties on these factors.

Our approach differs from those modeling the set of parties individual voters consider as viable options (e.g., Moral and Zhirnov, 2018; Oscarsson and Rosema, 2019). Even though such voter-specific consideration sets are relevant for the voter calculus, we aim to represent the actual, external given, choice situation voters face in their constituencies and regions. Therefore, we take one step back and provide an approach for modeling differently composed ballots and studying the differential voting behavior for the various parties therein. In contrast to the varying choice set logit model (VCL) (Yamamoto, 2014), a model frequently used to deal with complex choice data structures, which estimates heterogeneous effects across ballot compositions, we specify separate effects for each of the parties contained in the different ballots. This effect heterogeneity permits researchers to study how the components in the utility functions affect voting for each of the parties on the various ballots. As compared to the VCL model, where simulation procedures or distributional assumptions are required, our modeling strategy comes with convenient properties and assumptions, such as the closed-form solution for the choice probabilities, and is computationally straightforward and easy to apply.

We illustrate our modeling approach with the 2015 UK General Election, which had the highest number of effective electoral parties since 1918 (Green and Prosser, 2016). We study the full range of varying ballot compositions present at the constituency level, enabling us to specify voter utility functions for up to seven parties, spread across eight unique ballot compositions. Modeling individual electoral choices in such a context requires a sufficient number of voters across countries and constituencies. The British Election Study Internet Panel (BESIP) meets these data requirements (Fieldhouse et al., 2015).

Our findings suggest British voters rely on spatial, tactical, and nonpolicy considerations when deciding which party to vote for under the First-Past-The-Post (FPTP) electoral system. We reveal substantial differences across parties on both the proximity and tactical decision criteria. Our results indicate that tactical considerations affect voting for Conservatives and Labour less than voting for smaller parties, such as the Greens. By contrast, we find the opposite for spatial considerations: ideological proximity impacts voting for smaller parties more than for larger parties. Such party-specific effects are not found when neglecting ballot composition heterogeneity and the various parties therein. Our modeling approach also uncovers interesting insights into voting for the smaller parties based on cleavage-oriented characteristics. For example, working-class members not only tend to support Labour but also UKIP and are less likely to vote for the Greens.

In the following, we first provide an overview of the heterogeneous ballots voters were confronted with in the 2015 UK General Election. Then, we outline the three features of our modeling strategy. Next, we investigate the differences between our approach and the VCL model. Then, we present the empirical results and draw various conclusions based on our findings.

Heterogeneity in Ballot Compositions

British voters face different sets of parties when choosing which party to vote for depending on their constituency of residence. Even though the particular set of parties that are actually on offer is of importance in steering the voters' calculus and, therefore, in modeling multiparty elections, studies accounting for the ballot composition are scarce. We are aware of only three studies on spatial voting in Britain that move beyond the three-party choice approach. Schofield et al. (2010)

model the three British countries with different sets of parties separately. This study does model the regional parties but still ignores the varying ballot compositions within the countries. More promising are Labzina and Schofield (2015) who allow for some variation in ballot composition between constituencies within countries. They consider a total of three different ballot compositions by taking additionally to the three major national parties the regional parties in Scotland and Wales into account. But they still exclude UKIP and the Greens from their analysis.[2]

We study the 2015 UK General Election, which was the most volatile election since 1931 and had the highest number of effective parties since 1918 (Green and Prosser, 2016). Even though the Conservatives and Labour were still by far the largest and politically most important parties, and the only ones with realistic hopes of leading the government, the remaining parties' electoral chances were substantial in 2015. Almost 33 percent of the votes were cast for other than these two major parties, and more than 25 percent for other than the two major parties and the Liberal Democrats (see Table A1 in Supporting Materials A). Considering only the three traditional major parties disregards a quarter of the voters and 20 percent of the constituencies – a substantial part of the electorate.

In addition, the composition of the three largest parties in British politics altered in 2015. The electoral support for the Liberal Democrats, which consistently had been the third party, collapsed from 23 to 7.9 percent. Instead, UKIP received the third-largest vote share by gaining 12.6 percent of the popular vote (see Table A2 in Supporting Materials A). The regional parties also significantly increased their electoral bases. The Scottish National Party (SNP) defeated Labour and became the largest party in Scotland with 50 percent, receiving 30 percent more votes

[2]Notable exceptions outside the British case are Gallego et al. (2014) and McAlister et al. (2013) who analyze Canadian elections and include regional parties. Labzina et al. (2017) consider small and nationalist parties in Spanish general elections.

than in 2010. Given these electoral results, we consider up to seven parties to represent the electoral choices as realistic as possible. These are the five main national parties (Labour, Conservatives, Liberal Democrats, UKIP, Greens) and two regional parties, the SNP in Scotland and Plaid Cymru in Wales. When studying such a high number of parties, we face the challenge that the ballots vary across and within the three countries. Some national parties that seek to represent all British voters are not on offer in every constituency. A party might decide not to put a candidate forward in a particular constituency as it lacks resources or estimates the chances of winning very small.

To identify the different ballot compositions, we use 2015 BES Constituency Results with Census and Candidate Data (2015) reporting the election results from the Electoral Commission. Section B.1 in the Supporting Materials provides details on the construction of the ballot compositions. Let A_B, $b = \{1, \ldots, B\}$ denote the ballot compositions. By focusing on the five main national parties and two regional parties, we model eight unique ballot compositions:

$$
\begin{aligned}
A_1 &= \{\text{Lab, Cons, LD, UKIP}\} \\
A_2 &= \{\text{Lab, Cons, LD, UKIP, Greens}\} \\
A_3 &= \{\text{Lab, Cons, LD, SNP}\} \\
A_4 &= \{\text{Lab, Cons, LD, UKIP, SNP}\} \\
A_5 &= \{\text{Lab, Cons, LD, Greens, SNP}\} \\
A_6 &= \{\text{Lab, Cons, LD, UKIP, Greens, SNP}\} \\
A_7 &= \{\text{Lab, Cons, LD, UKIP, PC}\} \\
A_8 &= \{\text{Lab, Cons, LD, UKIP, Greens, PC}\}\,.
\end{aligned}
\tag{1}
$$

As Labour, Conservatives, and Liberal Democrats are on the ballot throughout Britain, disregarding other parties allows scholars to model a single ballot composition for all British voters. However, Equation (1) shows that considerable variation in ballot compositions is ignored and not modeled by considering only the three traditional major parties. We will model the full range of heterogeneous ballots at the constituency level, spread across all three British countries.

Table 1 summarizes the composition of the different ballots and how they are distributed across the 631 constituencies in England, Scotland, and Wales. The ballot composition that occurred most frequently across England (in 501 constituencies) consists of five parties: Labour (Lab), Conservatives (Cons), Liberal Democrats (LD), UKIP, and the Greens. However, the Greens were not on the ballot in 31 English constituencies. In Scotland, voters were confronted with one out of four different ballots. Four parties (Lab, Cons, LD, and SNP) were part of all ballots. Scottish voters could solely vote for these four parties in eight constituencies. In twenty Scottish constituencies, the ballot contained these four core parties and UKIP. Scottish voters could choose among the four core parties and the Greens in ten constituencies. In 21 constituencies, voters could vote for the four core parties and UKIP as well as Greens. In Wales, voters mostly had a ballot consisting of Labour, Conservatives, Liberal Democrats, UKIP, Greens, and Plaid Cymru (PC), except for five constituencies where the Greens did not compete.

Modeling individual electoral choices under such a high number of different ballots has demanding data requirements because it requires a sufficient number of voters in every constituency for each single ballot composition across the countries. The British Election Study Internet Panel (BESIP) meets these requirements and additinally provides information about voter characteristics and attitudes. Within this panel, we use Wave 5, which was conducted during the formal campaign (Fieldhouse et al., 2015). We linked the BESIP data with the Census and Candidate Data (2015) using the Press Association Constituency ID that each respondent had been assigned. Our subsample consists of 16,453 respondents spread across all

TABLE 1: Ballot Compositions in the 2015 UK General Election

		Ballot Compositions A_B							Constituencies	
		Lab	**Cons**	**LD**	**UKIP**	**Greens**	**SNP**	**PC**	**N**	**%**
England	A_1	x	x	x	x				31	4.91
	A_2	x	x	x	x	x			501	79.40
Scotland	A_3	x	x	x			x		8	1.27
	A_4	x	x	x	x		x		20	3.17
	A_5	x	x	x		x	x		10	1.58
	A_6	x	x	x	x	x	x		21	3.33
Wales	A_7	x	x	x	x			x	5	0.79
	A_8	x	x	x	x	x		x	35	5.55
Total									631	100

Source: Census and Candidate Data (2015).
Note: Northern Ireland and the Speaker's constituency (108) in England are excluded. The x indicates that the party was on the ballot.

constituencies in England, Scotland, and Wales. Section B.2 in the Supporting Materials contains a detailed description of how we arrive at this subsample size. Table 2 summarizes how the votes are distributed across the seven parties in the eight ballot compositions. The BESIP data perfectly reflects the actual ballot compositions that occurred more than once in the 2015 UK General Election in the three British countries. It also provides a sufficient number of votes for each party within the eight different ballot compositions we aim to model.

TABLE 2: Distribution of Votes across Ballot Compositions in the BESIP Sample

		Party							Votes	
		Lab	**Cons**	**LD**	**UKIP**	**Greens**	**SNP**	**PC**	**N**	**%**
England	A_1	202	215	38	105	–	–	–	560	(3.40)
	A_2	3,315	4,043	901	1,565	647	–	–	10,471	(63.64)
Scotland	A_3	109	37	6	–	–	192	–	344	(2.09)
	A_4	287	217	76	51	–	536	–	1,167	(7.09)
	A_5	145	76	31	–	18	274	–	544	(3.31)
	A_6	326	270	130	36	68	585	–	1,415	(8.60)
Wales	A_7	79	62	6	26	–	–	30	203	(1.23)
	A_8	603	466	141	249	95	–	195	1,749	(10.63)
Total		5,066	5,386	1,329	2,032	828	1,587	225	16,453	(100)

Source: 2015 BESIP, Wave 5 (Fieldhouse et al., 2015).
Note: Northern Ireland and the Speaker's constituency (108) in England are excluded. Entries report absolute frequencies of votes in Wave 5 of the BESIP (Fieldhouse et al., 2015). Numbers in parentheses give relative frequencies. The dash indicates that the party was not on the ballot.

Modeling Approach: A Ballot-Specific Vote Choice Model

This section outlines our methodological approach to incorporate heterogeneous ballot compositions into a spatial vote choice model for partially-contested multiparty elections. Our modeling strategy follows the discrete choice framework, where choice-specific (e.g., the voter-party proximities) and chooser-specific (e.g., socioeconomic voter attributes) variables determine the vote choice. It builds on the classical conditional logit model (see McFadden, 1974), which has become a well-established framework for translating the spatial voting theory into an empirical model (see, e.g., Adams et al., 2005; Ansolabehere and Puy, 2018; Mauerer et al., 2015; Thurner, 2000). In contrast to the classical conditional logit model, which assumes that all party choices are available to each voter, our approach accounts for the fact that the quality and quantity of party options differ in partially-contested elections.

We first lay out how the variation in ballot compositions can be integrated into the classical conditional logit framework. Next, we discuss the second feature of our approach: the different components of the vote choice functions and their operationalization. Then, we present the specification and flexible parametrization of the voter utility functions, the third model feature. Finally, we outline our specific theoretical expectations for proximity and tactical considerations in the voter calculus in the British FPTP electoral context.

Model Feature I: Heterogeneous Ballots

Let $Y_i \in \{1, \ldots, J\}$ denote the nominal-scaled dependent variable that contains J finite and mutually exclusive party choices of which voters $i = \{1, \ldots, n\}$ choose one. In partially-contested multiparty elections, the theoretically possible and therefore externally given set of party choices is constrained by regions, countries, or individual constituencies. Therefore, only a subset of the total J parties is available for voters. The ballot compositions A_B, $b = \{1, \ldots, B\}$ define the subset. Each voter belongs to one single ballot composition and can only vote for the parties in the respective ballot compositions. The standard conditional logit model neglects this variation because it assumes the set of parties to be identical for all voters so that every voter can vote for any of the J parties. As already stated in McFadden (1974), this assumption can be relaxed within the convenient conditional logit framework by introducing an indicator variable that contains and describes the actual available choice alternatives. Next, we outline this straightforward model extension.

Following the classical random utility framework to motivate discrete choice models, let U_{ij} denote the random utility voters $i = \{1, \ldots, n\}$ associate with each party $j = \{1, \ldots, J\}$. The voters are assumed to follow the principle of maximum random utility so that they cast a ballot for the party that maximizes the random utility

$$Y_i = j \quad \Leftrightarrow \quad U_{ij} = \max_{r \in A_B} U_{ir}, \quad r = \{1, \ldots, J\}.$$

Note that the ballot composition indicator A_B, $b = \{1, \ldots, B\}$ enters the random utility maximization process. As the voters can select only from the subset of parties in the ballot composition they belong to, only this subset of parties is considered by those voters.

Assume further that the utility consists of two contributions that are connected additively, $U_{ij} = V_{ij} + \varepsilon_{ij}$. Let V_{ij} denote the observed part of voter utility function that accumulates the systematic determinants of the vote choice as a function of explanatory variables and unknown coefficients. $\varepsilon_{i1}, \ldots, \varepsilon_{iJ}$ are independent and identically distributed (i.i.d.) random variables, which are assumed to follow a maximum extreme value or Gumbel distribution with distribution function $F(x) = \exp(-\exp(-x))$. Thus, the relationship between the choice probabilities

$P(Y_i = j|A_B)$ and the utility functions V_{ij} can be expressed with the logistic response function:

$$P(Y_i = j|A_B) = \frac{\exp(V_{ij})}{\sum_{r \in A_B} \exp(V_{ir})}. \tag{2}$$

As compared to the classical conditional logit model, the only difference and novel element in the model presented in Equation (2) is the consideration of the ballot composition indicator A_B, $b = \{1, \ldots, B\}$ in the range of the summation operator in the denominator. The inclusion of the ballot composition indicator explicitly integrates information on which subset of party choices of the entire of theoretically available parties the voters can select one party. It ensures that only the subset of parties contained in A_B, $b = \{1, \ldots, B\}$ enters into the utility function of those voters so that they only comparatively assess and evaluate the parties that are actually competing in their constituencies.

By applying the logit link function, one obtains the convenient log odds and odds presentation of the model

$$\frac{P(Y_i = j|A_B)}{P(Y_i = r|A_B)} = \exp(V_{ij} - V_{ir}), \quad \log\left(\frac{P(Y_i = j|A_B)}{P(Y_i = r|A_B)}\right) = V_{ij} - V_{ir}. \tag{3}$$

Model Feature II: Components of Voter Utility Functions

Three different types of considerations enter the voter utility functions V_{ij} in Equations (2) and (3). In the following, we discuss these components.

Spatial Proximity. The first component in the voters' calculus is spatial proximity. In the tradition of rational choice explanations of voting behavior (Davis et al., 1970; Downs, 1957), we consider the ideological closeness to the parties as the main source of voter utility. By following the principle of ideological proximity, voters are expected to assess parties' policy platforms by comparing them and cast a ballot for the party offering policy proposals closest to their policy preferences. Several studies have investigated the relationship between party-voter proximities on central policies and party choice in Britain (e.g., Adams et al., 2005; Alvarez et al., 2000; Cho and Endersby, 2003; Endersby and Galatas, 1998; Quinn et al., 1999; Sanders et al., 2011; Whiteley et al., 2013). All these studies highlight that ideological closeness is an important predictor of vote choice in Britain.

To demonstrate the benefits of our modeling approach, we capture spatial considerations by relying on a simple linear ideological proximity specification. The proximity component can be easily modified to account for discounting (Grofman, 1985), directional (Rabinowitz and Macdonald, 1989), or compensatory considerations (Kedar, 2006) in spatial voting. We measure spatial considerations by focusing on Left-Right divisions. By no means, we claim to be exhaustive in considering all relevant policy dimensions in contemporary British politics. Depending on the particular research interest, the empirical analysis can be extended to specific policies, such as European integration or climate change.

Tactical Considerations. The second component accounts for tactical considerations. Only a few studies relying on spatial voting theories to explain electoral choices in Britain include tactical considerations of voters (exceptions are Alvarez et al., 2006; Alvarez and Nagler, 2000). However, the British majoritarian electoral system with single-member districts (SMD) gives voters strong incentives for tactical voting. In the context of FPTP, voters have to consider for the national level and the constituency level what they want the electoral outcome to be and how their vote might contribute to that outcome. Each election at the constituency level brings the chance of a wasted vote if the party voted for has no chance of winning. Voters face the dilemma of casting a ballot for a party they prefer based on national considerations or a party that can win the constituency. When voters decide (partially) based on the parties' strength in their constituency, we call this tactical rather than strategic voting behavior.[3]

The literature distinguishes a direct and an indirect approach to capture tactical considerations empirically (see Blais et al., 2005).[4] The direct approach measures tactical voting by assessing how many voters vote for a party other than their most preferred one and do so because they ascribe that party better chances of winning than their most preferred party (see, e.g., Heath and Evans, 1994). The indirect approach models how perceptions of parties' likelihood of winning a constituency affect the vote choice and use that model to estimate how many voters would have voted differently if tactical considerations had not influenced their choice (see, e.g., Alvarez and Nagler, 2000; Blais and Nadeau, 1996; Lanoue and Bowler, 1992). Win probabilities are usually operationalized in three ways: (1) performance in the previous election (vote shares), (2) a party's standing in the pre-election polls, or (3) the amount of money a party is spending on the campaign. In the British case, win probabilities are most frequently measured by the parties' previous election results (see Alvarez and Nagler, 2000; Alvarez et al., 2006).

We rely on an indirect and subjective approach to incorporate tactical considerations into the voting rule. The measure is based on voter-specific expectations of each of the parties on the ballot winning the constituency. Using individual perceptions to operationalize the concept of tactical considerations has three advantages over using previous election results. First, voters are allowed to have individual

[3]Strategic voting takes place when voters take into account the strength of parties solely on the national level. Although the terms tactical and strategic voting are used in various ways throughout the literature, we use these definitions as proposed by Van der Eijk and Franklin (2009). It stands in contrast to sincere voting (also known as expressive voting, see Alvarez et al., 2006), where citizens vote for their most preferred party without considering a party's chances of winning.

[4]See also Fisher (2004) for an extensive discussion of the various measurements of tactical voting employed by scholars.

perceptions, and it is these perceptions that affect their electoral decisions (see Blais and Nadeau, 1996). Second, voters evaluate only those parties that are actually on the ballot in their constituency. Third, the perceptions are measured at the moment of decision making. We are confident that such a measure provides a valid operationalization of the strength of tactical considerations in vote choice in line with its theoretical conceptualization.

Nonpolicy Considerations. The third component of the voter utility function contains nonpolicy considerations, which have shown to play a central role in spatial voting models (e.g., Adams et al., 2005; Thurner, 2000). The nonpolicy factors mainly follow cleavage-based approaches and represent socioeconomic voter characteristics and standard demographics. Similar to other Western countries, voting behavior in Britain was, for a long time, primarily explained by cleavage-based structures. Whereas most scholars argue that traditional social cleavages, especially along the lines of social class, have transformed and weakened as predictors of electoral choice (e.g., Dalton, 1996; Evans and Tilley, 2012), others contest the decline of class voting in Britain (e.g., Andersen and Heath, 2002).

Model Feature III: Specification of Voter Utility Functions

The third model feature presents a flexible effect parametrization of the components in the voting rule. Let us accumulate the three components in the utility functions V_{ij} that specify the utility voters $i = \{1, \ldots, n\}$ receive from each party $j = \{1, \ldots, J\}$ as linear predictors:

$$V_{ij} = \beta_{j0} + \sum_{m=1}^{M} s_{im}\beta_{jm} + prox_{ij}\alpha_j + winprob_{ij}\delta_j. \tag{4}$$

The parameters $\beta_{10}, \ldots, \beta_{J0}$ are constants, which capture unmeasured utility sources (see, e.g., Mauerer, 2020). The variables $s_{im}, m = \{1, \ldots, M\}$ represent the nonpolicy considerations and contain M voter characteristics. The related coefficients $\boldsymbol{\beta}_j^T = (\beta_{j1}, \ldots, \beta_{jM})$ indicate how different voter characteristics influence party choices. As the voter attributes do not vary across parties, the parameters associated with one party are set to zero to identify the model. The same applies to the constants.

The variable $prox_{ij}$ includes the absolute proximity between each voter i and party j on the eleven-point Left-Right ideological scale, using respondent-specific perceptions of party locations and self-placements. The variable $winprob_{ij}$ gives the stated probability of voter i that party j – which competes in the constituency where the voter resides – wins the constituency, running from zero to one-hundred percent. To ensure that the effect size of the tactical component is comparable to the one of voter-party proximities, both variables are standardized.

The variables $prox_{ij}$ and $winprob_{ij}$ are choice-specific attributes that can take different values for the different parties. In our parametrization, both variables are equipped with coefficients, $\boldsymbol{\alpha}_j^T = (\alpha_1, \ldots, \alpha_J)$ and $\boldsymbol{\delta}_j^T = (\delta_1, \ldots, \delta_J)$, that are specific to each party j. The parameters indicate the importance voters associate with the attributes – ideological proximity and win probabilities – when evaluating the different parties. As a result, the voter utility functions are not the same for all parties because different amounts can be added to the partial utility functions, depending on what specific party voters assess. In particular, when voters attach more importance to an attribute party j offers, they react more strongly to that attribute when they evaluate party j so that the respective partial utility increases. By allowing the parameters to differ across parties, we follow recent developments in the conception of spatial issue voting (Mauerer et al., 2015; Mauerer, 2016; Thurner, 2000). These studies demonstrate that the equality assumption regarding voters' reactions to issues seldom holds so that voters react differently to different parties on issues. We apply this flexible party-specific parametrization to both spatial and tactical considerations.

Party-Specific Expectations on Ideological and Tactical Considerations

Following the spatial voting theory, our general expectation is that ideological proximity positively affects vote choice: as the ideological closeness between voters and parties increases, the received utility increases. We also expect a positive relationship regarding tactical considerations: when a party's win probability gets larger, the utility increases. We allow the effects of ideological proximity and tactical considerations to vary across parties because we suppose that their impact is not the same for each of the seven British parties in the various ballot compositions we consider. One might expect that ideological proximity strongly influences voting for the two largest parties (Conservatives and Labour), whereas its impact on voting for the other parties might be smaller. By contrast, one might expect voters' perceptions of a party's likelihood to win a constituency to have a considerable positive impact on voting for the smaller parties and only minimal impact on voting for the two largest parties.

Although more than two parties are competing, Britain still has an FPTP electoral system with SMD that discourages voting for third parties, and we expect this factor to play a role in the voters' decision-making process. Ideological proximity might have a more substantial impact on voting for large parties than small parties, as voters worry less that their vote will not matter. Therefore, they can freely engage in expressive voting based on ideological considerations. When voters perceive a party's chance to win the constituency to be large, this is more likely to affect their vote choice for the smaller parties than for the larger parties, as there are no strategic considerations that deter them from voting sincerely. Voters, who prefer a small party based on spatial proximity, are less likely to follow up on this when they perceive the win probabilities for that party to be low and, as a result, might engage in tactical voting for a lesser preferred party. Contrarily, the lower the comparative win probability, the higher the incentives to not vote for the party for tactical reasons. As the party-specific parametrization relaxes the assumption that voters equally weigh parties' ideological platforms and their expected chances of winning, we can empirically test our expectations.

Comparing Modeling Approaches

A model that has been frequently used to study partially-contested elections is the varying choice set logit model (VCL) (Yamamoto, 2014). The model and variants thereof were applied to elections in Japan (Yamamoto, 2014), Canada (Gallego et al., 2014), Spain (Labzina et al., 2017), or Britain (Labzina and Schofield, 2015). A brief review and discussion of the VCL model will help to illustrate the drawbacks of this approach and the advantages of the model we propose to account for heterogeneous ballots in the analysis of voting behavior in partially-contested elections.

To simplify the model comparison, let us define a vector $\boldsymbol{s}_i$ that collects the constants $\beta_{10}, \ldots, \beta_{J0}$ and the voter-specific nonpolicy factors in Equation (4). The corresponding coefficient vector is $\boldsymbol{\beta}_j^T = (\beta_{10}, \ldots, \beta_{J0}, \boldsymbol{\beta}_1^T, \ldots, \boldsymbol{\beta}_J^T)$. Likewise, define a vector $\mathbf{x}_{ij}$ that collects the two party-specific variables, spatial proximity $prox_{ij}$ and the win probability $winprob_{ij}$. The corresponding parameter vector can be defined as $\boldsymbol{\gamma}_j^T = (\alpha_1, \ldots, \alpha_J, \delta_1, \ldots, \delta_J) = (\boldsymbol{\gamma}_1, \ldots, \boldsymbol{\gamma}_J)$. Thus, the utility functions in Equation (4) can be rewritten as:

$$\begin{aligned} U_{ij} &= \beta_{j0} + \sum_{m=1}^{M} s_{im}\beta_{jm} + prox_{ij}\alpha_j + winprob_{ij}\delta_j \\ &= \boldsymbol{s}_i^T \boldsymbol{\beta}_j + \mathbf{x}_{ij}^T \boldsymbol{\gamma}_j + \varepsilon_{ij}. \end{aligned} \tag{5}$$

According to Yamamoto (2014, 8), the VCL model can be derived from latent utilities

$$U_{ij} = \boldsymbol{s}_i^T \boldsymbol{\beta}_j + \mathbf{x}_{ij}^T \boldsymbol{\gamma} + \mathbf{z}_{ij}^T \boldsymbol{\tau}_b + \varepsilon_{ij}. \tag{6}$$

As in Equation (5), $\boldsymbol{s}_i$ and $\mathbf{x}_{ij}$ in the VCL model represent vectors of voter-specific and party-specific explanatory variables, respectively. $\mathbf{z}_{ij}$ is a subset of the covariates contained in $\mathbf{x}_{ij}$, and $b = \{1, \ldots, B\}$ is a choice set type indicator.[5]

Both model formulations in Equations (5) and (6) present classical discrete choice models that can handle both attributes of the party choices ($\mathbf{x}_{ij}$) and voters ($\boldsymbol{s}_i$). The models also have in common that they do not allow the choice set types to vary across individual voters, in contrast to individual-specific consideration set models (see, e.g., Moral and Zhirnov, 2018; Oscarsson and Rosema, 2019; Wilson, 2008). As in our vote choice model, each voter i belongs to one choice set type A_B, $b = \{1, \ldots, B\}$ from which she selects one party j. Voters within every constituency are assumed to have the same choice set, defined by the ballot compositions. We refer to these choice set types as ballot compositions.

As compared to the classical conditional logit model, the crucial extension in the VCL model is the term $\mathbf{z}_{ij}^T \boldsymbol{\tau}_b$. The parameter vector $\boldsymbol{\tau}_b$, which is associated with a subset of party-specific covariates contained in $\mathbf{x}_{ij}$, is subscripted by b. As the VCL model allows the effects to vary across ballots b, it estimates effects that are specific to each ballot composition. The parameters $\boldsymbol{\tau}_b$ are specified as random effects, which are assumed to follow an i.i.d. multivariate normal distribution. They are understood as deviations from the mean effects of $\mathbf{z}_{ij}$ and interpreted as

[5]To ensure consistency and uniqueness of the elements, we stick to the notation introduced above and adjusted the notation in Equation (6). In Yamamoto (2014), the vector associated with $\mathbf{x}_{ij}$ is denoted by $\boldsymbol{\alpha}$, the vector associated with $\mathbf{z}_{ij}$ by $\boldsymbol{\beta}_m$, where $m = \{1, \ldots, M\}$ gives the choice set type indicator, which we denote by b and refer to as ballot compositions. Note that we also sorted out the voters-specific variables in $\mathbf{x}_{ij}$.

coefficients "capturing the interactive effect between covariates and choice sets" (Yamamoto, 2014, 11).

The main difference between both approaches lies in the specification of effect heterogeneity. The VCL model estimates different coefficients for each ballot composition. By contrast, we do not allow the effects to vary across ballot compositions. As reflected in the term $\mathbf{x}_{ij}^T \boldsymbol{\gamma}_j$ in Equation (5), we estimate a different effect for each of the parties included in the ballot compositions. The parameters $\boldsymbol{\gamma}_j^T = (\boldsymbol{\gamma}_1, \ldots, \boldsymbol{\gamma}_J)$ are specific to each of the parties contained in the heterogeneous ballots, whereas the parameter vector in the VCL model is constrained across parties so that $\boldsymbol{\gamma}_1 = \ldots = \boldsymbol{\gamma}_j := \boldsymbol{\gamma}$. The parametrization of effect heterogeneity across parties permits analyzing how the party-specific components in the utility functions impact on voting for each of the parties on the various ballots.

By allowing the parameters to vary randomly across ballot compositions, the CVL model is very flexible and can detect how the effects of the explanatory variables in $\mathbf{z}_{ij}$ differ among ballot compositions. However, this flexibility comes with several drawbacks. The specification of random effects involves the need to use simulation-based methods to obtain choice probabilities (see, e.g., Train, 2009). The simulation of estimates also typically comes with a large number of parameters, which may tend to be unstable without careful variable selection (see, e.g., Tutz and Mauerer, 2020). Such simulation-based methods are computationally demanding, which makes it challenging to apply the model. For example, Yamamoto (2014, 17) reports a total computation time of 40 hours in his empirical application. The definition of random parameters also requires selecting a specific distribution for the random parameters that appropriately approximate the underlying behavioral process. The VCL model assumes that the random variables follow a normal distribution, which has support on both sides of zero. However, in some choice situations, such an assumption might be inappropriate; for example, when one only expects positive effects, alternative specifications are needed.

A further drawback of the VCL model is that the researcher needs to decide which party-specific variables are allowed to have random effects (enter $\mathbf{z}_{ij}$) and which ones are fixed across ballot compositions (enter $\mathbf{x}_{ij}$). Guided by theoretical expectations about heterogeneity across different ballot compositions, the researcher applying the model might consider different variables in $\mathbf{z}_{ij}$ and $\mathbf{x}_{ij}$. However, suppose the underlying theory does not provide such expectations. In that case, one faces the challenge of deciding which explanatory variables exhibit heterogeneous effects across ballot compositions and which ones are assumed to impact vote choice homogeneously, independent from the ballot composition. As the VCL model is designed to analyze ballot-composition dependence, ideally, the former would be a set of variables that describe and characterize the ballot compositions so that the variables are also subscripted by b to allow them to vary across ballot compositions.

A closer inspection of the empirical application to Japanese elections in Yamamoto (2014, 18, Figure 1) shows almost no differences between the point estimates obtained from the conditional logit model and the VCL model, however, the latter come with more uncertainty. Inspecting the heterogeneous effects across ballot compositions (see Figure 2 on p. 20) also reveals that the ballot-specific estimates tend to be very similar to each other and are equipped with substantial uncertainty in most cases. This raises concerns about the insights into effect heterogeneity across ballot compositions gained in this empirical application. In addition, the equality of the ballot-specific estimates should be tested empirically for the sake of parsimonious modeling.

In contrast to the VCL model, our modeling approach comes with convenient properties and assumptions. As the utility functions V_{ij} are connected with the choice probabilities through a logistic response function (see Equation 2), the model provides a closed-form solution for calculating the choice probabilities. By applying the well-known maximum likelihood estimation technique, the log-likelihood can be derived without the need to approximate the choice probabilities using simulation methods.

The convenient closed-form solution for the choice probabilities results from the assumption that the unobserved part of utility $\varepsilon_{i1}, \ldots, \varepsilon_{iJ}$ follows an i.i.d. maximum extreme value distribution. The i.i.d. condition means that $\varepsilon_{i1}, \ldots, \varepsilon_{iJ}$ as a whole is independently and identically distributed among all alternatives in the choice set. Therefore, it implies a specification where all covariances are assumed to be zero in accordance with the specified distribution, the extreme value distribution. This distributional assumption results in a behavioral assumption, known as Independence from Irrelevant Alternatives (IIA). The IIA assumption implies proportional patterns of substitution across the choice alternatives as it assumes that the ratio of the choice probabilities of any two alternatives depends only on the observed factors relating to those two alternatives and does not depend on anything else, that is, the presence or absence of any other choice options and their attributes. This means that when one alternative improves, this alternative draws from the other alternatives in proportion to their prior probabilities.

The conditional logit model has been criticized because of its distributional assumption for the unobserved part of utility. The IIA assumption is perceived as a very restrictive assumption that often needs to be relaxed in empirical settings (e.g., Glasgow, 2001; Glasgow and Golder, 2015). However, the IIA assumption is a convenient property as it allows a straightforward effect interpretation. As shown in Equation (3), there is a simple linear (exponential-multiplicative) relationship between the utility functions and the (log) odds. Therefore, the corresponding parameter estimates present the impact of the explanatory variables, which is independent from the values of the covariates.

Apart from the fact that it is always an empirical question of whether IIA holds in the respective research setting, relaxing the IIA assumption by moving toward more complex models, such as the VCL model, raises other methodological concerns. One is the "Invariant Proportion of Substitution Property " (Steenburgh, 2008). It implies that the substitution ratio is independent of which choice attribute is improved, causing similar counterintuitive choice behavior as under IIA.

In sum, the advantages of our modeling approach are:

- Whereas the VCL model estimates ballot-specific effects, for whom variables are necessary that characterize the different ballots, we model effect heterogeneity across the numerous parties in the different ballots.
- As the model provides a closed-form solution for evaluating the choice probabilities, parameter estimates can be obtained without the need to simulate them with complex maximization methods, as in the case of the VCL model. Therefore, the model is computationally straightforward.
- The approach does not involve any random parameters. It frees the researcher from selecting a particular distribution for the random effects, which involve additional parameter estimates. Therefore, the model is much sparser in the number of parameters and can be easily applied.
- It comes with the convenient IIA property that allows a straightforward effect interpretation.

Empirical Results

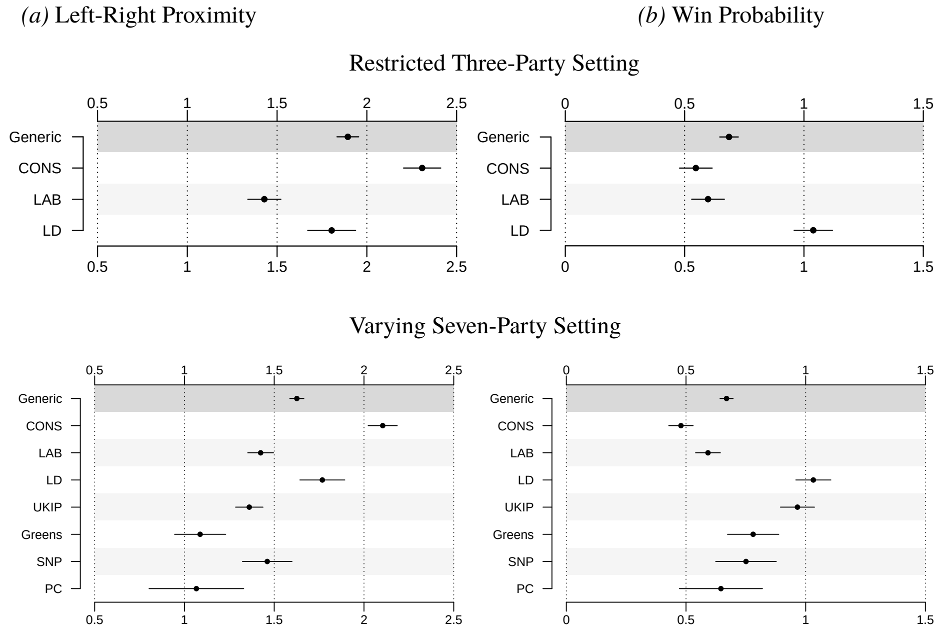
The empirical application proceeds as follows. We first compare the estimates of the traditional restricted three-party setting with the seven-party setting by focusing on the spatial and tactical components of the voting rule. For each setting, we specified two models. In the first one, the spatial and tactical considerations are parametrized in a way that constrains the respective coefficients to be identical across parties (generic specification). In the second one, we relax the assumption of similar reactions on both variables (party-specific specification). Then, we demonstrate how cleavage-oriented and standard demographic voter characteristics affect vote choice in the heterogeneous seven-party setting. Section C in the Supporting Materials reports tabled estimation results of all models presented here. The replication files can be provided.

Three and Seven-Party Settings Compared

Figure 1 summarizes the results for the spatial and tactical components, represented by $prox_{ij}$ and $winprob_{ij}$ in Equation (4). The left-hand plots depict the estimates for the Left-Right proximities, and the right-hand plots the ones for the win probabilities. The dark gray shaded areas show the generic coefficients, which are constrained to be the same for all parties (i.e., $\boldsymbol{\alpha}_1 = \ldots = \boldsymbol{\alpha}_j := \boldsymbol{\alpha}$ and $\boldsymbol{\delta}_1 = \ldots = \boldsymbol{\delta}_j := \boldsymbol{\delta}$). The remaining areas depict the party-specific voter reactions where we estimate seven coefficients for each predictor; one for each party so that $\boldsymbol{\alpha}_j^T = (\alpha_1, \ldots, \alpha_J)$ and $\boldsymbol{\delta}_j^T = (\delta_1, \ldots, \delta_J)$. The upper part shows the results for the restricted three-party setting where we exclude all voters stating a choice in favor of UKIP, the Greens, SNP, and Plaid Cymru (PC). Since the three major parties (Lab, Cons, LD) are on the ballot in whole Britain, the restricted three-party setting results in modeling only one single ballot composition for all British voters. This forced three-party scenario neglects 20 percent of the constituencies (see Table 1) and 28.4 percent of our sample (see Table 2).[6] The lower part depicts the estimates based on eight different ballot compositions containing maximally seven parties.

[6]The three-party choice models are based on 11,781 respondents and drop 4,672 voters of our total subsample size of 16,453.

Figure 1: Generic vs. Party-specific Effects on Left-Right Proximity and Win Probability in the Three and Seven-Party Settings



Source: 2015 BESIP, Wave 5 (Fieldhouse et al., 2015).
Note: Figures depict standardized maximum likelihood logit coefficients with 95% CIs. The dark gray shaded areas show the generic coefficients, the remaining areas the party-specific ones. Section C in the Supporting Materials reports tabled estimation results.

We first focus on the difference between the generic and the party-specific specification of spatial and tactical considerations. Figure 1 provides strong empirical evidence that Left-Right proximities and win probabilities unequally influence voting for different parties. The generic specification appears to be misleading because it averages out the actual differences between parties in the vote function. This finding equally applies to proximity and tactical considerations and is observed for both the three-party and the seven-party setting. Would we base our conclusions on the generic coefficients, we would overpredict the impact for some parties and underpredict their effects for others. To further support the visual inspection, we also performed statistical tests that examine the equality of the party-specific parameters. In line with previous research (Mauerer et al., 2015; Mauerer, 2016; Mauerer et al., 2015), the test statistics indicate that the assumption of identical reactions for all parties does not hold. As the party-specific models significantly better fit the information in the data, they more accurately reflect the behavior of voters.[7]

Comparing the forced three-party scenario and the varying seven-party setting also demonstrates that splitting the generic coefficients into party-specific ones leaves the coefficients for the three main parties largely unaffected. As the parameter estimates for the three major parties do not systematically differ when including the four usually neglected parties UKIP, Greens, SNP, and Plaid Cymru (PC), this is strong empirical evidence that IIA holds in our specification.

Next, we examine in detail the party-specific effects of ideological closeness and tactical considerations on voting in the seven-party setting. Our estimates indicate that the ideological proximity decision criterion is especially of relevance for the Conservative vote. The respective coefficient is partly twice as large as the ones for the remaining parties. Particularly interesting is also the large impact of spatial considerations on voting for the Liberal Democrats. By contrast, ideological proximity only marginally influences the Greens and PC votes and shows a moderate effect for Labour, UKIP, and SNP. Inspecting the tactical component reveals the following findings: First, the overall impact of perceived win probabilities is smaller than Left-Right proximities, but still quite substantial and again party-

[7]For each setting, we compared the generic and party-specific models based on Likelihood-Ratio tests. The test statistics are χ^2-distributed with four and twelve degrees of freedom, respectively, which equal the number of restrictions. The null hypothesis, stating that the generic specification is better than the party-specific one, can be rejected at the 5% significance level for both settings. Three-party setting: $\chi^2(4)$= 265.61, p=0.00; seven-party setting: $\chi^2(12)$=570.15, p=0.00.

specific. We observe that voters' expectations of the parties' chances to win the constituency are only of some relevance for both the Conservative and Labour vote. By contrast, our results suggest that when the Liberal Democrats and UKIP are believed to be likely to win the constituency, tactical considerations strongly affect voting for them. Tactical considerations also substantially influence voting for the Greens, SNP, and PC. However, these effects are significantly smaller than the ones for the Liberal Democrats and UKIP. In accord with our expectations, the empirical estimates indicate that voting for the two large parties tends to be less affected by tactical considerations and more by ideological closeness.

Nonpolicy Considerations in the Seven-Party Setting

In this section, we focus on how nonpolicy considerations impact vote choice in the seven-party setting. They are represented by cleavage-oriented voter characteristics (home ownership, union membership, subjective class) and standard demographics (age, gender, education), contained in s_{im}, $m = \{1, \ldots, M\}$ in Equation (4).[8] As the coefficients for the Conservatives are set to zero to identify the model, the interpretation of the remaining $(J-1) \cdot M$ estimates $\hat{\boldsymbol{\beta}}_j^T = \left(\hat{\beta}_{j1}, \ldots, \hat{\beta}_{jM}\right)$ refers to the Conservatives. The effects can be interpreted as follows: when the variables increase by x-units, the odds of voting for Labour, Liberal Democrats, UKIP, Greens, SNP, or Plaid Cymru (PC) – as compared to the Conservatives – change by the factor $\exp(\hat{\beta}_{jm} \cdot x)$, ceteris paribus. Since we consider all seven parties simultaneously, the estimates tell us how nonpolicy factors affect voting for the

[8]The variables are coded as follows. Home ownership: 1 (homeowner), 0 (otherwise); Union membership: 1 (union members), 0 (otherwise); Subjective class: two dummy variables for working class and middle class with reference category no class; Age: centered around the sample mean of 50.12, measured in decades; Gender: 1 (female), 0 (male); Education: age respondent completed formal education.

smaller national and regional parties in addition to the usually investigated parties, Conservatives, Labour, and Liberal Democrats.

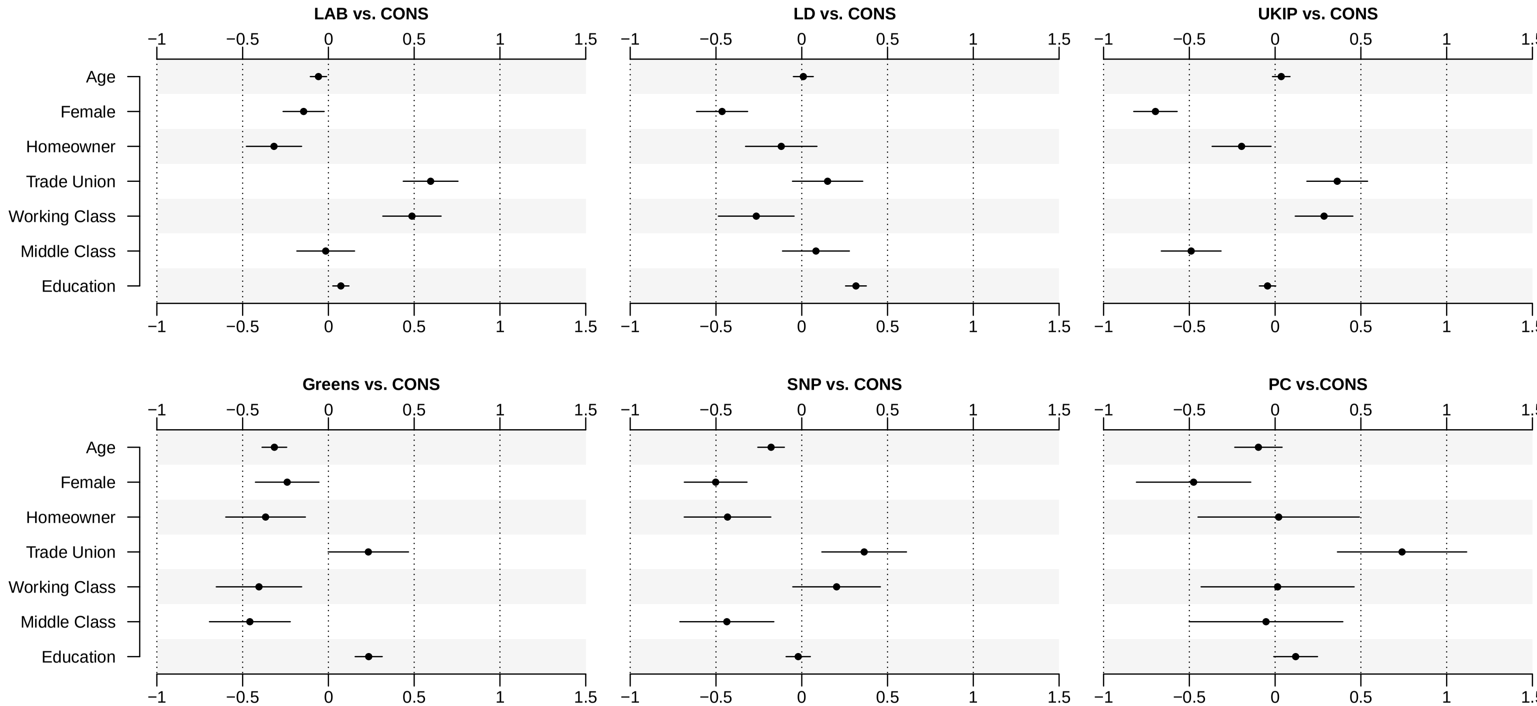
Figure 2 depicts the estimates. Inspecting the coefficients for age suggests that the Conservatives (compared to Labour, Greens, and SNP) attract older voter segments. Simultaneously considering all seven parties reveals that the Greens are particularly strong among younger voter segments. By contrast, age seems not to be decisive for voting for the Liberal Democrats, UKIP, and PC (compared to the Conservatives). The findings indicate that also gender matters: Females are less likely to vote for all parties (compared to the Conservatives), and males are especially more likely to support UKIP, for which we estimate the largest effect. In particular, the odds of voting UKIP instead of Conservatives are remarkably 50 percent lower among females, ceteris paribus.[9]

The estimates for the voter characteristics capturing traditional cleavage structures along the line of social class also reveal interesting patterns. Home ownership has not only a substantial negative effect on voting for Labour but also on UKIP, SNP, and the Greens (compared to the Conservatives). At the same time, it does not influence voting for Liberal Democrats and PC. The strong positive impact of union membership on the Labour vote is in line with conventional class voting approaches. Our results indicate that also UKIP and SNP and notably PC – for whom we identify the largest effect[10] – attract union members. As one would expect, working-class voters are more likely to vote for Labour than the Conservatives. However, our model also uncovers a positive effect of working-class members on supporting UKIP (versus Conservatives) and a negative effect on voting for the Liberal Democrats and the Greens (versus Conservatives). A

[9]Calculation of changes in odds as percentages: $100 \cdot [\exp(-0.698 \cdot 1) - 1] = -50.24\%$.

[10]Note that the point estimates for PC are equipped with large standard errors as we have the fewest observations in our sample for that party.

Figure 2: Impact of Voter Attributes in the Seven-Party Setting with Heterogeneous Ballot Compositions



Source: 2015 BESIP, Wave 5 (Fieldhouse et al., 2015).

Note: Figures depict maximum likelihood logit coefficients with 95% CIs. The interpretation of the estimates refers to the Conservatives (Cons) as their parameters are set to zero to identify the models. The complete tabled estimation results can be found in Table A7 in Supporting Materials C.

middle-class affiliation negatively impacts voting for UKIP, Greens, and SNP compared to supporting the Conservatives. Finally, our findings indicate that education strongly influences voting for the Liberal Democrats and the Greens compared to voting for the Conservatives. By contrast, education only marginally impacts the Labour vote and does not influence voting for UKIP, SNP, and PC.

Discussion and Concluding Remarks

In partially-contested multiparty elections, voters are not confronted with the same ballot nationwide. Instead, voters are offered different sets of parties depending on their region or constituency of residence. We presented a modeling strategy that takes such heterogeneous ballot compositions seriously. Drawing on the discrete choice framework, our approach builds on the well-known and convenient conditional logit model. In contrast to the classical model, which assumes that all party choices are available to each voter, the model extension accounts for differently composed ballots across countries and individual constituencies. It explicitly integrates information on the ballot composition into the random utility maximization process so that voters comparatively assess the parties that are actually competing in their constituency.

We applied the approach to study voting behavior in Britain, where ballot compositions vary across and within countries. As an empirical example, we used the 2015 UK General Election and modeled the full range of heterogeneous ballots at the constituency level. Using the extensive BESIP data capturing constituency-based realities, we were able to study individual electoral choices for up to seven parties spread across eight unique ballot compositions. To better understand the electoral decisions for such a large number of parties in Britain, which still has an FPTP electoral system with SMD, we implemented two further model features: First, we incorporated, in addition to spatial proximity and nonpolicy factors, tactical considerations into the voting rule. Second, we applied a flexible parametrization for the impact of spatial and tactical considerations on vote choice, which permits specifying effects specific to every single party contained in the various heterogeneous ballots.

Overall, our empirical results show proximity and tactical considerations are next to the traditional cleavage-based explanations important predictors for voting behavior in Britain. The party-specific specification uncovers substantial effect differences across parties. Ideological closeness tends to affect voting for Conservatives and Labour more than for smaller parties, such as the Greens. By contrast, tactical considerations exhibit a more considerable impact on voting for the smaller parties than for the larger parties. The empirical application also demonstrates that the frequently criticized IIA assumption, inherent in conditional logit models, holds in our specification. Comparing the forced three-party choice approach and the seven-party setting with heterogeneous ballot compositions shows that a simple extension of the conditional logit model is sufficient to represent the complex choice situation British voters face adequately.

Our findings demonstrate the significance of moving beyond the traditional three-party choice approach in the British context. The paper presents a step forward in the study of voting behavior in Britain as well as the study of voting behavior in contexts that have varying ballot compositions within countries in general. As the proposed approach offers a deeper understanding of how different components of the voting calculus impact voting for the numerous parties on the heterogeneous ballots, we see a great potential to apply the approach to other polities with partially-contested elections, such as Canada or Spain. Admittedly, modeling heterogeneous ballot compositions can be a challenging endeavor in terms of data requirements. One needs to have data that captures constituency-based realities with a sufficient number of voters for each party within each ballot composition to model it. It also requires some effort in data management as the researcher needs to identify the different ballots, the parties therein and assign individual voters to the respective ballot compositions. Section B in the Supporting Materials provides details on data-setup requirements to enable readers to use this approach in their own work.

We hope this contribution inspires scholars to take the actual composition of ballots seriously when studying the unique choices voters make at the polls. Let us try as electoral researchers to avoid simplifying the choice situation that voters face and ignoring substantial parts of the electorate, and better acknowledge the role that minor parties play in voters' decision-making process and how they affect the electoral success of major parties.

Supporting Materials

Additional Supporting Material can be found in the Online Appendix:

Appendix A: Party Vote Shares in UK General Elections

Appendix B: Data Management

Appendix C: Tabled Model Estimates

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