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Ballot Position and Election Results: Evidence from a Natural Experiment*

by

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Abstract:

Candidates listed first on the ballot paper regularly receive more votes than other candidates. Experimental studies from first-past-the-post systems show that this ballot position effect is causal, not just a result of parties affording top positions to popular candidates, and stems from the physical ordering of candidate names functioning as a cue to voters. Does this also hold for PR systems where voters may avoid the challenge of choosing a specific individual candidate and instead simply vote for a party? We identify a natural experiment in the Danish simultaneous local and regional elections – pure list PR systems – where the ballot design make the allocation of some top positions as-if random. Based on election results for more than 10,000 candidates, listed on 103 different ballot papers, we find that ballot position, indeed, also has a causal effect on election results in PR systems. Our findings indicate that the empirical domain of ballot position effects is much wider than suggested by previous research.

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The question of whether a top position on the ballot paper affords a candidate an advantage over his or her fellow candidates in an election has a long history, both in political science and in practical politics. At the beginning of the twentieth century, Woodrow Wilson made an observation that summed up speculations that were to last until the present days:

> I have seen a ballot of this kind which contained seven hundred names. It was bigger than the page of a newspaper and was printed in close columns as a newspaper would be. Of course no voter who is not a trained politician, who has not watched the whole process of nomination carefully, who does not know a great deal about the derivation and character and association of every nominee it contains, can vote a ticket like that with intelligence. In nine cases out of ten, as it has turned out, he will simply mark the first name under each office (Wilson 1912: 593).

Since then, a considerable body of political science research has been devoted to identifying more exactly the effect of being listed first on the ballot. Many studies find positive effects but many studies also find, that the contingent effects suggested by Wilson – publicity, engagement, educated voters and many other factors – may modify or even nullify ballot position effects (e.g. Chen et al. 2014; Ho & Imai 2008; Kim et al. forthcoming; Koppel & Steen 2004; Meredith & Salant 2013).

In practical politics, ballot position effects have figured prominently. Losers have often contested election results arguing that winners were unfairly favored by their position on the ballot. Cases have been taken before courts, which have often acknowledged ballot position effects and sometimes annulled election results for this reason (Alvarez et al. 2006; see also Miller and) Krosnick 1998).

However, identifying ballot position effects with some accuracy is challenging. The reason is that political parties and candidates are likely to anticipate them and act strategically to harvest them. If being listed first really brings electoral advantages, parties and candidates are likely to actively seek this position on the ballot. Again, Woodrow Wilson made an early cogent observation. Speaking of ballots on which candidates were listed alphabetically, he remarked:

> There are cases on record where shrewd seekers of office have had their names changed to names beginning with some letter at the head of the alphabet preparatory to candidacy on such a ballot, knowing that they had no chance of election otherwise (Wilson 1912: 593).

This is, of course, a widespread phenomenon today. Candidates regularly fight to be placed at the top of the ballot, and political parties place their top candidates first. To the researcher, however, this raises a challenge: How to disentangle the effect of the ballot position from the effect of the

characteristics of the individual candidate who has successfully fought to obtain this position? To the researcher, tricky technical issues of selection effects and reverse causality are involved.

This methodological problem is now broadly acknowledged in the literature and the preferred solution is to turn to experimental methods, in which the assignment of candidates to ballot positions is somehow randomized. However, the discipline of experimental investigation of ballot position effects is still in its infancy and overwhelmingly based on natural experiments in the US where random rotation of candidate names is used in a number of states (e.g. Darcy 1986; Chen et al. 2014; Krosnick et al. 2004). However, very little experimental evidence exists on ballot position effects in other systems.

It is especially unfortunate that there is very little evidence from proportional representation (PR) systems, which is the most common type of electoral system worldwide (Reynolds et al. 2005: 31). We are, however, primarily interested in list PR systems where voters also have the option of casting the vote for a specific candidate on the PR list, i.e. systems allowing personal/preferential votes (open or semi-open electoral list PR systems). The ballot position effect arises here because voters have the option of selecting a specific candidate from the list. Voters are not fully informed about all candidates and they therefore to some extent have to base their decision on cues such as the ordering of the candidates on the ballot paper. However, in most list PR systems with the option of casting a vote for a specific candidate, voters can also just vote for a party instead of voting for a specific candidate. It is therefore far from clear that ballot position effects can be found in these systems.

The purpose of this paper is to study list PR systems to determine the degree to which they belong to the empirical domain of ballot position effects. Danish local and regional elections offer a unique opportunity to do this. First, these elections are conducted as pure (open or semi-open) list PR systems with no formal electoral threshold. Each municipality and each region constitute one election district, and each voter has one vote to cast for the municipal council and one for the regional council. Second, the printing of the candidates' names in columns represents a natural experiment in which some candidates are as-if randomly assigned to top positions. Third, factors normally found to mitigate ballot position effects – partisan elections, media attention, educated voters – are all present in the Danish context. This makes Denmark a least-likely case for the identification of ballot position effects, even among countries using list PR systems. In sum, if ballot position effects are found in Danish local and regional elections, this would hold important empirical lessons for PR systems generally and theoretical lessons for the literature on ballot design.

The paper is structured as follows: First, we turn to theory and explain why ballot positions should matter. Second, we review the existing empirical literature in order to evaluate the present knowledge of ballot position effects, to identify lacunae in the literature, and to argue for the value added by our study. Third, we introduce the Danish local and regional electoral system and argue that it represents a natural experiment for the identification of ballot position effects. Fourth, we explain our data and our analytical approach. Fifth, the results of our empirical analyses are presented. They show that the ballot position of a candidate in the Danish list PR system has a causal effect on election results. Finally, we conclude and discuss the broader implications of the study.

Why a Candidate's Position at the Top of the Ballot Matters

In this section we outline the theoretical reasons why ballot position matters. We do not offer any new theoretical insights, so we keep our presentation brief. It is based on the succinct exposition provided by Krosnick et al.'s (2004) review study, but also draws on insights from Brockington (2003), Darcy & McAllister (1990) and Kim et al. (forthcoming).

Ballot position effects have their roots in human psychology. Deciding which candidate to vote for is often a cognitively demanding task. An informed choice requires that the voter knows the election laws, knows the importance of the election, carefully follows the election campaign, studies the candidates running for office and, once in the election booth, carefully evaluates the individual candidates against each other. However, these cognitive demands are too high for most voters, so to some extent they choose to remain rationally ignorant. Instead of making fully informed choices in the election booth, they rely on cues such as name recognition (e.g. "incumbency effects") or information offered by the ballot paper about the candidates such as their party affiliation, gender, surname ethnicity, surname race, locality or occupation.

One additional cue may be the order in which the candidates are arranged on the ballot paper. Voters may be inclined to select the first name they see in a list of candidates. The exact mechanism behind this phenomenon is not completely clear. It is often considered to be a "primacy effect" resulting from the temporal order in which voters encounter candidate names on the ballot as they read from top to bottom or from left to right. Primacy effects occur because voters tend to evaluate candidates with a confirmatory bias – looking for reasons to select one, rather than not to select one. When working through the list, voters think less and less about each subsequent alternative because they become increasingly fatigued and short-term memory becomes

increasingly clogged with thoughts. Thus, voters may be more inclined to generate supportive thoughts about candidates listed first and less likely to do so for later-listed candidates. Primacy effects may also be caused by Herbert Simon's (1976: 20-45) notion of satisficing, according to which people are inclined to settle for the first acceptable solution to a problem, especially when the costs of making a mistake are small. Voters may simply settle for one of the first names listed because they have no reason to think that these candidates are not acceptable.

However, ballot order effects may not only arise from the temporal order of names but also from their spatial order. As noted by Kim et al. (forthcoming: 4-6), people implicitly associate "up" with "good" and "down" with "bad". These associations are present in linguistic metaphors, such as "high on life" and "down in the dumps", and physical movements, such as standing tall when feeling proud or slouching when feeling sad. According to this logic, when voters are inclined to vote for the first candidate, this is not only because the candidate is first in a temporal sense, but at the top in a physical sense.

In sum, ballot position effects are created by psychological mechanisms. It may be a temporal phenomenon, according to which cognitive fatigue builds as a voter considers candidate after candidate on a long vertical or horizontal list. This creates primacy effects which is a systematic bias in favor of candidates listed first. It may also be a spatial phenomenon, according to which voters implicitly associate physical top positions with qualities of the candidate. Ballot order effects are expected to be generally relevant but most important when other cues are missing, or when voters confront many choices or face complex voting systems.

What We Already Know About Ballot Position Effects

Given the potential impact on the outcome of elections, it is not surprising that the potential effects of the candidates' position on the ballot paper have attracted considerable scholarly attention. The topic is almost as old as the political science discipline itself (Bagley 1966; Brooks 1921; Dana 1912; Gold 1952; Mackerras 1968; Mueller 1969; White 1950; Wilson 1912). But scientific interest really took hold in the last quarter of the twentieth century (Bakker & Lijphart 1980; Bowler et al. 1992; Brook & Upton 1974; Byrne & Pueschel 1974; Darcy 1986; Darcy & McAllister 1990; Hughes 1970; Kelley & McAllister 1984; Lijphart & Pintor 1988; Miller & Krosnick 1998; Robson & Walsh 1974; Scott 1977; Taebel 1975; Volcansek 1981). After the turn of the millennium this interest has not lost momentum (Alvarez et al. 2006; Brockington 2003; Chen et al. 2014; Faas & Schoen 2006; Geys & Heyndels 2003; Ho & Imai 2008; Johnson & Miles 2011; Kim et al.

forthcoming; King & Leigh 2009; Koppel & Steen 2004; Krosnick et al. 2004; Lutz 2010; Matson & Fine 2006; Meredith & Salant 2013; Villodres & de la Puerta 2006).

When evaluating this literature it is important to keep in mind the methodological problem mentioned in the introduction. Political parties may anticipate name order effects and therefore place top candidate first. Likewise, individual candidates may fight to gain a top position to increase their chances of election. Studies of name order effects that do not deal with this problem are likely to overestimate name order effects. However, as noted in Krosnick et al.'s (2004; see also Darcy and McAllister 1990) review of the early literature, most studies do not address this problem, but simply measure whether candidates in different positions on average do better or worse. These studies should therefore be read with caution. To unambiguously identify a name-order effect, one must focus on situations where the assignment of candidates to top positions is randomized.

The more recent literature recognizes the problem and turns to experimental methods to deal with it. In the following we focus on such studies – which also include some early contributions – in order to assess the current knowledge of name order effects, to identify lacunae in the literature and to argue for the added value of our study.

A list of experimental studies of ballot position effects is provided in Table 1. We cannot guarantee that it includes all relevant studies, but we have done our best to make it as comprehensive as possible. At first sight, Table 1 indicates that there is solid evidence in favor of ballot position effects. Almost all studies find a positive effect of being listed first on the ballot. However, on closer inspection the evidence is less persuasive. The survey experiment by Kim et al. (forthcoming) is a fine demonstration of the pure name order effect, but its external validity is questionable as it cannot estimate the extent to which this effect is strong enough to matter in real-world elections. The majority of studies of real-world elections are natural experiments from the US which mostly use random rotation of candidate names. Almost all these studies find positive ballot position effects. However, it is not clear how well these findings travel beyond the peculiarities of the US election system and political context.

From a non-US perspective it would appear desirable to identify ballot position effects in other election systems, especially the PR systems used in so many other countries. However, of the few non-US experimental studies only the German study by Faas & Schoen (2006) and the Belgium study by Geys & Heyndels (2003) are set in PR systems (the Australian study by King & Leigh (2009) is set in a majoritarian system, the Alternative Vote). Furthermore, the German and

the Belgium studies are most-likely cases for finding ballot position effects. In Bavaria, Germany, party votes are not possible, so voters must select individual candidates. This makes the use of cues such as the ballot position more likely. In Belgium a list PR system is used but one where each voter is free to cast one or more votes. As noted above, complexity increases the likelihood that voters rely on cues. Due to these features, the broader lessons for PR systems are difficult to extract.

(insert Table 1 about here)

What is needed is least-likely case, i.e. a study of a simple list PR system. This is what Danish local and regional elections offers. The theory expects ballot position effects to be largest in complex election systems with low-salience, low-importance and non-partisan elections that do not arouse any great media attention. In Denmark, however, local and regional elections are simple, partisan and of some salience and importance since local and regional governments are multi-purpose units entrusted with important welfare functions including health care, schools, old-age care, child care and unemployment services (Blom-Hansen and Heeager 2011). Therefore, local elections attract considerable media attention, regional elections, however, less so. As the two kinds of elections are conducted simultaneously, we should expect to find stronger ballot position effects in regional than in local elections, especially as voters are supposed to be more knowledgeable about candidates for local council than for the regional council. Furthermore, in both elections a list PR system is used where voters can vote for the party, if they for some reason do not want to cast their vote for a specific candidate. If ballot position effects can be identified in this context, and in particular in the local council elections, this would lend considerable support to their existence in PR systems.

Danish Local and Regional Elections: A Natural Experiment

In this section we introduce the Danish local and regional seat allocation system and argue why this constitutes a natural experiment for the identification of ballot order effects.

Elections to local and regional councils are both conducted as straightforward PR systems between parties/lists, where seats are allocated to participating parties/lists by the d'Hondt divisor seat allocation system. Parties/lists in a municipality or a region at least formally decide whether the candidates shall stand "in parallel" or as "a party list". The difference is that the former is a completely open list where *only* each candidate's vote result (in declining order) decides the order of election, while in the latter things are a little more complicated: After the election, the

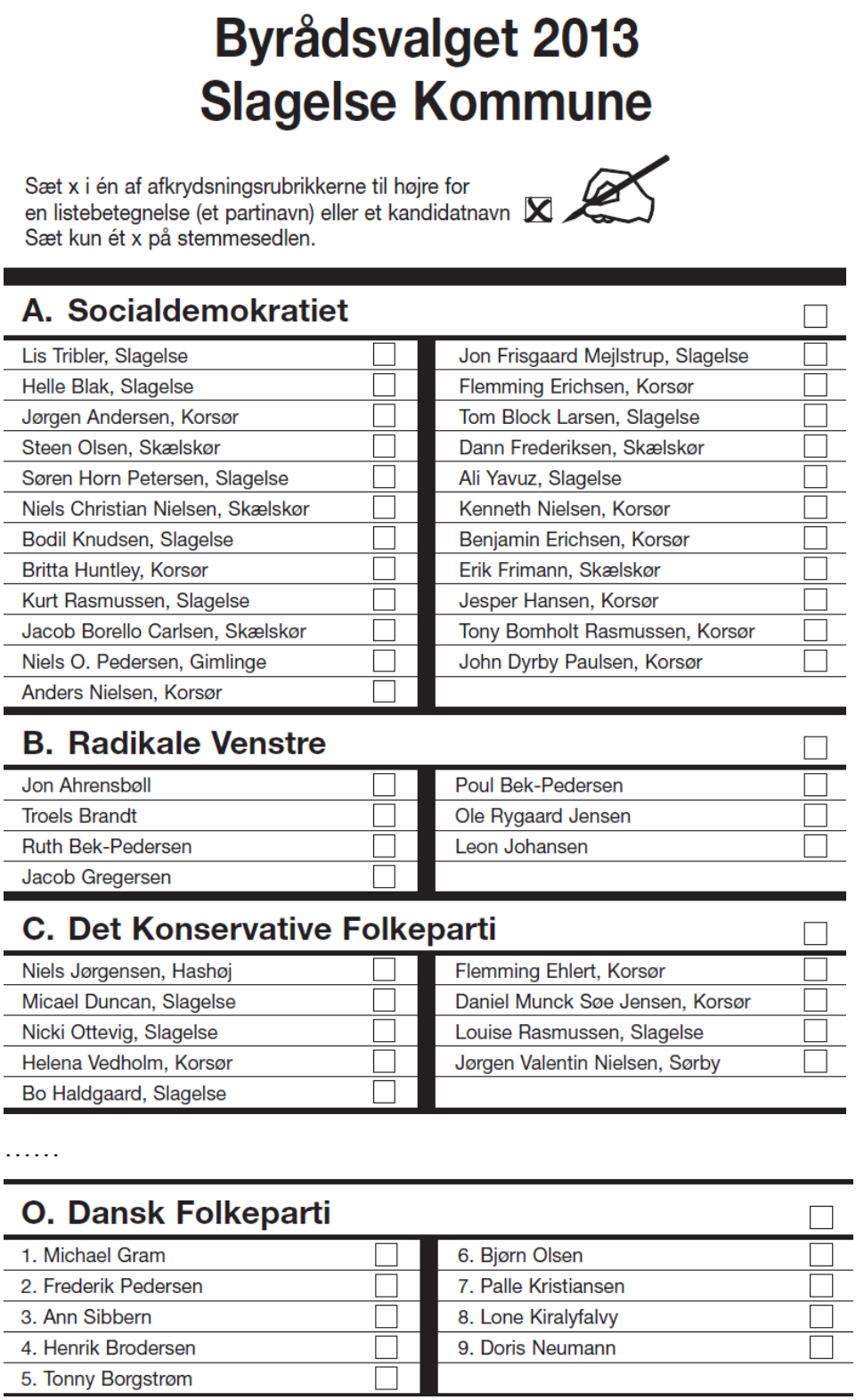
Droop quota is used to decide which candidates are immediately elected (maybe after some of the party votes are added to the candidate's number of preference votes), while remaining seats go to candidates in declining order of their votes (like, e.g., in parliamentary elections in the Netherlands). This list system is usually considered semi-open (or semi-closed). When parties decide that the candidates shall stand as a party list, the order of the candidates is indicated on the ballot paper (see the copy of the ballot paper in Figure 1, e.g. the party with the letter O, i.e. Dansk Folkeparti). When candidates stand in parallel no such numbering is seen on the ballot paper.

It is a unique feature of Danish local and regional elections (and other elections as well) that the party or list organizations in each municipality or region (or multi-member constituency in national elections) at least formally are free to decide for themselves how they want to have the seats filled, once it has been established how many seats the party (or list) is entitled to. The order of the candidates on the list is normally decided in two steps, in some – but certainly not in all – cases by a secret ballot by the local party members. This is however an internal party matter and the construction of the list is done in many different ways from one party branch to another. One way of doing it, is that first, in a separate election it is decided who the party's top candidate (and therefore also at least formally mayoral candidate) shall be. When that is clear, a fresh election among party members will decide the ordering of other candidates on the ballot paper. This is also done for parties where candidates are standing in parallel, so voters are not when this option is used presented with a candidate list in alphabetical order, [1] but for one where the party branch has already indicated in which order the party members would like to see the candidates elected, even though it is still an open list.

In both kinds of lists, a voter can cast one vote, either for the party as such ("a party vote") or a preferential (or personal) vote for one of the candidates. Both kinds of votes count equally towards the party's vote total, which is the basis for the d'Hondt seat allocation. If a voter by mistake cast a vote both for the party and for a candidate (of that party), only the latter is counted. About 75 per cent of all voters cast a preferential vote in the municipal election and about 70 per cent of all lists are open (Elklit 2013: 50). *Apparentement* is possible and is often used, but is not relevant in the context of this paper, so it is not dealt with. Thomsen and Sloth have recently presented an analysis of preferential voting in local elections, where the effects of list organization, incumbency, municipal reform, party and socio-economic contexts are examined (Thomsen and Sloth, 2013).

[1] The party branch can, however, decide that it want to have its candidates ordered alphabetically (in some cases only from no. 2 on the list), but it is their own decision, not a legal requirement.

Figure 1. Ballot paper from the 2013 election in the municipality of Slagelse (excerpt)



Byrådsvalget 2013
Slagelse Kommune

Sæt x i én af afkrydsningsrubrikkerne til højre for
en listebetegnelse (et partinavn) eller et kandidatnavn ☒
Sæt kun ét x på stemmesedlen.

A. Socialdemokratiet ☐

Lis Tribler, Slagelse	☐	Jon Frisgaard Mejlstrup, Slagelse	☐
Helle Blak, Slagelse	☐	Flemming Erichsen, Korsør	☐
Jørgen Andersen, Korsør	☐	Tom Block Larsen, Slagelse	☐
Steen Olsen, Skælskør	☐	Dann Frederiksen, Skælskør	☐
Søren Horn Petersen, Slagelse	☐	Ali Yavuz, Slagelse	☐
Niels Christian Nielsen, Skælskør	☐	Kenneth Nielsen, Korsør	☐
Bodil Knudsen, Slagelse	☐	Benjamin Erichsen, Korsør	☐
Britta Huntley, Korsør	☐	Erik Frimann, Skælskør	☐
Kurt Rasmussen, Slagelse	☐	Jesper Hansen, Korsør	☐
Jacob Borello Carlsen, Skælskør	☐	Tony Bomholt Rasmussen, Korsør	☐
Niels O. Pedersen, Gimlinge	☐	John Dyrby Paulsen, Korsør	☐
Anders Nielsen, Korsør	☐		

B. Radikale Venstre ☐

Jon Ahrensbøll	☐	Poul Bek-Pedersen	☐
Troels Brandt	☐	Ole Rygaard Jensen	☐
Ruth Bek-Pedersen	☐	Leon Johansen	☐
Jacob Gregersen	☐		

C. Det Konservative Folkeparti ☐

Niels Jørgensen, Hashøj	☐	Flemming Ehlert, Korsør	☐
Micael Duncan, Slagelse	☐	Daniel Munck Søe Jensen, Korsør	☐
Nicki Ottevig, Slagelse	☐	Louise Rasmussen, Slagelse	☐
Helena Vedholm, Korsør	☐	Jørgen Valentin Nielsen, Sørby	☐
Bo Haldgaard, Slagelse	☐		

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O. Dansk Folkeparti ☐

1. Michael Gram	☐	6. Bjørn Olsen	☐
2. Frederik Pedersen	☐	7. Palle Kristiansen	☐
3. Ann Sibbern	☐	8. Lone Kiralyfalvy	☐
4. Henrik Brodersen	☐	9. Doris Neumann	☐
5. Tonny Borgstrøm	☐		

Note: The figure is an excerpt. The full ballot paper includes 16 parties/lists and a total of 111 candidates.

We utilize one peculiar feature of the Danish ballot structure and design system in local and regional elections to assess ballot position effects. In order to reduce ballot paper length, ballot papers in both types of elections may now be divided into columns, a decision which rests with the local election management board, which is responsible for the printing of ballot papers (but within centrally determined parameters).

This is important since the order of candidates' names in the columns not only has a vertical but also a horizontal dimension. As noted above, temporal order effects may arise because voters encounter candidate names sequentially on the ballot as they read from top to bottom or from left to right. Spatial order effects may arise because voters implicitly associate physical top positions with qualities of the candidate. Being listed in the top of, say, the second column on a party's ballot list can be considered a good alternative to being listed second in a single-column ballot. Vertical as well as horizontal ordering effects are therefore taken into account in the literature (Darcy 1986; Geys & Heyndels 2003), but their micro-foundation is rarely investigated. Kim et al. (forthcoming), a rare exception, separate temporal and spatial order effects in a survey experiment and find evidence in favor of spatial effects.

To probe further into the psychological process behind name order effects we ran a lab experiment in which 18 students were asked to select candidates from Danish municipal ballot papers and names from lists of random names arranged in row and columns. Tracking how their eyes moved across these ballot papers and random lists of names showed almost no trace of systematic reading from top to bottom or from left to right, but left an almost erratic pattern of eye movements, even though a slight tendency to study lists downwards from the top was identified. Results from two of the experiments are shown in Figures 2a and 2b. The first shows that the subjects looked briefly at the names in the first column, but mostly in the bottom half, and hardly glanced at the names in the top of the second column. The second shows the experiment's results when using a a real ballot paper, namely from the 2013 elections in Slagelse municipality (also shown in Figure 1). It shows that the respondents studied the parties'/lists' names intensively, but exhibited no systematic pattern when looking at the candidates' names, especially so in the second column. Our subjects were given at total of six experiments, which all produced comparable non-systematic results.[2] Like Kim et al.'s (forthcoming) analyses, our findings thus indicate that the most likely process behind order effects is the spatial explanation.

[2] The six experiments were the following: Two experiments were on finding a specific name from a list of random names organized in two colums (like Figure 2a); two experiments were on finding "a name you like" from a list of random names organized in two colums; two experiments were on voting for a candidate or party/list from a real ballot

(insert Figures 2a and 2b about here)

Crucial for our purpose, the decision whether to divide the ballot into columns in local and regional elections is taken *after* the political parties and lists have sent their lists of candidates to the local or regional election board. The board then makes the decision on the number of columns based on the total number of candidates listed by parties and non-partisan lists. This means that the parties and lists do not know in advance which candidate ends up in top positions in columns beyond the first one. In other words, we have a situation where the assignment of candidates to top ballot positions (beyond the first column) is approximately random. In the language of experimental analysis, the assignment to top column positions is "as-if-random" (Dunning 2012: 15-27).

Since as-if randomness is the key difference between natural experiments and conventional observational studies, the validity of this claim is crucial. We offer three specific arguments why assignment of candidates to top positions in columns beyond the first can be considered as-if-random.

First, the formal rules on the design of local and regional ballots mean that the division of the ballot into columns is taken *after* the decision on the number and ordering of candidates. These rules, which are made by the central government (Act 127/2013; Government order 1195/2013), require that, before the elections, all political parties prepare a list of candidates including at most four candidates more than the number of seats in the council. The parties are free to decide the order of the candidates on the list. The parties are to send their lists of candidates to the municipal, or regional, election board which is a body elected by the incumbent local, or regional, council. The election board then designs the ballot. It is free to decide whether the ballot is to have one or more columns. If they go for more than one column, all candidates from all parties must be divided equally between the columns in the order in which they are placed on the lists submitted to the election board.

In practice, election boards are assisted by election secretariats composed of civil servants from the municipality or region. The secretariats prepare draft ballots for approval by the election board. The ballot is supposed to be designed so that it is as easy as possible to grasp and manage for the voters once they are in the voting booth. Crucial for our purpose, the parties do not know with any certainty whether the ballot will be divided into one or more columns since this

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paper (like Figure 2b). The experiments were conducted at the Cognition and Behavior lab at the School of Business and Social Sciences, Aarhus University, in September 2014. 18 subjects were recruited from the lab's student pool.

decision is not taken until all parties have completed their lists of candidates and since it depends on the total number of candidates. In other words, the parties, when deciding the order of their candidates, cannot know who will end up in the top of second, third, etc. columns since they do not know whether the ballot will be divided into columns and, if so, in how many columns. In practice, the number of columns varied between one and five in the 2013 local elections, although the majority of the 98 municipalities had only one or two columns, cf. Table 2. The five regions had ballots with between two and five columns.

(insert Table 2 about here)

Second, one might speculate that even though the parties do not know with any certainty whether the ballot will be divided into columns, they may have an idea based on the experience from previous elections. To find out if this is the case we interviewed leaders from two political parties, the Social Democrats and the Liberals, in two municipalities, Aarhus and Randers. The two parties were selected because they are old and experienced players in Danish local politics. The two municipalities were selected because they represent different situations. In Aarhus, the municipal ballot paper has been divided into three columns for many years. In Randers, the municipal ballot paper was redesigned from two to three columns in 2013. The interviews revealed that the two parties in Randers did not take the question of columns into consideration when preparing their 2013 candidate lists. According to both our interviewees in Randers, this issue was not discussed at all. In Aarhus, the response from the Social Democrats was the same, as columns were not discussed when the 2013 list of candidates was prepared. However, in the Liberal party in Aarhus, there was some discussion of the column question. According to our interviewee, this issue received some attention since there was an understanding that it might matter for the election result. But this understanding was not used when ordering the candidates on the list since this decision is not taken by the party leadership but by ordinary party members at a general selection meeting. We conclude that it cannot be ruled out that some local parties have an understanding of potential column effects but that this understanding is extremely difficult to use strategically, partly because the number of columns is not known with any certainty, partly because the ordering of candidates is not easily manipulated by party leaderships.

Our third argument is that if assignment to a top placement in columns beyond the first column is indeed as-if-random, then potentially confounding pre-treatment characteristics of

the candidates should be statistically unrelated to the candidates' placement in columns. Table 3 reports the results of a logistic regression analysis which seeks to explain which candidates are placed in top positions on local and regional ballots in the 2013 elections. We use the individual characteristics available – gender and non-Danish ethnicity (non-Danish name) – as predictors. As is evident, these characteristics are important predictors of who ends up as number 1, 2 and 3 in the *first* column on the ballot. This suggests, unsurprisingly, that it is not random who receives these top positions. In other words, we see the contours of the endogeneity problem discussed in the introduction. However, the coefficients for the individual characteristics do not obtain statistical significance in the analysis of who ends up in the top of the second, third, fourth and fifth column of the ballot. In other words, these positions are statistically unrelated to the individual characteristics of the candidate, which is evidence in favor of as-if-random assignment to these positions.

(insert Table 3 about here)

In sum, we feel confident that assignment of candidates to top positions in columns beyond the first one on Danish local and regional election ballots can be considered as-if-random.

Data and Statistical Method

We are interested in estimating the effect of top ballot paper position on the vote share of candidates. Hence, according to our expectations, the position of an individual candidate affects the vote share for this candidate. We estimate this effect by OLS regression with vote share as the dependent variable, measures of ballot position as independent variables, and with a number of control variables. Table 4 shows definitions, sources, and descriptive statistics for these variables.

The dependent variable should measure the share of votes for each of the more than 10,000 candidates of the November 2013 local and regional elections. In Danish elections, voters can – as explained above – vote for a specific candidate (a personal – or preferential – vote) or for a party (a party vote). A natural measure of the dependent variable is therefore the share of votes for a specific candidate; more specifically the number of personal votes for this candidate as a share of the total number of personal votes for candidates of his/her party. On average, a candidate receives about 11 pct. of the personal votes of his/her party, with a large standard deviation of about 19. Figure 3 (left panel) shows the distribution for this variable.

(insert Figure 3 about here, but not earlier)

The distribution is heavily skewed to the right, because most personal votes are cast for a limited number of popular candidates. To obtain a better distribution of the dependent variable, we transform it by the natural logarithm. The right panel of Figure 3 shows that the distribution of the transformed variable is closer to normal. Consequently, we will use this as our dependent variable in the next section. Table 4 shows its descriptive statistics.

(insert Table 4 about here, but not earlier)

The independent variables describe the position of candidates on the ballot paper. More specifically, we are interested in measuring the effect of being positioned at the top of the second column. We measure this with a dummy variable ("No. 1 in 2. col" in Table 4). Similarly, we use dummy variables to indicate whether a candidate is positioned at the top of columns 3, 4, and 5. Finally, we include the traditional measures (which are likely to be biased due to endogeneity) of top positions in the first column. Table 4 shows that about 11 percent of all candidates hold the top position of column 1, and nine and eight pct. has the second and third position of column 1. The reason that more candidates hold a top position than a second or a third is simply that some parties do only field one candidate. About five percent of the candidates hold the top position of column 2. The reason that fewer candidates appear in the top of the second column than in the first is simply that just below half of the ballots have more than one column (see Table 2).

Since we use a natural experiment, it is not crucial to include control variables. However, it can serve as a useful additional check to control for characteristics of candidates which (1) are likely to be associated with the share of personal votes and (2) are clearly visible to voters when voting. Votes can typically, based on reading the names on the ballot, obtain knowledge of the sex and ethnicity of the candidate. We therefore control for the gender of the candidate, for whether the candidate is the top female candidate, and for whether the candidate has a non-Danish name. We also control for the total number of candidates of the party, since this is a measure of the level of intra-party competition for votes. In the next section we estimate the effect of ballot paper position of the share of votes in a series of OLS regression models. Table 4 also shows that the data set comprises 10,207 candidates. Of these, 11.4 pct. (corresponding to 1,163 candidates) are candidates in the regional elections. The remaining 9,044 are candidates in the local elections.

Empirical Analysis

Table 5 shows the results of three OLS models of the effect of ballot position on vote share. In model (1), seven dummy variables indicating ballot position are included together with a dummy variable indicating whether the candidate is running for a local or regional election and an interaction term. In model (2) the control variables are added and in model (3) we also control for the number of candidates on the party's list and two interaction terms are included. The first three dummy variables in model (1) indicate, respectively, whether a candidate holds the first, second and third position of the party's list of candidates on the ballot. "No. 1 in 1. col" has a large and clearly statistically significant effect, reflecting the well-known finding that a candidate placed at the top position receives more preferential votes than other candidates of the same party. The coefficients for "No. 2 in 1. col" and for "No. 3 in 1. col" are clearly smaller but still statistically significant. This indicates that candidates placed in the second and third place also receive more personal votes on average than other candidates do. These results are not surprising but they are, as we argued above, poor estimates of the causal effect of ballot position, as the top position in the first column is not allocated randomly by parties.

The fourth dummy variable ("No. 1 in 2. col.") is our core independent variable. It indicates whether a candidate holds the top position of column 2 of the party's list of candidates on the ballot. We refer to this as holding the "top position" of column 2. As we have argued above, assignment of candidates to this position is as-if random. If ballot position confers advantages to candidates, this variable should have a positive and statistically significant effect on the share of votes. It turns out that the effect is indeed positive and statistically significant. We take this as evidence that ballot positions have a causal effect on vote shares of candidates.

As argued above, we expect the advantage of holding the top position of column 2 to be larger in regional elections than in local election, since candidates are generally less well known in the regional elections. The interaction term "No. 1 in 2. col x Region" confirms this. The positive effect of holding the top position of column 2 is larger in regions than in municipalities and the difference is statistically significant. The dummy variable "Region" is also statistically significant and negative. It shows that regional candidates tend to receive a smaller share of personal votes. This is likely to be an artifact created by the fact that regional elections tend to have a larger number of candidates (we control for this in model 2).

The remaining dummy variables in model (1) estimate the effects of holding the top positions of column 3, 4, and 5. The top position of column 3 has a positive and statistically significant effect. The other two coefficients are close to 0 and statistically insignificant. This, however, can either reflect that holding these top positions do not increase the personal vote share, or that the total number of candidates, and hence the competition for personal votes, tends to be higher in elections with more columns on the ballot paper.

We test for exactly this in model (2) by controlling for the number of columns. Unsurprisingly, the average share of personal votes of individual candidates tends to be lower when the ballot has more columns (the coefficient for "Number of col's" is negative and statistically significant). When this effect is controlled for, we observe that the estimated effect of holding the top position of column 1-4 is consistently positive and statistically significant for column 1-3. The effect of holding the top position of column 5 is negative and insignificant. This is likely to be a consequence of a number of cases too low to provide reliable estimates (remember that only two elections had a ballot with five columns, see Table 2). We also find, as in model (1), that the advantage of holding the top position of column 2 is larger in regions than in municipalities. Hence, model (2) supports the conclusion that the ballot position has a causal effect.

Model (2) also shows that female candidates tend to get a larger share of personal votes. This applies, in particular, to the top female candidate. Candidates from parties using the "Party list" system, which allocates votes for the party according to the order of candidates on the ballot, tend to get more personal votes. However, whether a candidate has listed his / her local area residence has no statistically significant effect on the vote share.

In model (3) we add the variable "No. of cand's of party". This simply indicates for each candidate the total number of candidates on the ballot for his or her party. It is not surprising to see that the effect is negative: As more competitors are added to the ballot for one's party, the fewer votes one can, ceteris paribus, get. We also add interaction terms between "No. 1 in 2. col." and two control variables. We interact top position with Party list to see whether the effect of top position decreases when it is unlikely that this candidate can be elected.[3] It turns out that the effect of the interaction term is statistically insignificant. We interact top position of column 2 with Locality to investigate whether the additional cue of attachment to a geographical area reduces the effect of the potential cue associated with holding the top position of column 2. The statistically significant

[3] This is the case because party votes are allocated to top candidates (these votes are allocated to No. 1 in 1. col, then No. 2 in 1. col. and so on).

effect of - 0.188 is consistent with this expectation. In model (3) the estimated effects of holding top positions of columns 4 and 5 are negative and statistically significant.

Hence, although model (3) shows that the size of the effect of top ballot position may depend on other factors (such as whether the locality of the candidate is mentioned on the ballot), and that the effects for columns 4 and 5 are different, we consistently find that holding a top position of the first three columns has an effect on candidates' vote shares, in support of the conclusion that ballot position has an effect on election results also in PR systems of this kind. Since the allocation of candidates to the top position of column 2 is as-if random, we are confident that this effect is causal, and not due to the candidate selection process.

(insert Table 5 about here)

A final question is whether these effects are sufficiently large to be substantially significant. This is quite hard to see from the three models in Table 5, as the dependent variables are measured as the natural logarithm of the personal vote share. To get an estimate of the effect of holding the top position on the share of votes (measured in percentage points), we run model (2) of Table 5 with this dependent variable. The estimated effect of holding the top position of column 2 is 3.7 percentage points. This can be compared with the average vote share of 11 percent. Hence, the ballot position effect is substantial and it is definitely sufficiently large to be important to election results. Many candidates lucky enough to end up in top position of ballot columns get elected because of this and would not have been elected if the ballot had been designed differently.

Conclusion

The ballot papers used in Danish local and regional elections allow us to study position effects in a kind of elections and with a kind of ballot paper structure and design, which to the best of our knowledge is a novelty. Therefore, it is an addition to existing empirical literature on the topic.

Our study – based on all ballot papers in all 98 municipalities and five regions in the 2013 simultaneous local and regional elections – demonstrates a clear ballot position effect. This is interesting because we have studied an open (or semi-open for a minority of parties/lists) list PR election, where all candidate names appear on the ballot paper and where names are printed in two or more columns on the ballot paper in almost half of the cases. Because of the decision making

process behind this feature, we can convincingly argue that we have an as-if-random situation and this can, therefore, be seen as a natural experiment.

The results are that we can document a clear position effect for positions 1-3 in the first column and for position 1 in the second column.

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Table 1. Experimental studies of ballot position effects

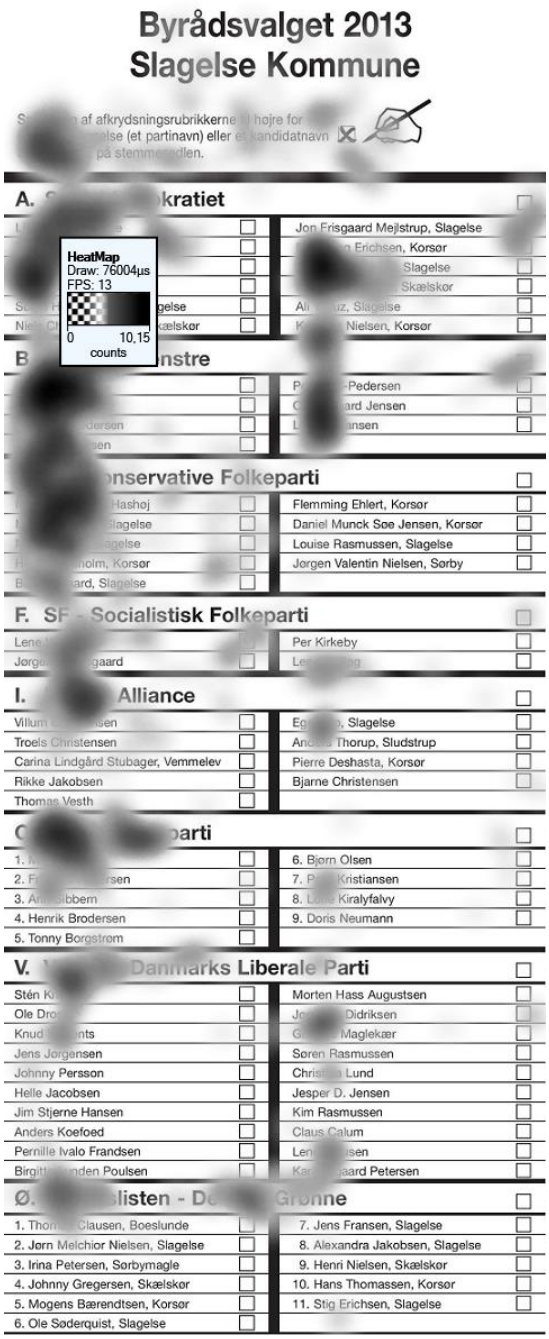
	Identified ballot position effect
Natural experiments from the USA (random rotation of order of candidates)	
Alvarez et al. (2006)	Positive effect of being listed first
Chen et al. (2014)	Positive effect of being listed first
Darcy (1986)	No position effect
Ho & Imai (2008)	Positive effect of being listed first
Koppel & Steen (2004)	Positive effect of being listed first
Krosnick et al. (2004)	Positive effect of being listed first
Meredith & Salant (2013)	Positive effect of being listed first
Miller & Krosnick (1998)	Positive effect of being listed first
Other experimental studies from the USA	
Bagley (1966): Lab experiment	No position effect
Gold (1952): Field experiment	No position effect
Kim et al. (forthcoming): Survey experiment	Positive effect of being listed first
Taebel (1975): Lab experiment	Positive effect of being listed first
Natural experiments from outside the USA (random rotation of order of candidates)	
Faas & Schoen (2006): Bavarian state elections in Germany	Positive effect of being listed first
Geys & Heyndels (2003): Regional elections in Brussels in Belgium	Positive effect of being listed first
King & Leigh (2009): Australian federal elections	Positive effect of being listed first

Figure 2a. Heat map of eye tracking experiment I

Re kka Alexandersen	Hedvig Andreasen
Ola Hansen	M Clausen
H Kristoffersen	M med Christiansen
T Jepsen	Ja ob A. Knudsen
Sørensen	La ke A. Kjeldsen
Schmidt	L nok Hall
Lis ulsen	Mia Østergaard
r Schou	A anda Thygesen
Al te Krogh	A dreas Jakobsen
A Jacobsen	Valdemar Iversen
Ale nder Sørensen	Nikolaj Mikkelsen
Tr Petersen	Albert Danielsen
Sørensen	e Thygesen
Kristoffersen	ssen
Karlsen	aard
A Kristoffersen	
acobsen	sterfensen
Jørgensen	r Jessen
s Hermansen	Vestergaard
Kristensen	emette Jespersen
illadsen	Dahl
Jakobsen	us Kjeldsen
e Kruse	ina Jørgensen
s Hansen	Lauritsen
Lorenzen	Toft
t Lund	a Mortensen
sja Mogensen	Clausen
s Jensen	Johnsen
Lise Nygaard	Østergaard
ik Svendsen	Pedersen

Note: The figure shows the result of an eye-tracking experiment where 18 subjects were asked to simply find the name "Silke Søndergaard" (placed in the middle of the second column). Dark shades indicate the places where the subjects' eyes lingered. The names in the two columns were generated by a random name generator.

Figure 2b. Heat map of eye tracking experiment II



Note: The figure shows the result of an eye-tracking experiment where 18 subjects were asked to vote for a candidate or party/list on the ballot paper from the 2013 election in the municipality of Slagelse. Dark shades indicate the places where the subjects' eyes lingered.

Table 2: Number of columns on ballots in the 2013 local and regional elections

	Municipalities		Regions	
Number of columns	Frequency	Percent	Frequency	Percent
1	52	53	0	0
2	39	40	0	0
3	4	4	2	40
4	2	2	2	40
5	1	1	1	20
Total	98	100	5	100

Source: Ballots collected from municipalities / regions and from the Ministry of Economic Affairs and the Interior

Table 3: Logistic regression analysis of the effect of gender and ethnicity on ballot positions in 2013 local elections

	(1) No. 1 in 1. col	(2) No. 2 in 1. col	(3) No. 3 in 1. col	(4) No. 1 in 2. col	(5) No. 1 in 3. col	(6) No. 1 in 4. col	(7) No. 1 in 5. col
Female	-0.500***	0.195***	0.243***	0.0620	-0.173	-0.247	-0.265
	(0.0757)	(0.0727)	(0.0765)	(0.0948)	(0.186)	(0.282)	(0.517)
Non-Danish name	-0.281*	-0.403**	-0.00832	0.0801	0.480	-0.666	
	(0.152)	(0.174)	(0.158)	(0.185)	(0.294)	(0.719)	
Constant	-1.938***	-2.338***	-2.514***	-2.898***	-4.196***	-4.922***	-6.101***
	(0.0366)	(0.0428)	(0.0459)	(0.0543)	(0.0998)	(0.144)	(0.258)
Observations	10,200	10,200	10,200	10,200	10,200	10,200	9,625

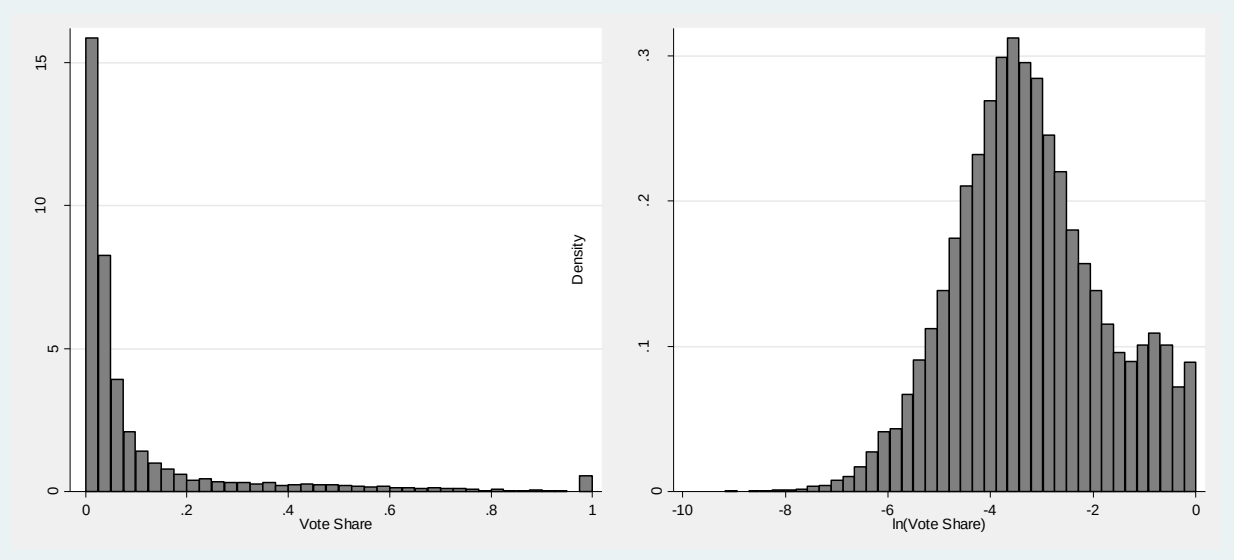
Standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1. Sources: See Table 4.
In model (7) Non-Danish name predicts failure perfectly (i.e. no candidates with Non-Danish names appear as no. 1 in 5. col.). To estimate the model we drop the variable observations with Non-Danish names.

Table 4: Variable definitions, sources, and descriptives

Variable	**Description**	**Source**	Mean	Std.dev	Min	Max
Personal vote share	Natural log of candidates' personal votes as a share of personal votes on party	Computed from manually coded values from ELECB	-3.242	1.462	-9.2	0
No. 1 in 1. col	Series of dummy variables indicating top ballot position of column 1-5	Computed from candidates' ballot positions, obtained from ballots collected from all municipalities	0.111	0.314	0	1
No. 2 in 1. col			0.092	0.288	0	1
No. 3 in 1. col			0.080	0.272	0	1
No. 1 in 2. col			0.053	0.225	0	1
No. 1 in 3. col			0.015	0.120	0	1
No. 1 in 4. col			0.007	0.081	0	1
No. 1 in 5. col			0.002	0.044	0	1
Number of columns on ballot	Variable indicating the number of colums on the ballot	Visual inspection of actual ballots collected from all municipalities	1.997	1.098	1	5
Sex	Dummy variable (1 = female, 0 = male)	Manually coded from first name in ELECB. Ambiguous names have been clarified, typically by municipal web sites	0.303	0.460	0	1
Top female	Dummy variable (1 = candidate is top female on list, 0 = candidate is not)	Manually coded from ELECB	0.085	0.278	0	1
Non-Danish name	Dummy variable (1 = first name is not a typical Danish name, 0 = name is typical Danish)	Manually coded from ELECB	0.056	0.231	0	1
Member of Mayors's party	Dummy variable (1 = Member of Mayors's party 2009-2013, 0 otherwise)	Information of mayor's party has been obtained from municipal web sites	0.203	0.402	0	1
No. of candidates of party	Variable indicating for each candidate the total number of candidates on the ballot for his/her party	Manually coded from ELECB	15,037	8,681	1	45
Party list	Variable indicating whether party votes are allocated according to the order of candidates on ballot	Manually coded from ballots	0.223	0.416	0	1
Locality	Variable indicating whether candidate's local area residence is indicated on ballot	Manually coded from ballots	0.399	0.490	0	1
Region	Variable indicating whether the candidate belongs to region	Manually coded from ballots	0.114	0.318	0	1

Note: ELECB refers to the official Danish election result data base, available at www.kmdvalg.dk. Actual ballots were obtained directly from municipalities/regions or, in a few cases, from the Ministry of Economic Affairs and the Interior. N varies from 10,188 to 10,207.

Figure 3: Distribution of dependent variable



Source: See Table 4.

Table 5: Effect of ballot position on candidates' personal vote share of personal votes on party

	(1)	(2)	(3)
No. 1 in 1. col	3.220***	3.046***	2.763***
	(0.0317)	(0.0317)	(0.0311)
No. 2 in 1. col	1.808***	1.600***	1.403***
	(0.0345)	(0.0344)	(0.0330)
No. 3 in 1. col	1.303***	1.123***	0.966***
	(0.0365)	(0.0355)	(0.0339)
No. 1 in 2. col	0.739***	0.711***	0.505***
	(0.0475)	(0.0464)	(0.0575)
No. 1 in 3. col	0.279***	0.346***	0.0428
	(0.0823)	(0.0797)	(0.0759)
No. 1 in 4. col	0.0650	0.0322	-0.189*
	(0.121)	(0.118)	(0.112)
No. 1 in 5. col	-0.147	-0.242	-0.407**
	(0.221)	(0.214)	(0.202)
Number of col's		-0.271*	0.259*
		(0.156)	(0.148)
Female		0.117***	0.125***
		(0.0233)	(0.0221)
Top female		0.296***	0.259***
		(0.0402)	(0.0381)
Non-Danish name		0.0504	0.0341
		(0.0407)	(0.0385)
Member of mayor's party		-0.495***	-0.0564**
		(0.0242)	(0.0262)
No. of cand's of party			-0.0498***
			(0.00145)
Party list		0.111***	0.0601**
		(0.0252)	(0.0246)
No. 1 in 2. col x Party list			0.0775
			(0.0926)
Locality		0.0210	0.0980***
		(0.0253)	(0.0246)
No. 1 in 2. col x Locality			-0.188**
			(0.0832)
Region	-0.0763**	0.226	-0.151
	(0.0323)	(0.223)	(0.211)
No. 1 in 2. col x Region	0.608***	0.540***	0.451***
	(0.123)	(0.118)	(0.116)
Constant	-3.908***	-3.461***	-3.612***
	(0.0127)	(0.274)	(0.259)
Observations	10,188	10,181	10,180
R-squared	0.548	0.597	0.639

Standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1. Sources: See Table 4. Fixed effects dummy variables for each municipality and region are included in all models (not shown).