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**Electoral system, personal votes, and party choice
- Multilevel models**

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Abstract:

Using local elections in Denmark as an example this paper shows that individual party choice is influenced both by individual level, municipality level, and national level characteristics. Some hypotheses about the effects of the electoral system on personal votes derived from a theory by Carey & Shugart (1995) are first tested using a fixed-effects model. The effect of the personal reputation of the candidates, measured by personal votes, on party choice is then tested using a multilevel multinomial logit model suggested by Rabe-Hesketh and Skrondal (2008). The paper shows that both the electoral system and the personal reputation of local candidates have theoretically expected effects on party choice at local elections in Denmark. The methodology can be used for cross-national studies of multilevel effects on multi-party choice.

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The problem

Individual voting behavior is caused by a multitude of causes on different levels of the society. In this paper we focus on causes for individual party choice at local elections in Denmark at three distinct levels: the individual, the municipal and the national level. At the individual level political attitudes influence which party is chosen, at the municipal level the reputation of the local candidates running for a party might further influence party choice, and finally, national party politics might influence the outcome of local elections. In a proportional representation (PR) multiparty systems like Denmark one tends to overlook the importance of the candidates running for the different parties, as if the voter first chooses a party and then maybe a candidate running for that party. However, we shall study how far the personal reputation of the local candidates influences party choice, if at all.

Before studying the effect of personal reputation of candidates, we will investigate if the design of the electoral system creates incentives to cultivate a personal vote as suggested by Carey and Shugart (1995). We can do so because of a very unique feature of the Danish electoral system: In every municipality the local party branch can decide if they want to use closed list or open list standing of the candidates. With closed list standing the local party members decide the order the candidates will appear on the list of candidates for the party, and the candidates are elected in that order.¹ With open list standing only the personal votes decide the order in which the candidates are elected.

Another interesting feature of the Danish electoral system is that the voter can decide between voting for a candidate or just for a party. This means that the share of personal votes not only differ between candidates but also between parties. The share of personal votes out of all votes for the party is used as a measure for the personal reputation of all party-candidates.

The main conclusion from the analysis of the 2009 local elections in Denmark is that one both find expected effects of the electoral system on preferential (personal) voting, and that the share of personal votes (out of all votes for the party) at the municipality level, as a measure for the reputation of the local candidates, has strong effect on voting for the party (no matter if the party vote is personal or not).

The data

The individual-level data is a quite large academic survey ($N = 3.336$) of voting behavior at the 2009 local elections in Denmark with about an equal number of respondents from each municipality no matter the actual size of the municipality. The municipality-level data are the election results including both number of votes and the share of personal votes out of all votes for each party.

Table 1 shows votes and type of standing for each party in all 98 municipalities at the 2009 Danish local elections. The parties are shown in the order from left to right on the political left-right scale.

Table 1 Votes and type of standing in all municipalities at the 2009 Danish local elections.

	Total votes Pct.	Personal votes Pct. of total votes	Stand in # municipalities	Stand with closed list
Unity Party (Left wing)	2.3	56.8	65	47
Socialist People's Party	14.5	58.4	98	44
Social Democrats	30.6	80.4	98	17
Social Liberals	3.7	73.5	92	19
Liberals	24.8	82.8	98	9
Conservatives	11.0	77.8	97	3
Danish People's Party	8.1	60.7	95	37
Local lists ¹	4.9	83.0	90	28
Total	100.0	75.3	733	204
N	2,784,466	2,095,567	98	98

¹ Including minor parties, not standing nationwide.

Table 1 shows that all parties except the minor left wing Unity Party stood in most of the 98 municipalities. The Unity Party was also the only party with a majority (47 out of 65) choosing closed list standing. The share of municipalities with closed list standing was also somewhat high within the Socialist People's Party and within the right wing Danish People's Party. About 3 out of 4 voters gave a personal vote by checking a candidate instead of just the party on the ballot paper.

Incentives to cultivate a personal vote

From the point of view of the individual candidate it is a rational choice to cultivate a personal vote by appearing competent and likeable to increase the probability of being elected. At the same time, if every candidate fights for herself it is a collective action problem to maintain the reputation of the party as such.

The tension between the interests of the party and the interests of the candidates has been pointed out by Katz (1980), Cox (1987) and Carey & Shugart (1995). Further, Carey & Shugart have proposed a general theory about how the electoral system motivates the candidates to enhance their personal reputation. Three assumptions in this theory are important for understanding voting behavior in Danish local elections.

The first assumption is that open list standing better than closed list standing gives every candidate a fair chance of being elected and thus motives each candidate to cultivate a personal vote (op. cit., p. 418).

The second assumption claims that the effect of the number of candidates running for at party depends on the list being open or closed. More precisely, in an open list system where every candidate has a chance, the higher the ratio of the number of candidates to the number of seats the higher is the value of personal reputation. Conversely, in a closed list system where some candidates are almost certain to be elected, the higher the ratio of candidates to seats is, the lower is the value of personal reputation, because more candidates really have no chance of being elected (op. cit., p. 431).

Finally, a third assumption is that if the votes on all candidates are pooled within the party to calculate the number of seats won for the party then the value of personal reputation is lower than

if votes are not pooled, since some candidate might be elected because of the merit of other candidates (op. cit., p. 421). According to this assumption, since votes are pooled in the Danish system, this should decrease the incentives to cultivate a personal vote in Denmark.

The above theory has been criticized by Swindle (2002) for not taking into account that the individual motivation of the candidates can hurt the collective interest of the party. With Japan's single non-transferable vote system (before 1996) as an example he shows that even if the votes are not pooled within the party the candidates might restrain themselves, so that only few votes are lost for the party. On the other hand, with the Irish single transferable vote system where votes are pooled, the collective interest of the party is not damaged and competition between candidates might even be to the benefit of the party.

Following this finding we suggest that the third assumption above is no hindrance applying the first two assumptions to the Danish case. Using the share of personal votes as a measure for personal reputation we state the following two hypotheses.

Hypothesis 1. In municipalities where the local party branches chooses open list standing the personal vote share is higher than in municipalities where the local party chooses closed list standing.

Hypothesis 2. In municipalities where the local party chooses open list standing the personal vote share is higher the higher the ratio of candidates to seats; while in municipalities where the local party chooses closed list standing the personal vote share is higher the lower the ratio of candidates to seats.

While the first hypothesis suggests a simple effect of open vs. closed list on the personal vote share, the second hypothesis suggests interaction between open vs. closed list and the ratio of candidates to seats to explain personal vote share. We will test the two hypotheses in a single statistical model with the personal vote share for each party at the municipality level as dependent variable.²

In the statistical analysis we control for two other factors. Since the personal acquaintance with local candidates is expected to be higher in smaller municipalities the size of municipality, measured by the number of valid votes (log-transformed) in the municipality, is introduced as a control variable at the municipality level. Further, since we expect some parties in general to be more based on personal relations than other parties, we introduce a party constant for each party on the national level in a fixed effects model.³

Figure 1 shows the model for the effects of the electoral system on personal vote shares.

Figure 1. Causal model for the effects of the electoral system on personal vote shares

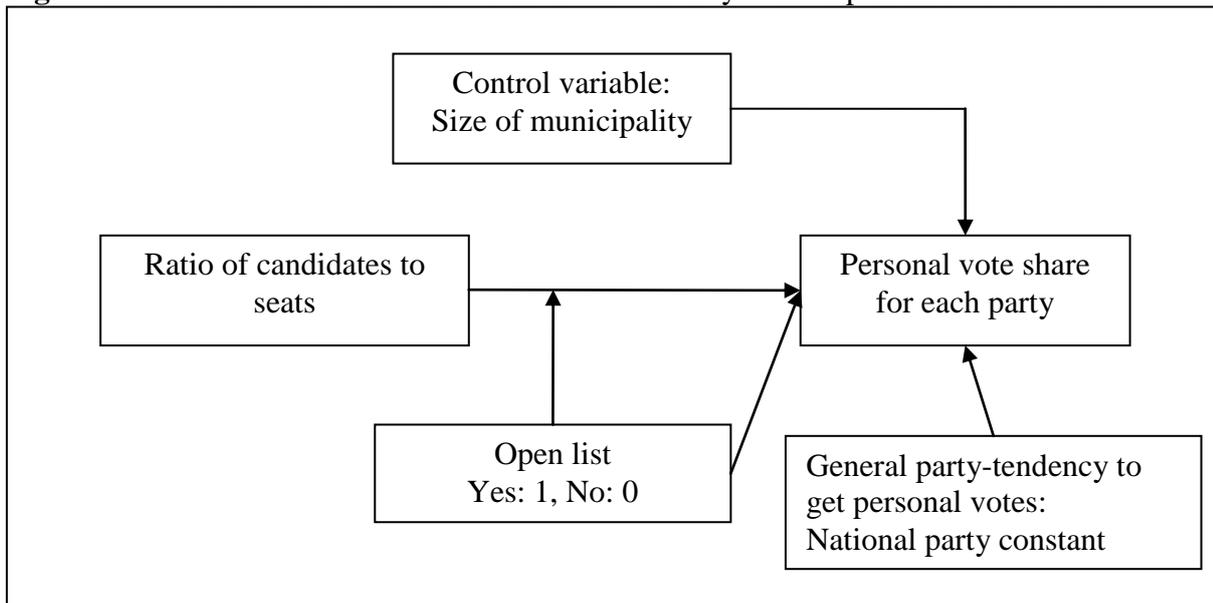


Table 2. Personal votes and electoral system

	Coeff.	Std. error	t	P > t
Open list standing	0.569	0.059	9.59	0.000
Candidate ratio (centered)	0.155	0.163	0.95	0.344
Open list × Candidate ratio	0.751	0.177	4.24	0.000
Size of municipality	-0.269	0.053	-5.07	0.000
<i>Party constants</i>				
Unity party (Left wing)	-0.739	0.096	-7.67	0.000
Socialist People's Party	-0.943	0.084	-11.17	0.000
Social Democrats	-0.461	0.089	-5.21	0.000
Social Liberals	-0.543	0.093	-5.85	0.000
Liberals	-0.369	0.085	-4.36	0.000
Conservatives	-0.355	0.083	-4.25	0.000
Danish People's Party	-0.941	0.086	-10.98	0.000
Local lists (reference)				
Constant	3.909	0.521	7.50	0.000

Dependent variable is personal votes share (logit-transformed).

$N = 733$. $R^2 = 0.483$. Standard errors are adjusted for municipal level clustering effects.

As expected from hypothesis 2 the combination of open list standing and high candidate ratio has a positive effect on the personal vote share. This can be seen from the fact that the coefficient to the interaction term between open list standing and ratio of candidates to seats is positive and strongly significant.

Since the candidate ratio is mean-centered, the interpretation of the positive and strongly significant main effect of open list standing is a strong effect of open list standing on the personal vote share

for local parties with a mean candidate ratio (at about 0.5 i.e., half as many candidates are nominated as there are seats). Thus hypothesis 1 is confirmed as a strong mean tendency.

On the other hand, since the dummy-variable for open list standing is equal to 0 for closed list standing the interpretation of the weak and insignificant main effect of the candidate ratio is that the candidate ratio seems to have no effect on the personal vote share for local parties with closed list standing. Thus, only the first part of hypothesis 2 is confirmed. Contrary to expectation, in Denmark a high candidate ratio is not damaging the incentive to cultivate a personal vote when the local party branch chooses closed list standing.⁴

Local lists are chosen as reference party for the party constants. Since the party constants for all other parties are negative and strongly significant this shows that local lists tend to get more personal votes than expected from the electoral system. This probably reflects that local lists tend to be based on personal relationships within the municipality. The reverse seems to be true for the Socialist People's Party and the Danish People's Party with the strongest negative coefficients. The advantage with the fixed effects model is that the effects on personal vote shares are only estimated from the variation across municipalities with parties, no matter the national level of personal vote share for each party.

In conclusion, a large share of the variation in preferential voting at local elections in Denmark is explained by the design of the electoral system. Not only the option of choosing open list standing, but also a high candidate to seats ratio in combination with open list standing strengthen the incentives to cultivate a personal vote.

The effect of preferential voting on party choice

The following analysis uses municipal-level data and individual-level survey data to investigate if the personal reputation of the local party candidates affects individual party choice, no matter if the choice is for one of the party candidates or for the party as such. The analysis is based on the assumption that the personal vote share for each party at the municipal level can be used as a proxy measure for the reputation of the local party candidates. Consequently, we test the following hypothesis:

Hypothesis 3. The reputation of the local party candidates, measured by the personal vote share, has a positive effect on the probability that the individual voter votes for the party, no matter if the vote is personal or for the party as such.

One of the most established findings concerning local candidates is the advantage of the local incumbent office-holder (Ansolabehere et al., 2000; Rallings et al., 1998). In Danish local politics it is especially the incumbent mayor that has an advantage over other candidates and parties (Kjær, 2007). Consequently, the party which holds the post of mayor (the incumbent party) has a larger probability for being chosen than expected from other causes for party choice. Even if the mayor is replaced by another hopeful candidate within the same party the incumbent party has an advantage (Frandsen, 1997). Voters vote for the incumbent party for a reason, and we expect that the reason is the reputation of the local candidates of the incumbent party by the following hypothesis:

Hypothesis 4. The positive effect of the incumbent party is fully mediated through the reputation of the candidates of the incumbent party.

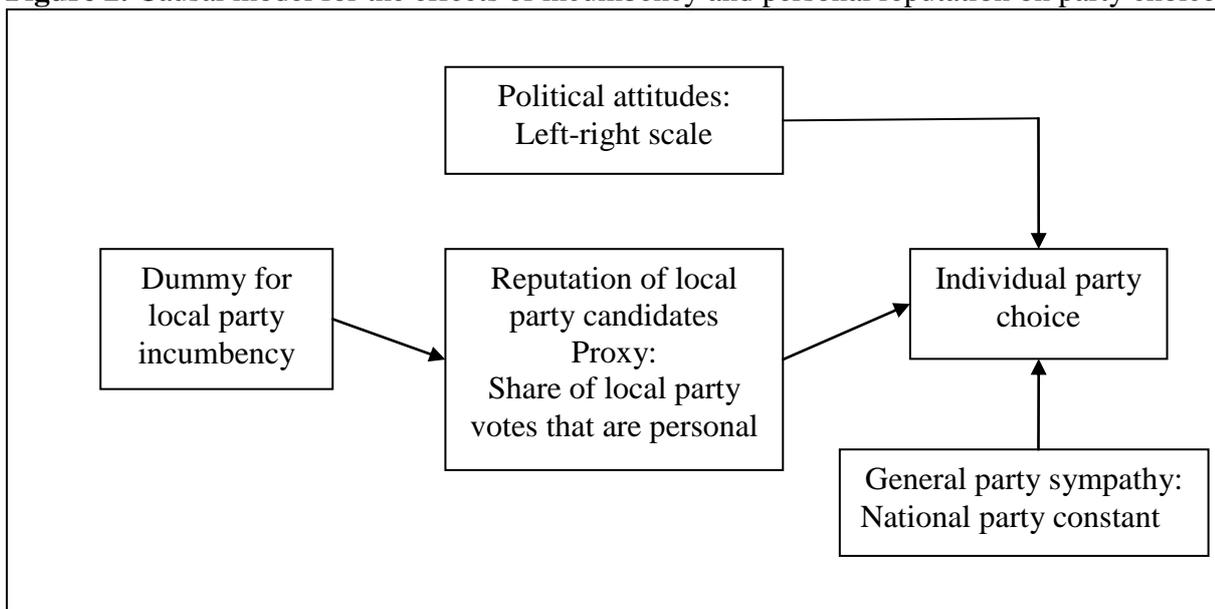
Thus, we expect that there is no direct effect of incumbency on party choice when controlling for the reputation of local party candidates.

On the individual level there are many reasons for choosing a certain party besides the reputation of the candidates. All these reasons are supposed to be reflected in the political attitudes of the individual voter. In Denmark, a variable that to a very high degree reflects the political attitudes of the voter is the position of the voter on the general left-right scale (Thomsen, 2004). The survey respondents were asked to place themselves on this scale with a number from 0 (most left) to 10 (most right). This scale was transformed from -0.5 to +0.5 with the neutral value of 0 for those respondents that were neither leaning to the left or to the right. This variable was used to control for individual-level causes for party choice.

Finally, we expect that the general party sympathy varies between parties because of national politics. We therefore introduce a national party constant for each party at the national level in a fixed effects model, like in the previous analysis.⁵

Figure 2 shows the model for the effects of incumbency and personal reputation on party choice with causal arrows between variables.

Figure 2. Causal model for the effects of incumbency and personal reputation on party choice



The causal pattern in figure 2 shows that there is no direct arrow from the dummy for local party incumbency to individual party choice because all effects of incumbency are supposed to be mediated by the personal reputation of the local candidates, measured by the personal vote share.

The analysis uses 5 different versions of a multilevel multinomial model for party choice with both a fixed and a random part. Table 3 shows the results for the fixed part of the analysis and table 4 shows the results for the random part of the analysis.

Table 3. Results for the fixed part of the analysis of the models for party choice

	Model 1	Model 2	Model 3	Model 4	Model 5
Incumbent party			0.394***		0.106
Personal vote share				0.613***	0.568***
<i>Left-right scale</i>					
Unity party (Left wing)		-1.109	-1.108	-1.106	-1.106
Socialist People's Party		-0.654	-0.651	-0.658	-0.657
Social Democrats		-0.255	-0.251	-0.257	-0.257
Social Liberals		-0.243	-0.239	-0.234	-0.234
Liberals		0.398	0.406	0.400	0.402
Conservatives		0.424	0.425	0.423	0.423
Danish People's Party		0.389	0.397	0.398	0.399
<i>Party constants</i>					
Unity party (Left wing)	-1.009	-2.660	-2.550	-1.900	-1.932
Socialist People's Party	0.903	0.374	0.481	1.143	1.110
Social Democrats	1.700	1.643	1.562	1.887	1.840
Social Liberals	-0.501	-0.558	-0.456	-0.130	-0.137
Liberals	0.579	0.249	0.375	0.548	0.550
Conservatives	1.561	1.251	1.204	1.405	1.372
Danish People's Party	0.387	0.094	0.187	0.870	0.833
Local lists (reference)					
N	21105	21105	21105	21105	21105
Log likelihood	-4858.9	-4301.0	-4277.0	-4230.3	-4228.8
Pseudo R^2	0.140	0.239	0.243	0.251	0.251
Improvement by random part	0.120	0.069	0.057	0.056	0.053

*** p < 0.001. Dependent variable is party choice. Party specific random effects assumed at municipal level.

The main message from the analysis appears in the two first lines of Table 3. They show that incumbency has a significant effect on party choice in a model (Model3) that does not include personal vote share. However, if personal vote share is included (Model 5) incumbency has no significant effect. Thus, personal votes as a proxy for reputation of the local candidates mediate the effect of incumbency, and hypothesis 4 is confirmed. Further, the strong effect of personal vote share on party choice confirms hypothesis 3.

In the following we explain the other results in table 3 and 4. Model 1 is a model that explains party choice exclusively by a constant for each party on the national level (table 3) and by a latent variable on the municipality level with a different loading for each party (table 4). The party constants in model 1 reflect the size at the national level of the different parties in relation to the reference party (Local lists). The loadings in table 4 for model 1 shows that especially Conservatives and Local lists (with large negative loadings) have high unexplained variation not explained by the party constants. The loadings show that these parties tend to be strong in municipalities where Danish People's Party is weak and vice versa. The relative large share of

Pseudo R^2 explained by the random part of the model (0.120 or 12 pct.) shows that the latent random variable has a relatively high "work load" in Model 1, where there are no other independent variables to explain party choice.

Table 4. Results for the random part of the analysis of the models for party choice

	Model 1	Model 2	Model 3	Model 4	Model 5
<i>Loading</i>					
Unity party (Left wing)	-0.306	-0.466	-0.305	-0.188	-0.173
Socialist People's Party	0.376	0.256	0.183	0.207	0.191
Social Democrats	0.632	0.498	0.304	0.322	0.285
Social Liberals	0.605	0.584	0.595	0.616	0.612
Liberals	0.724	0.936	0.840	0.575	0.587
Conservatives	-1.522	-1.394	-0.928	-0.925	-0.855
Danish People's Party	1.166	1.247	1.333	1.438	1.437
Local lists	-1.674	-1.659	-2.021	-2.045	-2.083
N	21105	21105	21105	21105	21105
Log likelihood	-4858.9	-4301.0	-4277.0	-4230.3	-4228.8
Pseudo R^2	0.140	0.239	0.243	0.251	0.251
Improvement by random part	0.120	0.069	0.057	0.056	0.053

Dependent variable is party choice. Party specific random effects assumed at municipal level.

Model 2 introduces the left-right scale on the individual level, and the explanatory power measured by pseudo R^2 is nearly doubled from 0.140 to 0.239, while the improvement with the random part declines to 0.069. As could be expected, the coefficients to the left-right scale (in relation to the neutral reference party of Local lists) are negative for the left-oriented parties from Unity party to Social Liberals and positive for the right-oriented parties from Liberals to Danish People's Party.

With the inclusion of incumbency in Model 3 pseudo R^2 is slightly improve to 0.243 and the random part is slightly reduced to 0.057. Pseudo R^2 is again slightly improved to 0.251 in Model 4 where incumbency is substituted with personal vote share. Pseudo R^2 is not improved in model 5 with both incumbency and personal vote share, because the effect of incumbency disappears when controlling for personal vote share.

When more explanatory variables are introduced from Model 1 to Model 5 the loading for Local list tends to be larger while the loadings for all the other parties tend to be smaller. This suggest that support for Local lists is not well explained by incumbency and by personal vote share, and thus is left to be explained by the latent random variable.

Conclusion

With Danish local elections as an example this paper shows that multilevel models are well suited to explain the effects of the electoral system on preferential voting and the effect of preferential voting on individual party choice. Because the local party branch can choose between open and closed list standing and choose the number of nominated candidates we are able to study the

combined effect of open/closed standing and the ratio of candidates to seats. The analysis confirms the expectation that incentives to develop a personal vote is promoted by open list standing and that a high ratio of candidates to seats also promotes personal votes in open list systems. However, the analysis does not confirm the expected negative effect of the candidate ratio on personal votes when the list system is closed.

Because it is voluntary to give a personal vote in the Danish electoral system it is possible to use the personal vote share at the municipal level as a measure for the reputation of the local party candidates. Consequently, it is also possible to study the effect of the personal reputation of the candidates on individual party choice, no matter if the choice is personal or not. By applying a multilevel multinomial logit model proposed by Rabe-Hesketh and Skrondal (2008) the analysis shows a strong effect of the reputation of local party candidates on individual party choice, and that the effect of incumbency is mediated by the reputation of the candidates of the incumbent party.

The multilevel multinomial logit model has great potential for being used in cross-national research, when the dependent variable have multiple categories and the effect of unobserved national characteristics can be explained by latent random variables.

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Endnotes

¹ A special provision implies that if a candidate receives at least as many personal votes as the Droop quota (1 plus number of valid votes divided by number of seats plus 1) this candidate will "break" the list, but since this is mostly obtained by high ranking candidates, this rule seldom changes which candidates are elected.

² The units of analysis are the 733 different local parties at the municipality level reported in table 1 (with all local lists collapsed to a single party). To take account of floor and ceiling effect for vote shares the personal vote share p_{jk} for party k in municipality j is logit-transformed. The logit-transformed vote share is $y_{jk} = \ln[p_{jk}/(1-p_{jk})]$.

³ A linear regression model with *fixed intercept* for each party is applied. The dependent variable y_{jk} is the logit-transformed personal share of votes for party k in municipality j , cf. endnote 2. The model is

$$y_{kj} = \alpha_0 + \beta_1 x_{1kj} + \beta_2 x_{2kj} + \beta_3 x_{3kj} + \beta_4 x_{2kj} x_{3kj} + \alpha_k + \varepsilon_{kj}$$

where x_{1kj} is size of the municipality measured by the logarithm of the number of valid votes, x_{2kj} is a dummy-variable equal to 1 for open list standing and equal to 0 for closed list standing (however, for the residual category of local lists this variable is the share of local lists with open list standing) and x_{3kj} is the centered candidate ratio (the ratio of the number candidates to the number of seats for each party in the municipality, centered by subtracting the mean candidate ratio of 0,487). α_0 is a fixed intercept for the whole country, α_k is a fixed intercept for each party and ε_{kj} is a random error term. Standard errors are adjusted for a possible clustering effect at the municipality level.

⁴ The explanation for this negative finding might be that in Denmark closed list are not really closed, as explained in endnote 1. Since low ranking candidates might break the list by getting many personal votes, a high number of candidates do not completely discourage the candidates from cultivating a personal vote.

⁵ Each model is estimated as a *multilevel multinomial logit* model with *random intercept* at the municipality level using the Stata module gllamm (Rabe-Hesketh & Skrondal. 2008; Rabe-Hesketh et al., 2004:111-15). In all models the dependent variable Y_{ij} is the choice of party by voter i in municipality j , and this variable takes the values $k = 1, \dots, K$ for each of the K parties. Model 5 with all independent variables is

$$\Pr(Y_{ij} = k | \mathbf{x}) = g(\kappa_k + \beta_{1k} x_{1ij} + \beta_{2k} x_{2jk} + \beta_{3k} x_{3jk} + \alpha_k \theta_j); \quad g(\lambda_{ijk}) = \frac{e^{\lambda_{ijk}}}{e^{\lambda_{i1j}} + e^{\lambda_{i2j}} + \dots + e^{\lambda_{iKj}} + 1}$$

where κ_k is a party constant (*fixed intercept*) for party k , x_{1ij} is the position of voter i on the left-right scale (from -0,5 to +0,5) with the alternative-specific slope β_{1k} . x_{2jk} is a dummy-variable indicating if party k before the election had the post as Mayor in municipality j , and x_{3jk} is the share of votes for party k in municipality j that are personal (logit-transformed, see endnote 4). The first four terms in $g()$ is the fixed part of the model, same as a *conditional logit* model (Long & Freese, 2006: 293-313), while $\alpha_k \theta_j$ is the party specific random intercept for party k in municipality j , where θ_j is a latent random variable at municipality level and α_k is the *loading* of party k on this variable. The latent variable θ_j is similar to a factor in a factor analysis with a single factor that accounts for the correlations in the deviations from the fixed part of the model, with different loading α_k for each party. In the fixed part of the model the reference category is the last party K (in this analysis K is the last category of Local lists, meaning that the coefficients for Local lists are set to 0). To identify the random part of the model one have to choose two different reference parties. The default solution is that gllamm sets party 1 and party K to be reference parties and sets $\alpha_1 = 1$ and $\alpha_K = 0$. If the model subsequently is identified by setting

$$\sum \alpha_k = 0 \quad \text{og} \quad \frac{1}{K} \sum \alpha_k^2 = 1$$

one get the same results no matter which parties initially are chosen as reference parties. However, the sign of α_k can be reversed arbitrarily for all k (as in factor analysis). As a measure for the explanatory power of the model McFadden's Pseudo R^2 is applied. "Improvement by random part" shows improvement in Pseudo R^2 by including the random part, computed as share of Pseudo R^2 for the full model with both fixed and random part. By a pseudo-maximum-likelihood method, described in Rabe-Hesketh & Skrondal (2006), the data is weighted so that each municipality has the same importance in the analysis no matter if the municipality is large or small.