

## **Assessing the Mechanical and Psychological Effects of District Magnitude**

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## Introduction

In Portugal, as in Spain, Switzerland and Finland, the number of MPs to be elected varies substantially across districts. In Portugal (resident, 2005), that number ranged from 2 in the district of Portalegre to 48 in Lisbon. This makes Portugal one of the countries with the largest degree of variation in district magnitude. The question that we address in this paper is simple and straightforward: How much are the vote and the final outcome affected by district magnitude? How different would things be if district magnitude did not vary?

District magnitude is an important aspect of the institutional context, influencing both party strategies and voters' decisions. In PR elections, district magnitude largely affects the degree of proportionality of the electoral outcome. The larger the number of seats to be allocated, the closer should be the correspondence between the distribution of votes and the distribution of seats. Following Duverger (1954), we would expect the potential for a large mechanical effect of the electoral system to be inversely related to district magnitude.

This implies that psychological effects on parties and voters should be stronger in smaller districts. When the number of seats to be allocated is small and the room for a mechanical effect is large, voters and parties should have stronger incentives to behave in a strategic way, anticipating the consequences of the mechanical effect. The crucial link between district magnitude and psychological effects of the electoral system is the viability of candidates and parties. The larger the number of seats is in a given district, the larger the number of candidates and parties with real electoral chances of winning at least one seat

This paper analyses the relation between district magnitude and electoral system effects, focusing on the case of the 2005 Portuguese election. There are two main reasons for selecting that country. First, as mentioned above, Portugal is one of the countries with the largest degree of variation in district magnitude. Second, the main five parties have been presenting candidates in all districts, while the other parties only get few votes and zero seat. In other words, strategic entry and selection bias are issues we do not have to care about when simulating what the results would have been with a more permissive electoral system. Therefore, Portugal fits the ideal conditions for assessing the mechanical and psychological effects of district magnitude.

The rest of the paper proceeds as follows. The second section presents the main characteristics of the party system and the electoral system in Portugal. Then the link between district magnitude and viability and the strategy to estimate the effect of district magnitude are explained. In sections third and fourth the effects of the Portuguese electoral systems are decomposed and the size of the mechanical and psychological effects is estimated. Section five concludes.

## Elections and Parties in Portugal

Elections in Portugal are held by the D'Hondt formula with closed party lists and no electoral threshold. Ignoring the two two-member districts for voters abroad, the 226 MPs in 2005 were elected in twenty districts with magnitudes ranging from 2 (Portalegre) to 48 (Lisbon). The mean district magnitude is 11.25, the median 7 and the standard deviation 11.9. In the sample of sixteen countries using districted proportional representation systems examined by Monroe and Rose (2002) to measure the 'variance effect', Portugal shows the highest district magnitude variation. As these 226 seats are allocated among districts in proportion to their population entitled to vote, the electoral system is almost perfectly apportioned (Samuels and Snyder, 2001). In Figure 1, the Gallagher's index of electoral disproportionality and the effective number of electoral and parliamentary parties in the fourteen elections held from 1975 to 2011 are shown. None of the variables follow a clear pattern as a consequence of the changes in the number of MPs and the emergence of new parties. In a sample of 26 European countries circa 2004, electoral disproportionality in Portugal (2005 election), measured again with Gallagher's least square index, is slightly above the mean (5.7 versus 5.5) and ranked 10th (Gallagher et al, 2005: 364).

[Figure 1 about here]

Since the founding election in 1975, the Portuguese party system has consisted of two major political parties, the centre-left Socialist Party (PS) and the centre-right Social Democratic Party (PPD/PSD), and two minor parties, the Communist Portuguese Party (PCP-PEV), and the conservative alliance between the Social Democratic Center (CDS) and the Popular Party (PP). Since 1975 these parties have consistently managed to elect MPs. Since 1999, a relatively new far left party, the Left Bloc (BE) has also entered Parliament (Lobo and Magalhaes, 2011). In the two elections examined in this paper, the 2002 and 2005 elections, the five parties contested all the twenty resident electoral districts.

The results of the 2005 election are displayed in Table 1. The PS won the election with 46% of the vote and 53% of the seats. The party won seats in every district. The PPD/PSD followed with 30% of the votes and 32% of the seats. Each of the three other parties received 7 or 8% of the votes and between 4 and 6% of the seats.

[Table 1 about here]

Given the absence of significant regional parties, the high nationalization of the Portuguese party system (Caramani, 2004), combined with a substantial variation in district magnitude, creates the ideal scenario for assessing the mechanical and psychological effects of district magnitude. In cross-national analyses of electoral systems district magnitude also significantly varies across and within countries. However, these cross-national studies face three severe problems. First, there is the possibility that their models are omitting some important factor that account for variation in party systems.

The use of crude indicators such as the effective number of ethnic groups to control for cleavage structures, for instance, may not suffice. Second, as Monroe and Rose (2002) notice, when district magnitude varies within countries, as in most national legislatures, mean or median district magnitude may not adequately capture the strength of electoral systems. Finally, in countries such as Spain, Switzerland and even Finland, variation in district magnitude is accompanied by the concentration of minorities in some regions. Accordingly, district-level party systems differ even when district magnitude does not.

To the best of our knowledge, only Bourdain (2007), Gschwend (2007) and Van der Weyden and Meuleman (2008) have systematically examined the impact of district magnitude on voters and party elites in Portuguese elections. Using district-level data from 1975 to 2002, Gschwend concludes that a party who is expected to win no seat will be strategically deserted on average by about the 3 percent of the voters.

Figure 2 shows the relation between district magnitude and party voting strength for the main five parties in the 2005 election. Not surprisingly, with the exception of the PCP-PEV, the two big parties, PS and PPD/PSD, do better in small districts, while the two small parties, CDS-PP and BE, follow the inverse pattern. This does not prove the existence of strategic voting but the pattern is consistent with the hypothesis that small parties suffer from strategic desertion in small districts.

[Figure 2 about here]

### **District magnitude and viability**

The purpose of the study is to ascertain the impact of district magnitude on the vote and the final outcome in the 2005 Portuguese election. We follow the logic suggested by Blais et al. (2011) for assessing the effects of electoral systems. They suggest that the psychological and mechanical effects of the electoral system can be measured when comparing the results of two distinct electoral systems. In our case, we compare districts of varying magnitude, and we use the largest districts as our point of reference. We want to estimate what is the effect of having a system comprising both small (some very small and others somewhat small) and large districts rather than a more permissive system with large districts everywhere.

What could/should change if all districts were large? The first thing that could happen is that more parties would present a list because it is easier for small parties to win a seat in large districts. But in fact each of the five main parties ran in each district and so the psychological effect on parties appears not to be present in this case. We cannot rule out the possibility that some parties invested few resources in mobilizing the vote in small districts where they had little chance of winning a seat (Gallego et al. 2012) but we have no data to test that hypothesis. Our analysis will focus on the five major parties only (PS,

PPD/PSD, CDU, CDS-PP, BE), which are the only ones to have received more than 1 percent of the vote in the 2005 election and all together 98 percent of the vote and 100 percent of the seats.

The second thing that could happen is that the incentive for voters to strategically desert small parties would be weakened since it is relatively easy for even small parties to win seats in large districts. What would change is that all parties would be perceived to be viable, which would reduce or eliminate the strategic desertion of small non viable parties that (presumably) takes place in small districts.

From the voter's perspective, then, the most important change that occurs as she moves from a small to a large district is that more parties become viable. Following previous research (Gschwend 2007; Lago 2008), we define a party as viable if and only if the party won a seat in that district in the previous election. Figure 3 shows the relationship between district magnitude and the number of viable parties in the 2005 Portuguese election (note that the two-seat district of Portalegre and the non-continental districts of Açores and Madeira are excluded here and in the rest of analyses since we have no respondent from those districts in the survey that is used later on). There is a strong (logarithmic) relationship between district magnitude and the number of viable parties. District magnitude explains two-thirds of the variance in the number of viable parties. According to the estimated regression, we should expect only two viable parties when district magnitude is less than 8 (7 districts), three when district magnitude is between 8 and 21 (8 districts), four when district magnitude is between 21 and 35 (there is none), and five when district magnitude is above 35 (2 districts). Most importantly, the relatively close relationship between district magnitude and the number of viable parties is consistent with our assumption that the district magnitude's psychological impact on the vote goes through its effect on party viability.

[Figure 3 about here]

In order to estimate the effects of a change in district magnitude, we need to compare electoral outcomes under two scenarios. On the one hand, we have the current system in which district magnitude ranges from 3 to 48. On the other hand, we wish to simulate what the electoral results would have been if all districts had a magnitude of 48, as in the largest district, Lisbon. For both scenarios, we keep the same aspects of the electoral system, that is, a PR system with d'Hondt rule.

Our reference point is the actual, less permissive system. We thus define the effects as the change in the distribution of seats resulting from using a more permissive system (i.e., large districts everywhere). In order to quantify this effect, we need to focus on the distribution of seats. We will summarize this distribution with two indicators: the degree of fragmentation of the electoral results, as measured by the Effective Number of Parties (ENP) and the number of votes or seats received by small parties (PCP-PEV, CDS-PP, and BE).

As mentioned above, all five major parties have been competing in all districts. This means that we can assume the psychological effect on parties to be absent. Our task is thus to quantify the effect on voters and the mechanical effect. The psychological effect on voters corresponds to the difference between the distribution of seats obtained when citizens' votes reflect their sincere preferences and the distribution of seats when they respond to candidates' viability. Both of these distributions of seats are computed with districts of varying magnitude, that is, with the actual electoral system. To simulate the effect of viability and how this affects citizens' vote, we estimate a model of vote choice, including indicators of citizens' political and partisan preferences, candidate viability, and interaction terms between viability and the preference indicators. This model allows us to predict both citizens' sincere vote (when all candidates are deemed viable) and their vote when some candidates are viable and others are not.

The mechanical effect of the electoral system in a given district is defined as the difference between the simulated effective number of parliamentary parties obtained when distributing votes with 48 seats in each district, and distributing votes with districts of varying magnitude. In other words, the mechanical effect reflects only the change in the distribution of seats due to applying a different electoral system, keeping votes constant.

### **Viability and the vote: the psychological impact**

The first step is to ascertain the impact of viability on vote choice, and for this we need to estimate a vote choice model. Data used in the analysis are drawn from Module 2 of the Comparative Study of Electoral Systems (CSES). The two-seat district of Portalegre and the non-continental districts of Açores and Madeira are not included in the CSES election survey and so only 17 districts are considered in the analyses. The dependent variable is party choice and has five categories: PS, PPD/PSD, PCP-PEV, CDS-PP and BE. Because our measures of preferences concern only the five main parties, our analyses exclude the other parties. However, as said before, this is not particularly problematic as their electoral support is tiny and they did not win any seat.

The utility of voters for parties is described as a function of four variables: their ideological distance from the parties on an 11-point left-right scale ranging from 0 (identical position) to 10 (maximal distance), their party sympathy on a scale ranging from 0 (strongly dislike) to 10 (strongly like), their evaluation of leaders, measured as a dummy variable that equals 1 when the respondent declares that his/her views are best represented by the corresponding party leader and 0 otherwise, and their party identification, measured as a dummy variable that equals 1 when the respondent feels close to the corresponding party and 0 otherwise. In order to calculate the voter's strategic incentives, one variable is included which is derived from the expected viability of parties. This is a dummy variable

measured for every party in each district that equals 1 if the party won a seat in that district in the 2002 election and 0 otherwise.

All our independent variables are alternative specific. That is, they express the relations between a respondent and a given party. The value of these variables can vary across parties for a given respondent. Accordingly, we estimate the model with a conditional logit regression. Table 2 presents the results of our vote choice model. The effect of all four preference variables is significant and in the expected direction. Furthermore, viability moderates the impact of party identification and of the evaluation of party leaders. The goodness-of-fit is excellent.

[Table 2 about here]

With this estimation, we can simulate what the distribution of the vote would be if all districts were large, which would entail that the viability score would equal 1 for each party, and compare with the distribution of the vote under the actual district size and thus the actual viability scores. By definition, the vote distribution would remain the same in the two largest districts where each of the five parties is viable. The predicted vote differs sometime in the smaller districts where the viability scores change.

When predicting how voters would have behaved in a different scenario, we need to account for the uncertainty surrounding our estimated regression parameters. In order to do so, we have taken 1000 draws from the distribution of the estimated parameters. This allows us predicting for each respondent 1000 predicted vote choices with viability being allowed or not to play. Of the 1446 respondents who can be included in the regression model, the predicted vote choices differ only in 25 cases (median value of the 1000 simulations). The implication is that about 2% of the voters would vote differently if all districts were large. The percentage is obviously nil in the two largest districts, but it gets higher in smaller districts. And as it only affects small parties, its impact is not negligible.

[Figure 4 about here]

On the basis of these 1000 estimations, we can determine the median difference in the vote distribution depending on whether viability is allowed or not to play in each district. Figure 4 shows how much the effective number of electoral parties and the percentage of the vote for the small parties (i.e., PCP-PEV, CDS-PP, and BE) increase depending on district magnitude. Table 3 presents the same information differently by summarizing the changes for three types of districts: small, medium, and large. There would be no change, of course, in the large districts. But in the small districts, support for the small parties would increase by more than one percentage point (a relative increase of 8%); the effective number of parties would increase by a value of 0.07. In the country as a whole, small parties would get 0.51 percentage point more. The distribution of the vote would thus change, but only slightly.

[Table 3 about here]

We also establish what this psychological effect on voters entails in terms of seats. Figure 5 shows how many more seats the small parties would obtain, and how much the effective number of legislative parties would increase, comparing predicted votes with and without viability, and using in both cases the existing district magnitude. Again, the same information is shown in Table 3 for the three types of districts. We are then measuring only the psychological impact since we are contrasting predicted vote choices under two scenarios where viability does or does not come into play, while neutralizing the mechanical impact (using the same districts in both cases).

[Figure 5 about here]

We notice that the small increase in the vote share of small parties in small and medium-sized districts is in most cases not sufficient to alter the distribution of seats. As shown by the left-hand panel of Figure 5, there is only one district in which the distribution of seats would change. This is the district of Faro, of magnitude 8. Small parties are thus penalized by the psychological effect, that is, by citizens avoiding to support non-viable parties. But the effect in terms of seats is strongly limited. The right-hand panel of Figure 5 shows the corresponding effect in terms of the effective number of parliamentary parties, which, logically, also varies in a single district.

### **The mechanical impact**

The second stage is to estimate the mechanical effect. In this case we wish to neutralize the psychological effect, and we thus use the simulated vote under a scenario where all parties are viable. We compare the seat distribution that we would obtain with that vote distribution and all districts having the maximum size of 48 with the seat distribution with the same vote but the existing district magnitude.

[Figure 6 about here]

The results are presented in Figure 6 and Table 3. We see that an increase in district magnitude would result in substantial changes, and that, unsurprisingly, these changes are much larger in smaller districts. The effective number of parliamentary parties would increase in virtually all districts. As can be seen in Figure 6, this increase would be as high as 1 effective party in some of the smallest districts. On average, the ENPP would increase by a value of 0.7 in small districts, and by a value of 0.3 in medium sized districts (Table 3). In small districts, the share of seats going to small parties would increase on average from 7.1% to 17.6%, a very substantial shift.

These changes in the distribution of seats are clearly larger than those resulting from the psychological effect on voters. In terms of the share of seats of small parties, the mechanical effect of a larger district magnitude would again surpass those of the psychological effect. Altogether, the mechanical and psychological effects of district magnitude would lead to sizeable changes in the strength of small parties. Their percentage of seats would increase by 4.4 points (from 15.1 to 19.5%), a relative increase of almost 30%. The relative increase in the effective number of parties would be of 10%.

## **Conclusions**

Portugal fits the ideal conditions for assessing the mechanical and psychological effects of district magnitude better than any other case and cross-national analyses. In the terms of Monroe and Rose (2002), Portugal uses a pure 'districted electoral system' in which MPs are elected in twenty districts with magnitudes ranging dramatically from 2 to 48 (resident, 2005) while significant subnational parties are unknown.

The mechanism connecting district magnitude and the effect of district magnitude is the viability of candidates or parties. All else equal, the larger the district magnitude, the larger the number of viable competitors. Therefore, both the mechanical and psychological effects tend to decrease as district magnitude increases.

We have proposed a methodology for estimating such effects in the 2005 Portuguese election based on a counterfactual simulation. What would change if all districts were large, i.e., if parties were viable in all districts as in the largest district, Lisbon? The psychological effect on voters is estimated by comparing the electoral outcomes under the current electoral system and the hypothetical system in which all districts have a magnitude of 48 as in Lisbon. The mechanical effect corresponds to the difference between the effective number of parliamentary parties when keeping the 2005 vote distribution constant but using the current and the hypothetical electoral systems.

According to the simulations, about 2% of voters cast a strategic vote in the 2005 Portuguese election (i.e., they would made a different party choice if all parties were viable in the district). This is a not an irrelevant amount of strategic behaviour on the part of voters if we take into account that only supporters of small (and non-viable) parties in small districts face an opportunity to behave strategically. But as such the psychological effect is not sufficiently large to have an independent impact on the outcome of the election. On the other hand, when the psychological effect is neutralized, changing the electoral system in favour of a more proportional one increases the effective number of parliamentary parties by 0.7 in small districts and 0.3 in medium size districts. In sum, the mechanical effect is clearly larger than the psychological effect in the 2005 Portuguese election. Although the two effects are not particularly large, this is not a surprising result as the 2005 Portuguese election is the twelfth after the restoration of democracy and the effect of district magnitude is substantially weaker than in the first elections.

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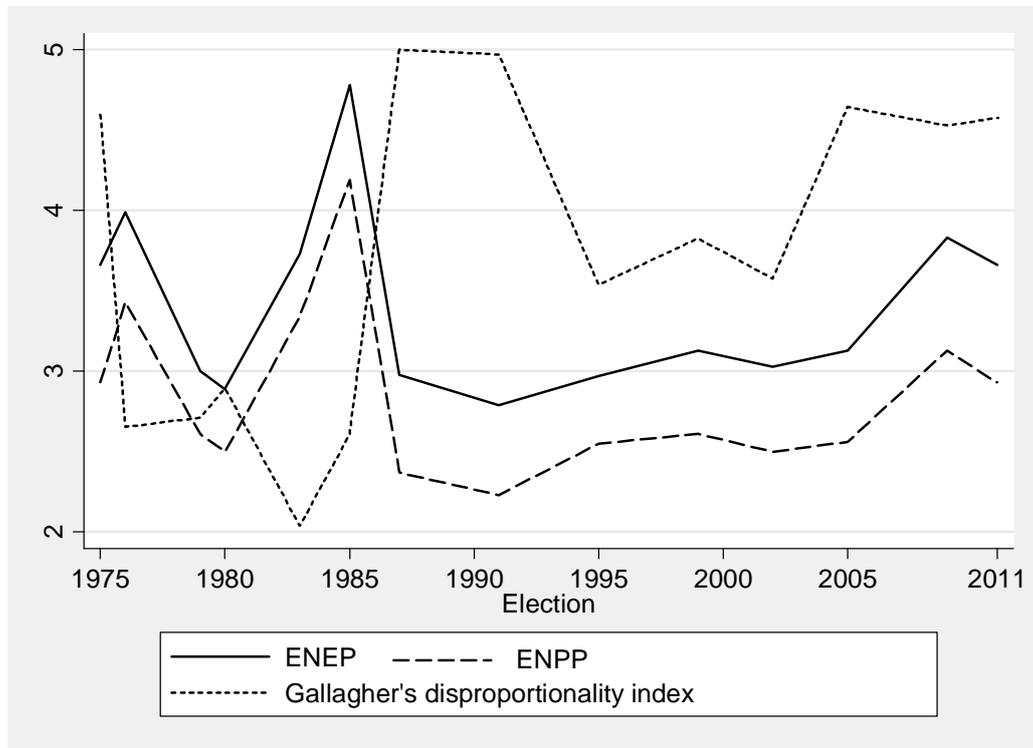


Figure 1. Elections in Portugal, 1975-2011

Table 1. 2005 Portuguese election (resident): national and district-level results

Parties	National level results			District level results (vote)		
	Vote (%)	Seats (%)	Districts with seats	Std. Dev	Min.	Max.
PS	46.40	120 (53,10)	20	5.70	34.98	56.00
PPD/PSD	29.64	72 (31,86)	17	9.16	12.28	45.24
PCP-PEV	7.77	14 (6.19)	7	6.72	1.72	24.08
CDS-PP	7.46	12 (5.31)	8	2.24	2.93	11.40
BE	6.54	8 (3.54)	3	2.09	2.40	10.27
Others	2.19	0 (0,0)	0	—	—	—
Total	100	226	—	—	—	—

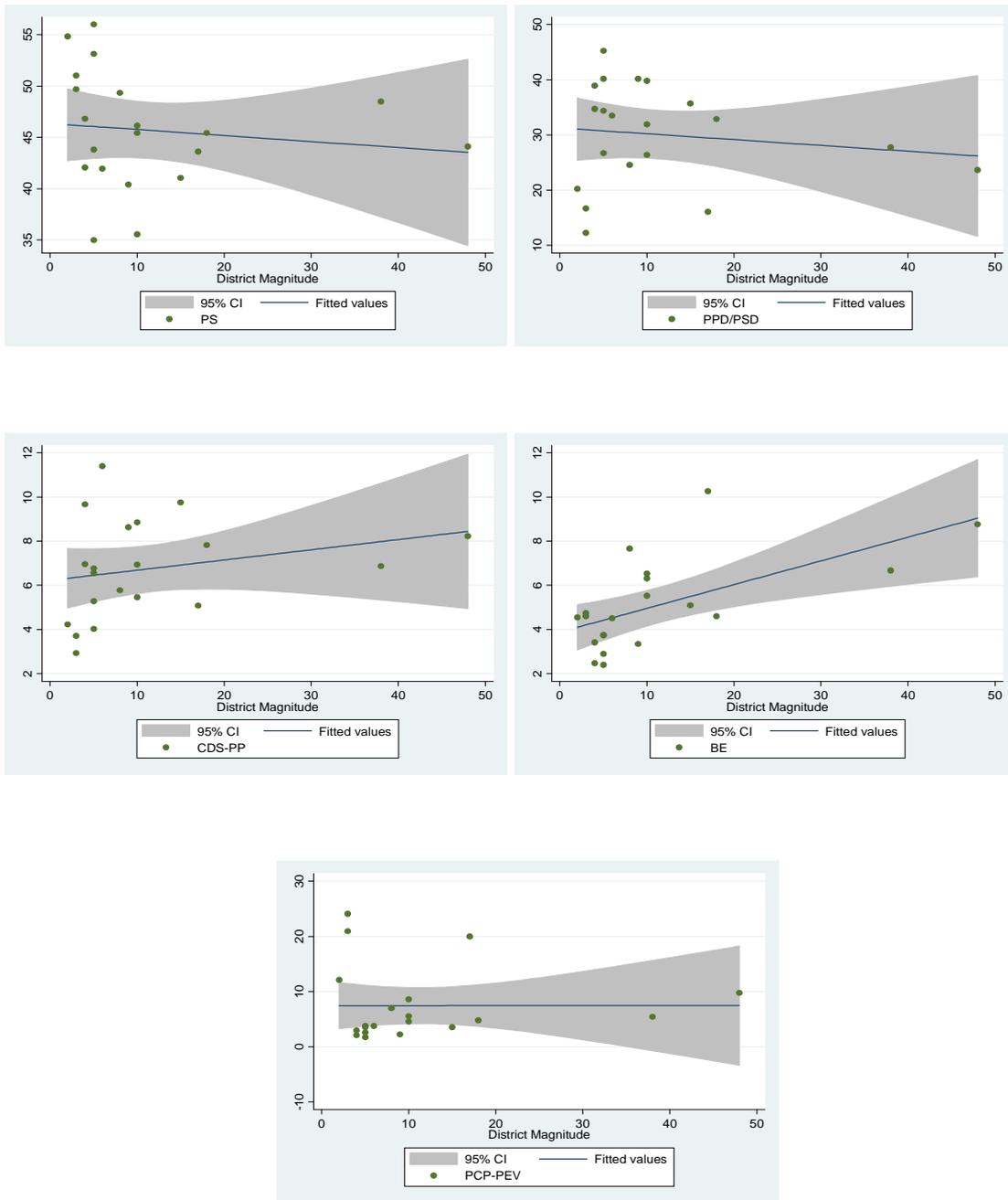


Figure 2. Vote shares of the five main parties in the 2005 election, by district magnitude, and linear prediction with 95% confidence interval

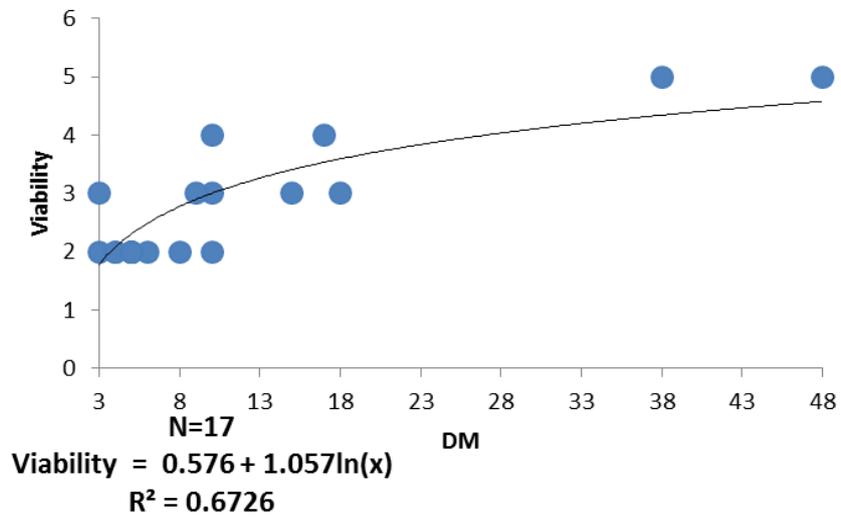


Figure 3: District magnitude and the number of viable parties

Table 2. Model of vote choice (Conditional logit model)

Variable	Coef.	Std. Err.
Viability	0.52	0.49
Left-right distance	-0.21**	0.07
Left-right distance * Viability	0.09	0.07
Party sympathy	0.60***	0.06
Party sympathy * Viability	-0.11	0.06
Leader	0.92**	0.29
Leader * Viability	0.80*	0.36
Party identification	1.15**	0.40
Party id. * Viability	0.84	0.46
BE	-1.33***	0.19
CDS-PP	-0.79***	0.18
PCP-PEV	-0.85***	0.17
PPD/PSD	-0.33**	0.13
N (observations)	7122	
N (respondents)	1446	
Log likelihood	-659.95	
McFadden R <sup>2</sup>	0.71	

\*p<0.05; \*\*p < 0.01; \*\*\*p < 0.001

Table 3. Summary of electoral system effects, by district magnitude

	All districts	By district magnitude		
		<8	8-21	>21
<i>Party system characteristics</i>				
Votes small parties	21.13	16.38	21.24	23.31
ENEP	3.25	2.88	3.27	3.39
% seats small parties	15.11	7.14	12.37	22.09
ENPP	2.53	2.04	2.41	2.91
<i>Psychological effect</i>				
Δ % votes small parties	0.51	1.26	0.74	0.00
Δ ENEP	0.03	0.07	0.05	0.00
Δ % seats small parties	0.47	0.00	1.03	0.00
Δ ENPP	0.02	0.00	0.05	0.00
<i>Mechanical effect</i>				
Δ % seats small parties	3.96	10.42	5.13	0.39
Δ ENPP	0.24	0.66	0.30	0.02
<i>Total effect</i>				
Δ % seats small parties	4.43	10.42	6.16	0.39
Δ ENPP	0.26	0.66	0.36	0.02

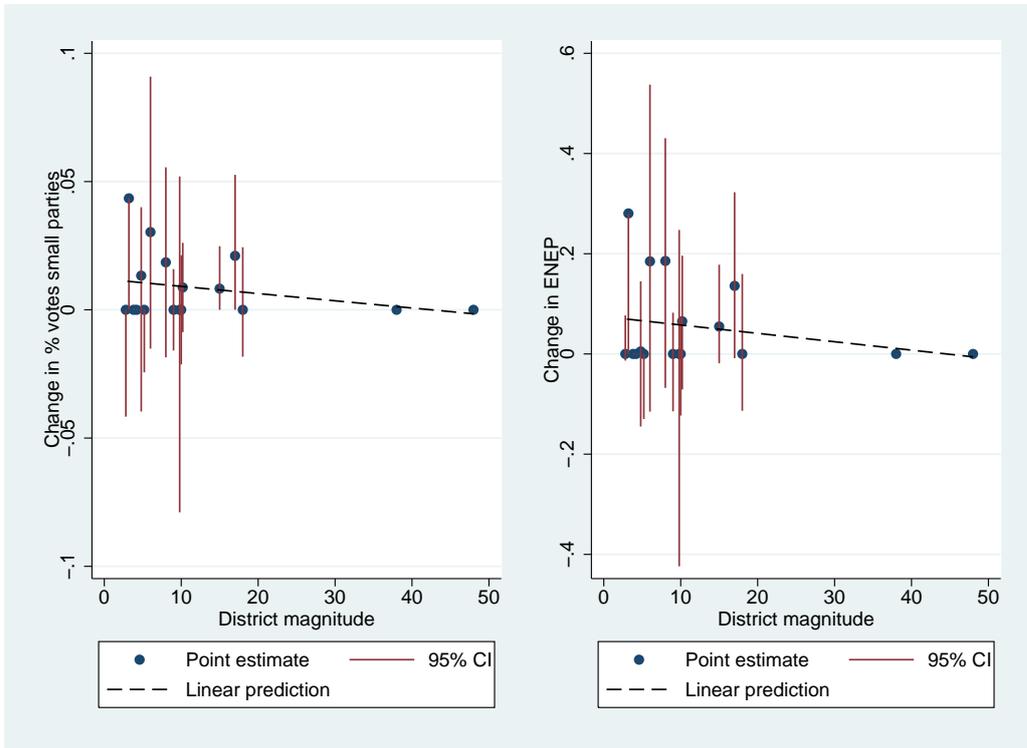


Figure 4. Psychological effect: Change in vote shares of small parties and in the ENEP, by district magnitude

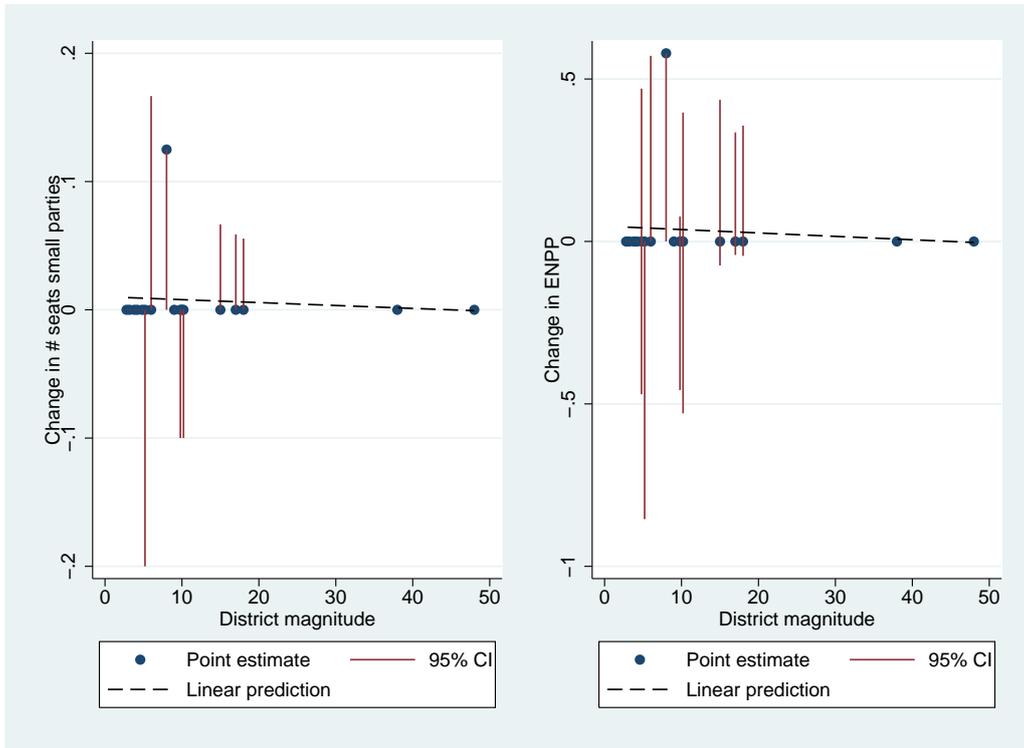


Figure 5. Psychological effect: Change in number of seats of small parties and in the ENPP, by district magnitude

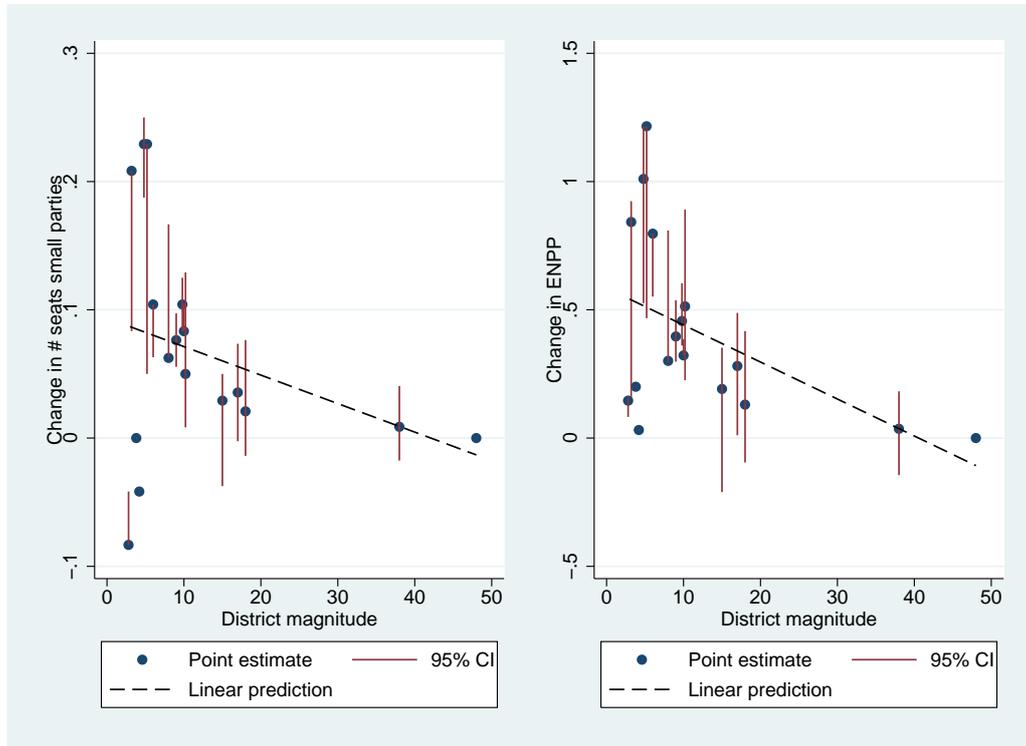


Figure 6. Mechanical effect: Change in number of seats of small parties and in the ENPP, by district magnitude