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David and Goliath in the poll booth: Group size, voting power and voter turnout

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Discussion
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David and Goliath in the Poll Booth: Group Size, Voting Power and Voter Turnout

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Abstract

This article analyses how the presence of a dominant group of voters within the electorate affects voter turnout. Theoretically, we argue that both the absolute size and the relative power of a dominant group influence voters' decision-making process. The former effect derives from increased free-riding incentives and reduced social pressure to vote within a larger dominant group, while the latter effect is driven by instrumental and expressive responses—in both the dominant and dominated groups—to electoral competition between groups. Our empirical analysis of a large cross-section of German municipalities confirms this joint importance of a dominant group's absolute and relative size for voter turnout. Such effects should thus be taken into account when redesigning electoral jurisdictions through, for instance, municipal mergers or gerrymandering.

Keywords:

Voter turnout, Power, Group size, Merger, Gerrymandering.

JEL Codes: D70, D72, H11, H40

1. Introduction

Electoral jurisdictions typically consist of several groups of voters: e.g., neighbourhoods within a city, distinct population centres merged into one municipality, or ethnically, linguistically or income-defined population groups. Yet, electoral jurisdictions generally hold only one general election to decide upon public good provision financed from a common pool of resources within its boundaries. Due to their nature, or the presence of (possibly prohibitive) transportation costs, some of these public goods have a highly localized character and mainly (or only) benefit one specific group (referred to as ‘local’ public goods). For instance, a park or swimming pool in one neighbourhood within a city first and foremost benefits the inhabitants of that neighbourhood. Clearly, with a common pool of resources, such local public goods are desirable for each individual group within the jurisdiction since the costs of their provision will be spread over the jurisdiction’s total population (Weingast et al. 1981; Baron and Ferejohn 1989) inducing a violation of the ‘principle of fiscal equivalence’ (Olson 1969).

The benefits of political representation for each individual group of voters in such a common pool framework in terms of the distribution of public expenditures are by now well understood (Baron and Ferejohn 1989; Besley et al. 2004; Knight 2004, 2008). Clearly, however, in order to gain representation and achieve ones preferred distribution of public expenditures, at least some group members will have to bear the cost of political participation: for instance, by turning out to vote and casting a ballot in favor of the group’s most-preferred candidate. In this article, we therefore analyse what determines the level of voter turnout in a common-pool setting where multiple groups within the same jurisdiction aim for the same prize (i.e. political representation). Specifically, we focus on how the absolute and relative sizes of these various groups affect the incentives for voter turnout. To the best of our knowledge, no study in the vast literature on voter turnout has previously attempted to address this question (for reviews, see Geys 2006a,b; Smets and Van Ham 2013).

Theoretically, we argue that, independent of whether the beneficiaries of local public goods are defined geographically (as in the discussion above and the empirical analysis below) or socio-demographically (e.g., blue-collar vs. white-collar workers or groups of varying racial-ethnic-linguistic backgrounds), the above-described violation of the principle of fiscal equivalence causes more than one contest to characterise an election. First, each group within the jurisdiction will want to win the election, because, as mentioned,

political representation matters for the distribution of public spending (Weingast et al. 1981; Baron and Ferejohn 1989; Besley et al. 2004; Knight 2004, 2008). This induces competition *between* groups. Second, each group must overcome free-riding incentives *within* its members which can be viewed as a competition *within* each group. Importantly, both dimensions of competition are critically affected by the absolute and relative sizes of the groups involved. In particular, we will argue that the absolute size of the largest group depresses voter turnout (due to increased free-riding incentives and reduced social pressure to vote *within* a larger dominant group), but that this effect is mitigated by the *relative* dominance of this group over the dominated groups (i.e. the size of the dominant group relative to the rest of the population in the electoral district). Moreover, we will maintain that the relative size of a dominant group within the electorate can depress or stimulate voter turnout (due to voters' instrumental and expressive responses to the effect of relative group size on the electoral competition *between* groups), depending on its *absolute* size (which affects the relative importance of voters' instrumental and expressive reactions). The empirical evaluation of these theoretical propositions using data on local elections in 577 German municipalities (across seven Länder) shows substantial supportive evidence.

From a policy perspective, these findings have important implications for the design or demarcation policy of government jurisdictions whether via municipal merger processes or gerrymandering. While previous research highlights important economic effects of municipal mergers in terms of fiscal policies (Hinnerich 2009; Blom-Hansen 2010; Blume et al (2011); Reingewertz 2012) and discusses the effect of gerrymandering on vote choice and parties' electoral (dis)advantage (Erikson 1972; Shotts 2002; Johnston 2002; Engstrom 2006), it pays little attention to the potential effect of such redistricting measures on residents' turnout decisions. Our results illustrate that this is an over-simplification, and that the (re)design of electoral districts is likely to influence voter turnout. This effect derives from the changes generated in the electorate's *composition* (i.e. re-defining the absolute and relative size of competing groups), and is independent of the fact that mergers and gerrymandering affect the size of the electorate (which is well known to affect voter turnout and individual voters' feeling of internal political efficacy; Downs 1957; Lassen and Serritzlew 2011; Sørensen, 2013).

In the next section, we provide more detail on our central theoretical argument, and derive a number of testable hypotheses. Then, we turn to their empirical implementation

using data on German municipal-level elections. Finally, we briefly summarize our main findings and discuss their practical relevance.

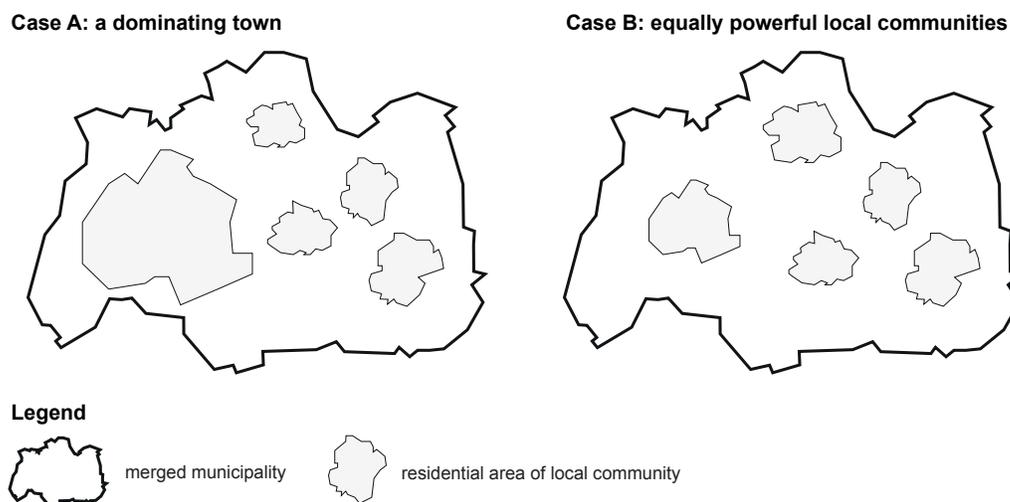
2. Theoretical background

To guide our theoretical discussion, figure 1 depicts two electoral jurisdictions (without loss of generality, one might think of them as municipalities) with five distinct subsets of voters which we will refer to as ‘groups’. These groups can be thought of both in terms of socio-demographic (e.g. race, age, religion, language, occupation) or geographical (e.g. communities, neighbourhoods, districts) characteristics. We are agnostic as to the exact interpretation here, since all that matters for our argument is the existence of several subsets of voters within the electoral jurisdiction that are geographically or socio-demographically connected. As both jurisdictions A and B in figure 1 have an identical set of voters, it is clear that the sole difference between the two jurisdictions is that one group of voters is larger than all others in Case A, while all groups are approximately equal-sized in Case B. To analyse how this size distribution of the various groups in the jurisdiction affects voter turnout in the general election (i.e. at the jurisdiction level), figure 1 already clarifies that two elements should be taken into account: a) the relative size of the dominant group compared to the other groups in the jurisdiction and b) its absolute size. Each of these may influence the decision-making processes of voters *at the margin* (Matsusaka 1995; Geys 2006a; Andersen et al., 2014) and thus can affect turnout.

Starting with the former, the *relative* size of a dominant group directly affects its probability of winning the electoral competition *between* groups (Downs 1957). For instance, in a two-group setting, a dominant group that represents 80% of the population is more likely to win the electoral competition between groups than a dominant group that represents only 55% of the overall population, all else equal. Crucially, however, this might have very different effects on individuals’ turnout decisions in the dominant and dominated groups.

In the dominated group, turnout is likely to decline with the extent to which it is dominated, because individuals in the dominated group realise that their probability to win the election falls (Downs 1957). There may, however, also be some expressive benefit from supporting the group with a competitive disadvantage (the ‘underdog’ effect; Vandello et al. 2007; Goldschmied and Vandello 2009). Nevertheless, there is, to the best of our knowledge, no indication in previous social science research that the strength of such

Figure 1: Representation of possible group-size distributions



underdog support is affected—neither positively, nor negatively—by the relative disadvantage of the underdog. We therefore assume that underdog preferences are independent of the *relative* size of dominant and dominated groups. Consequently, we would expect that, overall, voter turnout is likely to decline in the dominated group with the extent to which it is dominated.

The effect on individuals in the dominant group is a priori unclear. From an instrumental perspective, turnout may fall because its members realise that their vote becomes increasingly less necessary to clench electoral victory. From an expressive perspective, however, turnout may increase when voters obtain utility from supporting the winning group (which may arise due to a benefit from identifying oneself with 'winners' rather than 'losers'; Hinich 1981; Ashworth et al. 2006). The reason is that it becomes more likely for individuals in the dominant group to be in the electorally victorious camp when the relative size of the dominant group increases, which makes an investment in turnout for purely expressive reasons worthwhile. Which of both effects dominates is likely to depend on the absolute size of the dominant group, because the expressive utility from voting is positively related to the number of other voters for the same candidate/party" (Ashworth et al. 2006, 387; Schuessler 2000). This insight builds on the idea that group identification is a function of group size, since one determinant of the distinctiveness of a social category is (...) the number of persons who qualify for inclusion in the category"

(Brewer et al. 1993; see also Brewer 1991; Ellemers et al. 1999). Hence, a larger *absolute* size of a dominant group strengthens the positive effect of expressive utility on turnout, and works to mitigate the downward effect of *relative* dominance on voter turnout. As a direct corollary, this line of argument also implies that the relative dominance of a dominant group will depress voter turnout when the absolute size of the dominant group is sufficiently small. The reason is that the positive ‘expressive’ (or identification) effect is small when the dominant group is small in absolute terms (Brewer 1991; Brewer et al. 1993; Ellemers et al. 1999), which leaves mainly the negative effect of the relative size of the dominant group. This leads to our first two hypotheses.

Hypothesis 1: The *relative* size of a dominant group in the electorate depresses voter turnout.

Hypothesis 2: The effect of a dominant group’s *relative* size on voter turnout becomes less negative when its *absolute* size increases.

Let us now turn to the effect of the *absolute* size of a dominant group on voter turnout. This initially appears of relevance particularly *within* that group. Indeed, from an instrumental rationality perspective a larger dominant group decreases the probability for each individual within that group to be pivotal, which reduces their incentive to vote (Downs 1957). Sociologists such as Georg Simmel have long argued, however, that an increase in absolute group size also makes that individuals within that group tend to become increasingly isolated and more difficult to ‘control’ (Georg Simmel, as discussed in Ritzer and Goodman, 2008). This suggests, from an expressive rationality perspective, that absolute group size undermines the extent of social pressure to vote within groups, which has been argued to sustain the ‘social norm’ of voting (Schram, 1991; Schram and van Winden, 1991; Grossman and Helpman, 2001). Obviously, the probability of being pivotal is very small when a group becomes bigger (Owen and Grofman 1984; Sørensen 2013), while social pressure weakens once the size of the group increases beyond a certain point. Yet, the small absolute size of both elements does not undercut the negative relation between, on the one hand, group size and, on the other hand, pivot probability (Owen and Grofman 1984) and group dynamics (Ritzer and Goodman, 2008). That is, the extent of social pressure to vote experienced by any given individual differs depending on the size of the group to which (s)he belongs. These changes *at the margin* will, in our view, affect the voter turnout decision at the margin.

At the aggregate level, however, this line of argument ignores that such turnout-reduction *within* the dominant group might increase the probability that a dominated group gains the upper hand in the contest *between* groups. This will have two effects. First, since winning the competition *between* groups is desirable for both instrumental (i.e., setting public policy) and expressive (i.e., identifying with the winner) reasons, it provides a counter-weight to the tendency towards abstention in larger dominant groups. The reason lies in the fact that maintaining a dominant position in the competition between groups requires that turnout in the dominant group should not decline too much when its absolute size increases (for a given size of, and turnout in, the dominated groups). Second, it might affect the turnout decision in the dominated group(s). Here, declining turnout in the dominant group may stimulate turnout, as it increases the probability of overturning the balance of power in the competition *between* groups.

A simple numerical example might clarify our reasoning here. Consider three groups with 120000, 40000 and 20000 voters, respectively. Turnout rates are a decreasing function of group size (e.g., due to differing free-riding incentives in groups of different sizes; see above), and stand initially at 20%, 30% and 40%, respectively. Consequently, the 24000 voters in the dominant group win against 12000 and 8000 voters, respectively, in the dominated groups. Now imagine that the dominant group gains 20000 additional individuals, and turnout declines to, say, 15%. This would imply that only 21000 voters will turn out in the dominant group, barely 1000 more than in the dominated groups (at unchanged turnout rates). This closer contest would work to raise turnout in the dominated groups and limit the decline in turnout in the dominant group.

Given these opposing forces, what is the effect of the *absolute* size of a dominant group on voter turnout likely to be? Overall, we expect a negative effect on turnout. A decline in turnout among the dominant group is indeed likely to offset any increase in turnout among the dominant groups, because the former by definition plays out among a larger number of individuals than any potential turnout increase among the dominated groups. This leads to our third and final hypothesis.

Hypothesis 3: The *absolute* size of a dominant group in the electorate depresses voter turnout.

3. Empirical implementation

3.1. Institutional framework and sample

We evaluate our hypotheses using data on municipal-level elections in Germany. Legislative responsibilities in Germany are federally organized and divided between the national and the federal state level. From a legal perspective, local authorities are self-regulatory bodies within the federal states' administration and indirectly fulfil federal state administrative tasks. Nevertheless, local administrations can act autonomously, as guaranteed by the second paragraph of Article 28 of Germany's Constitution (Art. 28, Abs. 2 GG). Following the principle of subsidiarity, this article effectively states that the responsibility to provide public goods and services is concentrated at the local level unless legal regulations assign the provision to higher administrative bodies.¹

The institutional setting and scope of the provision of public goods and services at the local level are determined by the federal states' legal framework. Typically, however, there are three types of public goods and services provided by local governments²:

- a) First, local governments are required to provide certain public goods and services on behalf of the federal state (known as 'Obligatory tasks of the transferred sphere of responsibilities'. Local governments cannot decide *if*, *how much* or *how* a certain good is provided. They can only decide about the administrative effort, as long as the legally defined standards are fulfilled.
- b) Second, local governments are required to provide certain public goods and services where federal states' legal settings define minimum standards of provision (known as 'obligatory tasks of their sphere of responsibilities'. In this case, local governments can decide to provide *additional* services, and chooses *how* the local administration provides the respective goods.
- c) Third, local governments can freely decide to provide certain public goods and services (known as 'voluntary tasks of their sphere of responsibilities'). Local authorities decide *if*, *how* and *how much* of a certain good will be provided.

¹For a more detailed description of Germany's federal system, see, for example, Biehl (1994).

²A detailed description of municipal tasks is given by Zimmermann (1999), pp. 112 ff.

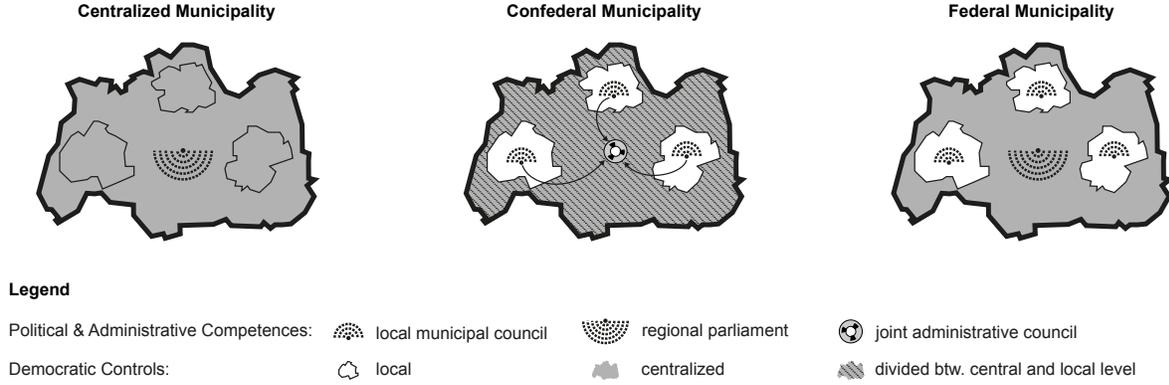
It should be noted that we have consistently referred to local governments rather than municipalities in the discussion above. The reason is that local government in Germany consists of counties ('Kreise'), municipalities ('Gemeinden'), and independent towns ('kreisfreie Staedte'). Independent towns cover functions of counties and municipalities at the same time. Hence, to ensure comparability in the amount of public good provision among the local jurisdictions included in our analysis, our final sample excludes independent towns and focuses purely on municipalities.

We thereby also focus on one particular type of municipalities. There has long been a tendency to increase the size of German municipalities via amalgamations to achieve economies of scale in the provision of local public goods and services. Thus, many current municipalities comprise formerly independent communities, which previously decided independently on public goods provision. As introduced by Michelsen et al. (2014), municipalities in Germany deal with this historical legacy on current collective decision-making in public good provision in three different ways (see figure 2). While two types of municipal governments (referred to as 'federal' and 'confederal' municipalities in figure 2) directly account for possible variation in local preferences within a municipality by having two bodies of government, the third type ('centralized' municipalities) concentrate all decisions in one centralized parliament. Since municipalities with a (con)federal constitution thus explicitly allow for political representation of local communities within the municipality (Michelsen et al. 2014), they provide an institutional solution for any power struggles between geographically distinct groups of voters within a municipality. In the centralized setting, local interests are instead debated in one jointly elected municipal council. Given this institutional design, we only include 'centralized' municipalities in our analysis. This indeed represents the only setting where the absolute and relative size of local communities can affect municipal-level turnout rates.³

To reach our final sample of 577 German municipalities (across seven Länder), we impose two further restrictions. First, to ensure sufficiently comparable political conditions, we only include municipalities that held elections in the 2002-2005 period. Second, we drop geographically homogenous municipalities (i.e., those with only one disentangled

³In some states, so-called 'Ortschaftsverfassungen' allow for some degree of local autonomy. This setting hands back some competences in administering and decision-making on local public good provision to communities. In practice, this opportunity is only rarely applied and limited to a small number of municipal tasks (see Rosenfeld et al. 2007).

Figure 2: Three types of municipalities



Source: Michelsen et al. (2014).

residential area) since our theoretical argument relies on (potential) conflict between different groups within a municipality. As discussed in more detail in the next section, we will operationalise such political conflicts using information about the presence of geographically distinct disentangled residential areas within a municipality (which usually reflect communities merged into one new municipality in the past). All data derive from the German Federal Statistical Office.

3.2. Empirical implementation

Our basic estimation approach consists of the following regression model:

$$turnout_i = \alpha + \varphi_{power} \cdot power_i + \varphi_{interaction} \cdot size_i \times power_i + \varphi_{size} \cdot size_i + \beta X_i + \vartheta_i \quad (1)$$

where $turnout_i$ is defined as the number of votes cast divided by the eligible population in municipality i , X_i is a vector of control variables, α , φ_{power} , $\varphi_{interaction}$, φ_{size} and β are a set of parameters to be estimated, and ϑ_i denotes an i.i.d. error component.

The variables of interest are those measuring the absolute and relative size of the dominant subset of voters in municipality i (as well as their interaction). To most closely capture the idea that “voters’ preferences are likely to be heterogeneous with respect to the geographic location of public services” (Saarimaa and Tukiainen 2012: 2-3; see also Alesina and Spolaore 1997), we thereby define subsets of voters within the municipal population geographically (rather than socio-demographically). An example is provided in Figure 3,

which illustrates that our division rests upon the identification of disentangled residential areas within the municipal boundaries using geo-referencing methods. Particularly, we identify all disentangled residential areas within the administrative boundaries of each municipality, and then focus on those settlements that have their own place name. These place names indicate previously independent localities that merged into one new (larger) municipality, for which we can assume that they are likely to prefer expenditures on local public goods within their residential area (rather than another residential area within the same municipality).

Figure 3: Identification of sub-groups in municipalities



Our measure for the dominant group’s *absolute* size is then simply the number of eligible voters in the largest disentangled residential area within the municipality. Given data constraints, we approximate this by multiplying the share of the largest residential area in the total municipal area with the total municipal population. Its *relative* size is

measured via the Shapley-Shubik and normalized Banzhaf power indices, which quantify the implicit a priori voting power of different groups within the municipality. The underlying idea is that each groups' power in the decision process over local public good provision in the municipality is determined by both its own size *and* that of the other sub-electorates. Putting this information in one measure, the Shapley-Shubik and normalized Banzhaf power indices allow us to quantify how 'power'-ful the largest group is (on a 0-1 scale) in terms of dominating the municipal legislative process, thereby assuming a simple majority rule as the decision process (for a comparison of both indices, see Laruelle and Valenciano 2001). It should be noted, however, that we also replicated the analysis using the population share of the largest residential area, as well as an indicator variable equal to one if the largest residential area exceeded 50% of the population, to measure the relative dominance of the largest group. All results remain qualitatively unchanged under both these alternatives (details upon request). Based on hypothesis 1, we expect that $\varphi_{power} > 0$, while hypothesis 2 suggests that $\varphi_{interaction} > 0$. Hypothesis 3 implies that $\varphi_{size} > 0$.

Taking advantage of the existing literature (for a review, see Geys 2006b), X_i includes variables for the overall size of the municipality (population), the closeness of the election⁴ share of non-partisan votes, share of high- and low-educated inhabitants, share of long- and short-term unemployed, population density, population mobility, municipal age structure and concurrent (EU or state-level) elections. Remaining unobserved level effects across the German territory are accounted for by an East Germany dummy (which captures all municipalities located in the area of the former GDR) as well as three more federal state dummies (other state-level indicator variables are dropped to avoid linear dependency). Detailed variable definitions and descriptive statistics for all variables are provided in Table 1.

Before turning to the main findings, it is important to highlight that since our dependent variable (i.e., turnout) is a fractional response variable, and by definition bounded

⁴Unfortunately, ex-ante data on election closeness from, for instance, pre-election polls are not available at the local level in Germany. Also, significant changes in the municipal structure prevent us from using historical election outcomes as a proxy (note that this would in itself be an imperfect proxy given the long time period between consecutive local elections). The ex post measure of closeness we rely on is, however, potentially endogenous as it may be affected by turnout levels. Still, excluding it from the analysis leaves our key results unaffected. Consequently, we can be fairly sure that its potential endogeneity does not affect our main findings

Table 1: Quasi-maximum likelihood (QMLE) estimation results

Variable	Description	Mean	SD	Min;Max
Endogenous variable				
<i>Turnout</i>	Votes cast/eligible voters	0.5086	0.0794	0.28;0.72
Explanatory variables				
<i>Power</i>	Shapley-Shubik or normalized Banzhaf index	0.7834	0.3010	0.01;1
<i>Size</i>	Number eligible voters in dominating group (in 1000)	0.8010	0.2964	0.01;1
<i>Total population</i>	Number eligible voters in dominating group (in 1000)	6.6269	7.3604	0.20;59.23
<i>Closeness</i>	Total inhabitants (in 1000)	12,854	12,141	0.37;112.23
<i>Non-partisan votes</i>	Difference between winner and runner-up (in %)	0.1905	0.1891	0;1
<i>Population density</i>	Dummy=1 if average share of non-partisan votes exceeds 33.3%	0.3812	0.4861	0;1
<i>Population mobility</i>	Number inhabitants/km2 (in 1000)	0.3278	0.3443	0.01;2.02
<i>HHI age</i>	In- and out-migrants / total population	0.1062	0.0301	0.02;0.22
<i>Long-term unemployment</i>	Herfindahl index of age-structure	0.0704	0.0038	0.06;0.11
<i>Short-term unemployment</i>	Number unemployed over 12 months / total population	0.0152	0.0227	0;0.29
<i>Education high</i>	Number unemployed under 12 months / total population	0.0441	0.0615	0;0.79
<i>Education low</i>	% population with university degree	0.0187	0.0191	0;0.17
<i>Dummy EU election</i>	% population without vocational training and without secondary school education	0.0366	0.0267	0;0.25
<i>Dummy state election</i>	Dummy=1 if concurrent EU election	0.6655	0.4722	0;1
<i>Dummy east</i>	Dummy=1 if concurrent state election	0.1906	0.3931	0;1
<i>Dummy RP</i>	Dummy=1 if former GDR	0.5303	0.4995	0;1
<i>Dummy BW</i>	Dummy=1 if municipality is located in Rhineland-Palatinate	0.0555	0.2291	0;1
<i>Dummy MV</i>	Dummy=1 if municipality is located in Baden-Wuerttemberg	0.279	0.4489	0;1
	Dummy=1 if municipality is located in Mecklenburg-Western Pomerania.	0.0849	0.2790	0;1

on the 0-1 interval, we estimate equation (1) using the quasi-maximum likelihood method (QMLE) based on a Bernoulli log-likelihood function proposed by Papke and Wooldridge (1996).

$$E(\textit{turnout}_i|z_i) = G(z, \pi) \quad (2)$$

where z_i stands for a matrix of all explanatory variables in Eq. (1), including the size and power variables, and π subsumes the corresponding parameter vector. We choose

the non-linear function $G(\cdot)$ to be the logistic function satisfying $0 \leq G(\cdot) \leq 1$. This estimator is preferable to standard OLS or Tobit-based estimators since it is consistent and asymptotically normal regardless of the true distribution of $turnout_i$ on the set of explanatory variables z_i , given that $E(turnout_i|z_i)$ is correctly specified (for detailed discussion, see Papke and Wooldridge 1996; Kieschnick and McCullough 2003). All results are robust, however, to using OLS and a fully parametric (ML) beta regression approach (details upon request).

4. Results

Our main findings are summarized in Tables 2 and 3. Model I relies on the Shapley-Shubik index to proxy the largest group's relative dominance while Model II employs the Banzhaf index. To evaluate the robustness of the results to the use of such power indices for measuring the relative dominance of the largest group, we also replicate the analysis using the population share of the largest residential area (Model III), as well as an indicator variable equal to one if the largest residential area exceeded 50% of the population (Model IV). Overall, our results are robust to this particular choice, and our parameter estimates provide strong support for our theoretical argument in all models estimated. The high explanatory power of all models is underpinned by the R-squared ($R^2=0.56$) at the bottom of Table 2.

To begin with a brief discussion of the control variables, we find that these are largely in line with findings in the existing aggregate-level voter turnout literature (Geys 2006b). For instance, municipalities where a larger share of the population has no or low education witness significantly lower turnout rates. Also in line with earlier results suggesting the importance of concurrent elections (Geys 2006b), we find that concurrent state-level elections increase voter turnout in municipal elections, but concurrent EU elections are linked to lower turnout in municipal elections. One possible explanation is that EU elections are still perceived as second-order elections, which fail to generate sufficient interest and turnout. The total population turns out to have no effect on voter turnout, which is also no unusual finding in the literature. The share of non-partisan votes is linked to significantly higher turnout, which most likely reflects the fact that higher political interest in the municipal population enhances both the number of non-partisan lists being presented to the population and voter turnout. As expected we find the short-run unemployment to have positive effect while the long-term unemployment rate exerts a negative impact on

voter turnout. Finally, we find that population density and mobility have no significant effect on voter turnout in our sample, and that the closeness of the election (measured ex post) *decreases* turnout. While particularly the latter finding, which contradicts Downs' (1957) predictions, is somewhat unexpected, it is not entirely uncommon in the literature (see Geys, 2006b).

Turning now to our key explanatory variables, we first of all find a negative direct effect of the *absolute* number of voters in the largest disentangled residential area within the municipality on voter turnout. Although this appears to weaken when the relative dominance of this largest group increases (as indicated by the positive interaction term in the estimation equation; see also below), the *overall* effect of the dominant group's absolute size never turns positive since both power indices lie between 0 and 1. This results is in line with hypothesis 3, and suggests that an increasing absolute size of a dominant group in the electorate tends to depress overall voter turnout.

Secondly, we find that the effect of the dominant group's *relative* dominance on turnout does depend on its absolute size. The presence of a more powerful group depresses turnout when this group is small in absolute terms (in line with hypothesis 1), but stimulates turnout when it is sufficiently large (i.e., over 4354 individuals, or roughly 51 percent of our observations). This pattern supports the idea—underlying hypothesis 2—that “the number of other voters for the same candidate/party” positively affects individuals' expressive utility from turning out on Election Day (Ashworth et al. 2006, 387; Schuessler 2000).

5. Concluding discussion

This article illustrated that pooling preferences of groups of voters by organising only one election affects voter turnout depending on the extent that one group dominates the others. More specifically, we show that *both* the absolute *and* the relative size of the largest group of voters in the overall population matters. The effects of these two characteristics on turnout are not independent of each other, but influence voters' decision-making process interactively. However, further research is required regarding the complex mechanics underlying democratic decision-making in such settings and on the exact nature of politically relevant cleavages between voter groups (i.e. beyond the geographical dimension in our analysis). Moreover, our empirical analysis is constrained to the case of German municipal elections. These, however, are characterized by a very particular electoral system.

Table 2: Quasi-maximum likelihood (QMLE) estimation results

	Model I (Shapley-Shubik index)			Model II (normalized Banzhaf index)		
	Coef.		Standard error	Coef.		Standard error
<i>Size</i>	-0.038	*	0.016	-0.037	*	0.016
<i>Power</i> × <i>Size</i>	0.030	*	0.013	0.029	*	0.013
<i>Power</i>	-0.130	**	0.044	-0.126	**	0.044
<i>Total Population</i>	-0.003		0.003	-0.003		0.003
<i>Closeness</i>	0.209	**	0.057	0.210	**	0.057
<i>Non-partisan votes</i>	0.067	**	0.022	0.068	**	0.022
<i>Population density</i>	-0.017		0.046	-0.019		0.046
<i>Population mobility</i>	0.049		0.398	0.039		0.398
<i>HHI age</i>	6,699	**	2,504	6,672	**	2,507
<i>Short-term unemployment</i>	1,293	*	0.578	1,316	*	0.587
<i>Long-term unemployment</i>	-3,985	*	1,902	-4,043	*	1,914
<i>Education high</i>	0.250		0.536	0.237		0.536
<i>Education low</i>	-1,613	**	0.469	-1,616	**	0.471
<i>Dummy EU election</i>	-0.243	**	0.050	-0.244	**	0.050
<i>Dummy state election</i>	0.412	**	0.044	0.413	**	0.044
<i>Dummy east</i>	-0.266	**	0.047	-0.265	**	0.047
<i>Dummy RW</i>	0.330	**	0.064	0.331	**	0.064
<i>Dummy BW</i>	0.314	**	0.059	0.316	**	0.059
<i>Dummy MV</i>	0.059		0.047	0.060		0.047
<i>Constant</i>	-0.129		0.192	-0.128		0.193
R^2			0.56			0.56

Note: N=577; **, * indicate significance at the 1%, 5% level of confidence.

Table 3: Robustness checks

	Model III (Dummy = 1 if largest residential area > 50%)			Model IV (Population share largest residential area)		
	Coef.		Standard error	Coef.		Standard error
<i>Size</i>	-0.0268	*	0.0098	-0.0713	*	0.0179
<i>Power</i> × <i>Size</i>	0.0183	*	0.0069	0.0538		0.0134
<i>Power</i>	-0.0852	*	0.0302	-0.0640	*	0.0623
R^2			0.56			0.57

Note: N=577; **, * indicate significance at the 1%, 5% level of confidence.

To test the more general validity of our results, additional research using cross-country comparative designs and analyses involving different types of elections are required.

Overall, however, our analysis provides empirical support for the idea that the design or demarcation policy of electoral districts directly affects voter turnout. Admittedly, this is not an entirely novel finding. Earlier work in the literature assessing municipal amalgamation processes has shown that political involvement and (feelings of) political efficacy of inhabitants is affected by municipal mergers. Yet, as mergers by construction lead to larger political entities, the channel of influence this literature has concentrated on is a simple size effect (e.g. Lassen and Serritzlew 2011; Sørensen 2013). Our findings illustrate that this is likely to be inappropriate, as ‘size’ might only represent half of how individual turnout decisions are made. In fact, mergers not only affect the size of jurisdictions, but are also likely to redefine the relative size and the geographical dispersion of competing groups within a merged jurisdiction. Moreover, looking beyond mergers, re-districting efforts could have no impact on the overall size of an electoral jurisdiction, while strongly affecting its geographic and socio-demographic composition. We highlight that such re-apportionment of the local political power distribution can have strong effects on voter turnout.

Our findings also add to the on-going debate on the potential role of competitiveness (and hence the size of dominant groups or parties) for voter turnout. As pointed out by Geys (2006b), existing scholarship has not come to any clear consensus neither empirically nor theoretically. Abrahamson et al. (2007), for instance, found that the expectation of a more decisive electoral victory reduces the likelihood that people participate in the election (in a majoritarian setting), while Ashworth et al. (2006) find that clear winners may stimulate turnout (in a PR setting). This confirms Grönlund’s (2004) finding that electoral system typology plays a critical mediating role: he indeed finds that the dominance of one group depresses turnout in a plurality system but increases political participation in a proportional setting. Our analysis adds to this debate by indicating that not only the relative size of different groups or parties matters (i.e. their dominance), but also the largest group’s or party’s absolute size and that these effects interact with one another.

From a practical perspective, our results imply that politicians and planners of jurisdictional reforms should take the geographic and socio-demographic composition of amalgamated entities into account. The reason lies in the fact that such reforms and particularly municipal mergers often aim at increasing the efficiency in local public good provision by increasing the size of local governments (Geys et al. 2008). However, since political participation has recently been shown to have a beneficial influence on public

sector efficiency (Borge et al. 2007; Geys et al. 2010), our results imply that the influence of a geographic and socio-demographic re-composition of the population on voters' incentives to turn out on Election Day may either fortify or abate any efficiency gains from mergers that arise from, for instance, economies of scale.

References

- Andersen, J.J., Fiva, J.H., G.J. Natvik (2014). Voting when the Stakes are High. *Journal of Public Economics*, 110, 157-166.
- Ashworth, J., Geys, B., Heyndels, B. (2006). Everyone Likes a Winner: An Empirical Test of the Effect of Electoral Closeness on Turnout in a Context of Expressive Voting. *Public Choice*, 128 (3/4), 383-405.
- Baron, D.P., Ferejohn, J.A. (1989). Bargaining in Legislatures. *American Political Science Review*, 83 (4), 1181-1206.
- Besley, T., Pande R., Rahman, L., Rao, V. (2004). The Politics of Public Good Provision: Evidence from Indian Local Governments. *Journal of the European Economic Association*, 2 (2-3), 416-426.
- Blom-Hansen, J. (2010) Municipal Amalgamations and Common Pool Problems: The Danish Local Government Reform in 2007, *Scandinavian Political Studies*. 33, 517-3.
- Blume, L., Döring, T., Voigt, S. (2011). Fiscal Effects of Reforming Local Constitutions: Recent German Experiences. *Urban Studies*, 48, 2123-2140.
- Borge, L.-E., Falch, T., Tovmo, P. (2008) Public sector efficiency: the roles of political and budgetary institutions, fiscal capacity, and democratic participation, *Public Choice*, 136 (3-4), 475-495.
- Brewer, M.B., (1991). The Social Self: On Being the Same and Being Different at the Same Time, *Personality and Social Psychology Bulletin*, 17(5), 475-482.
- Brewer, M.B., J.M Manzi and J.S. Shaw (1993). In-Group Identification as a Function of Depersonalization, Distinctiveness, and Status. *Psychological Science*, 4(2), 88-92.
- Downs, A. (1957). *An Economic Theory of Democracy*. New York: Harper.
- Ellemers, N., Kortekaas, P., Ouwerkerk, J.W. (1999). Self-categorisation, commitment to the group and group self-esteem as related but distinct aspects of social identity. *European Journal of Social Psychology*, 29(2-3), 371-389.

- Engstrom, E.J. (2006). Stacking the States, Stacking the House: The Partisan Consequences of Congressional Redistricting in the 19th Century. *American Political Science Review*, 100 (3), 419-427.
- Erikson, R.S. (1972). Malapportionment, Gerrymandering, and Party Fortunes in Congressional Elections. *American Political Science Review*, 66 (4), 1234-1245.
- Geys, B. (2006a). 'Rational' Theories of Voter Turnout: A Review. *Political Studies Review*, 4(1), 16-35.
- Geys, B. (2006b). Explaining Voter Turnout: A Review of Aggregate-Level Research. *Electoral Studies*, 25 (4), 637-663.
- Geys, B., Heinemann, F., Kalb, A. (2008) Local Governments in the Wake of Demographic Change: Evidence from German Municipalities, *Finanzarchiv*, 64(4), 434-457.
- Geys, B., Heinemann, F., Kalb, A. (2010) Voter involvement, fiscal autonomy and public sector efficiency: Evidence from German municipalities, *European Journal of Political Economy*, 26(2), 265-278.
- Goldschmied, N., and Vandello, J.A. (2009). The Advantage of Disadvantage: Underdogs in the Political Arena, *Basic and Applied Social Psychology*, 31(1): 24-31.
- Grossman G.M. and E. Helpman (2001), *Special Interest Politics*, MIT Press, Cambridge.
- Grönlund, K. (2004). Voter turnout in politically homogeneous and dichotomous contexts, *Electoral Studies*. 23, 501-524.
- Hinich, M.J. (1981). Voting as an Act of Contribution. *Public Choice*, 36, 135-140.
- Hinnerich, B. (2009) Do merging local governments free ride on their counterparts when facing boundary reform? *Journal of Public Economics*, 93 (5-6), 721-728.
- Johnston, R. (2002). Manipulating maps and winning elections: Measuring the impact of malapportionment and gerrymandering, *Political Geography*, 21 (1), 1-31.
- Kieschnick, R. McCullough, B. (2003). Regression Analysis of Variates Observed on (0,1): Percentages, Proportions and Fractions. *Statistical Modelling*, 3 (3), 193-213.
- Knight, B. (2004). Parochial Interests and the Centralized Provision of Local Public Goods: Evidence from Congressional Voting on Transport Projects. *Journal of Public*

Economics, 88 (3-4), 845-866.

Knight, B. (2008). Legislative Representation, Bargaining Power and the Distribution of Federal Funds: Evidence from the US Congress. *Economic Journal*, 118 (532), 1785-1803.

Laruelle, A. Valenciano, F. (2001). Shapley-Shubik and Banzhaf Indices Revisited, *Mathematics of Operations Research*, 26 (1), 89-104.

Lassen, D.D. S. Serritzlew (2011). Jurisdiction Size and Local Democracy: Evidence on Internal Political Efficacy from Large-Scale Municipal Reform. *American Political Science Review*, 105 (2), 238-258.

Matsusaka, J.G. (1995). Explaining Voter Turnout Patterns: An Information Theory. *Public Choice*, 84 (1-2), 91117.

Michelsen, C., Boenisch, P., Geys, B. (2014). (De)Centralization and Voter Turnout: Theory and Evidence from German Municipalities. *Public Choice*, 159(3-4), 469-438.

Olson, M.J. (1969). The Principle of 'Fiscal Equivalence': The Division of Responsibilities among Different Levels of Government. *American Economic Review*, 59 (2) 479487.

Owen, G. B. Grofman (1984). To Vote or not to Vote: the Paradox on Nonvoting. *Public Choice*, 42, 311-325.

Papke, L.E. Wooldridge, J.M. (1996). Econometric Methods for Fractional Response Variables with an Application to 401(K) Plan Participation Rates. *Journal of Applied Econometrics*, 11 (6), 61932.

Reingewertz, Y. (2012) Do municipal amalgamations work? Evidence from municipalities in Israel, *Journal of Urban Economics*. 72 (2-3), 240251.

Ritzer, G. and Goodman, D.J. (2008). *Sociological Theory* 7th Edition. McGraw-Hill, New York.

- Rosenfeld, M.T.W., Kluth, W., Haug, P., Heimpold, G., Michelsen, C., Nuckelt, J. (2007). Zur Wirtschaftlichkeit gemeindlicher Verwaltungsstrukturen in Sachsen-Anhalt. Institut für Wirtschaftsforschung Halle, Halle.
- Saarimaa, T. Tukiainen, J. (2012). Do Voters Value Local Representation and Why? Evidence from Electoral Boundary Reforms. *Mimeo*.
- Schram A.J.H.C. (1991), Voter Behavior in Comparative Perspective, Springer-Verlag, Berlin.
- Schram A.J.H.C. and F. Van Winden (1991), Why People Vote: Free Riding and the Production and Consumption of Social Pressure, *Journal of Economic Psychology*, 12, 575-620.
- Schuessler, A.A. (2000). A Logic of Expressive Choice. Princeton University Press, Princeton.
- Shotts, K.W. (2002). Gerrymandering, Legislative Composition, and National Policy Outcomes. *American Journal of Political Science*, 46 (2), 398-414.
- Smets, K. Van Ham, C. (2013). The Embarrassment of Riches? A Review of Individual-Level Research on Voter Turnout. *Electoral Studies*, 32(2), 344-359.
- Sørensen, R.J. (2013). Local Government Structure and Voter Turnout, *Mimeo*.
- Vandello, J.A., Goldschmied, N.P., Richards, D.A.R. (2007). The Appeal of the Underdog, *Personality and Social Psychology Bulletin*, 33, 1603-1616.
- Weingast, B.R., Shepsle, K.A., Johnsen, C. (1981). The Political Economy of Benefits and Costs: A Neoclassical Approach to Distributive Politics. *Journal of Political Economy*, 89 (4), 642-664.
- Zimmermann, H. (1999). Eine Einführung in die Lehre von der öffentlichen Finanzwirtschaft, Munich:Vahlen.