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Abstract

We analyze whether voters value local political representation by exploiting municipal mergers, which increase the number of candidates available to voters and intensify political competition. In the Finnish open-list proportional representation system, voters rank the candidates within parties, and thus, concentrating votes to local candidates increases the extent of local representation. Using a difference-in-differences strategy, we find that the vote distributions become more concentrated in municipalities less likely to gain local representation after the mergers. Moreover, the effect is much larger in municipalities where the benefits of local representation to voters are large. The latter result disentangles voters' responses from the responses of other political actors. The results are important also for designing local government mergers, which are an important policy tool in many countries. They highlight that concerns over deteriorating local democracy due to mergers have merit, because voters have preferences for local representation. At the same time, the vote concentration patterns we find alleviate these concerns.

Key words: Electoral boundary reform, difference-in-differences, local representation, municipality mergers, strategic voting.

JEL classes: C21, C23, D72, H73, H77.

1. Introduction

Received literature in both economics and political science shows that representation in a legislative body matters for the geographic distribution of centralized spending and the type of public spending in general.¹ Representation should be important also at the local level. If households sort into local communities based on their preferences concerning local public goods as suggested by Tiebout (1956), a local candidate is likely to share voters' preferences over the service-tax bundle that the local public sector offers. In addition, voters' preferences are likely to be heterogeneous with respect to the geographic location of the services. Moreover, local governments cater to these heterogeneous preferences from a common pool of funds, which implies that voters need a local representative to ensure their own share of the spending (Weingast et al. 1981) and to prevent others from spending too much (Baron and Ferejohn 1989).

In this paper, we analyze whether voters value local political representation by studying how voters in municipal council elections reacted to a recent wave of municipality mergers in Finland.² Here local representation refers to the candidates residing in the voters' pre-merger municipalities who are elected to the post-merger municipal council. Using the terminology coined by Duverger (1954), a municipal merger can be seen as an electoral boundary reform that results in both *mechanical* and *psychological* effects. The mechanical effects of a merger result from the way it changes the set of voters that are able to vote for a given candidate, the set of candidates competing against each other and the number of seats over which they compete. The

¹ See e.g. Knight (2005 and 2008), Dragu and Rodden (2011) and Albouy (2013) for evidence on the geographic distribution of centralized spending and Pande (2003) and Chattopadhyay and Duflo (2004) concerning spending that benefits minority groups.

² A related branch of research is interested in the effects of electoral rules on voting. See e.g. Blais et al. (2011) and Fiva and Folke (2014). These papers do not analyze changes in geographic electoral boundaries. Furthermore, redistricting and voting has been studied previously in national elections (e.g. Ansolabehere et al. 2000 and Hayes and McKee 2009).

mechanical effects are likely to lead to psychological effects, i.e. behavioral responses by political actors.

For our purposes, the essential feature of the Finnish local election system is that each voter casts a single vote to a single candidate meaning that voters (not parties) decide which candidates are elected from a given list. Therefore, votes contain information on voter preferences over individual candidates. From the voters' point of view, the electoral boundary reforms have two major components. First, a merger can be seen as an expansion of the voters' choice set, because in the merged municipalities voters can also vote for new non-local candidates. If the location of candidates is not relevant to voters, at least some voters should find a better match from the new larger set of alternatives. If so, the vote distribution of a municipality (when measured at the pre-merger level) should be less concentrated after a merger as votes are scattered to a larger number of candidates. If, however, voters prefer local over non-local candidates, they should keep on voting them regardless of the new choices available. This, in turn, should result either in no change or in a more concentrated vote distribution depending on the number of local candidates in the post-merger elections. According to a standard revealed preference argument, if we observe a voter choosing a local candidate over a non-local candidate when both are available, this choice reveals a preference for local over non-local candidates.

Second, by increasing political competition, a merger profoundly affects the extent of local representation, i.e. the expected number of representatives from voters' pre-merger municipalities in the post-merger municipal council. If voters value local representation *and* act strategically, i.e. take into account election probabilities, voters should concentrate votes to those local candidates that have a genuine chance of winning a seat from a non-local candidate. This means that vote concentration should increase with the strategic incentives.

The boundary reforms naturally facilitate a difference-in-differences (DID) analysis where the unit of observation is the pre-merger municipality and

voting data come from elections before (2004 elections) and after (2008 elections) the merger wave. The key aspect of our analysis is that we can decompose a merged municipality into the original pre-merger municipalities and trace back the vote distributions of individual candidates at the pre-merger municipal level both before and after the mergers. Furthermore, using the pre-reform vote distributions and the post-merger municipalities as new electoral districts, we can calculate counterfactual election outcomes that measure the mechanical effects of the mergers on local representation, i.e. the expected electoral success of local candidates. Our interest lies on the voters' psychological response to these mechanical effects.

We find that the vote distributions of the merged municipalities are clearly more concentrated in the post-merger elections than before, whereas there is no change among the municipalities that did not merge. More importantly, however, the concentration effect is clearly larger in municipalities with higher treatment intensity.³ In fact, we find no vote concentration among the merged municipalities that did not expect to lose representation (typically large municipalities merging with smaller partners), but find substantial vote concentration among municipalities that did expect a substantial loss (typically small municipalities merging with larger partners). This happened despite the fact that the voters in these municipalities had a much larger set of candidates and parties to choose from after a merger. We report the same patterns in overall vote distributions and the vote distributions over local candidates.

We also analyze whether the voters' response is larger in municipalities where the benefits of gaining local representation are larger. For example, losing local services, such as day care centers or schools, has more negative consequences in the localities farther away from the new location of these services (typically the new municipal center) due to increase in travel costs. Our

³ The mergers were decided voluntarily at the local level and are a non-randomly selected sample both from the perspective of the merger decision and the intensity of the treatment. Reassuringly, our DID design is valid in the light of common pre-trend tests (both the merger decision and merger subgroups with different treatment intensity), alternative control group (municipalities that considered merging, but eventually did not) and controlling for observables.

main finding in this respect is that the effect of our treatment on vote concentration increases substantially both as the geographic distance of voters' to the center of the new municipality (the largest municipality in a merger) and income heterogeneity between merging municipalities increase. The first result suggests that voters care about the geographic location of public services, and the second, that there is between municipality preference heterogeneity over services in accordance with Tiebout (1956) sorting. Overall, our findings show that voters value local representation so that the geographic location is an important attribute of a candidate. Our findings are also consistent with strategic voting in order to increase local representation.

The question remains whether we can attribute the changes in vote distributions to voter behavior instead the behavior of other political actors. Overall, the reform had a large effect on the set of available candidates both in terms of quantity and quality. However, we show that these party and candidate responses are not related to the preference heterogeneity measures that are important to voters. This observation is crucial and allows us to disentangle voters' behavioral responses from the confounding responses of other political actors. We also discuss at length why alternative explanations, such as campaigning, changes in voter preferences, voters rewarding for merger decisions or information advantages of local candidates, are unlikely to explain our findings.

Finally, it is interesting to note that voters were quite successful in their efforts. In our data, 20 out of the 120 merged municipalities would not have gained any representation into the post-merger council in our counterfactual elections. In reality, these municipalities gained on average almost three representatives (maximum of 7) and only one of these municipalities failed to gain a single one.

Our findings show that concerns over deteriorating local democracy due to mergers are important because of preferences for local representation, but the

vote concentration we report alleviates these concerns.⁴ This result is of substantial interest since municipal mergers have been an important policy tool in many countries. Major merger reforms have been implemented over time in a number of countries including Canada, Denmark, Germany, Israel, Japan, Sweden and Switzerland (Dafflon 2012; Blom-Hansen et al. 2014; Hinnerich 2009; Reingewertz 2012; Weese 2015). However, the political effects of these reforms have been largely neglected in the prior literature. These arguments apply also to mergers of other local jurisdictions, such as school districts (Gordon and Knight 2009).

Our results fill a clear gap in the literature, because, to our knowledge, this is the first paper to offer evidence concerning voter preferences for local representation using actual voting data from a natural experiment.⁵ We also contribute to the small, but growing literature that tests strategic voting using natural experiments by analyzing voter behavior in a novel context.⁶

The rest of the paper is organized as follows. In the next section, we briefly describe the institutional framework. In Section 3, we describe the boundary reforms in more detail. We present our econometric approach in Section 4 and the results in Section 5. The first part of Section 5 describes how the voters' choice set changes due to the boundary reforms and the second part analyzes voters' behavior. Section 6 concludes.

⁴ For a more detailed discussion on jurisdiction size and democracy, see Verba and Nie (1972), Dahl and Tufte (1973), Treisman (2011) and Lassen and Serritzlew (2011).

⁵ Prior research typically resorts to surveys when measuring voter preferences, which brings about its own complications on the appropriate survey design (see e.g. Ansolabehere et al. 2008), and issues that survey results are often highly responsive to seemingly trivial changes in the questionnaire or survey timing (Zaller and Feldman 1992). Shugart et al. (2005) offer complementary, but indirect evidence that voters use candidate's locality as an informational cue, whereas Nemoto and Shugart (2013) use evidence from a natural experiment to study how localism affects parties' strategic choices in candidate placement.

⁶ A substantial literature studies the extent of strategic voting using survey data (e.g. Blais et al. 2001; Blais et al. 2005; Abramson et al. 2010). However, the results vary depending on the survey design (Alvarez and Nagler 2000). Studies using actual election data usually report substantial strategic voting (e.g. Cox 1997; Fujiwara 2011; Lago 2012; Kawai and Watanabe 2013; Spenkuch 2014).

2. Institutional background

In Finland, public goods and services are provided by two tiers of government where municipalities constitute the local level. Municipalities are of considerable importance to the whole economy as they employ around 20 percent of the total workforce. The bulk of municipalities' expenditures come from producing social and health care services and primary education. In most of these services, the geographic location of services is relevant for the citizens. The most important revenue source is the flat municipal income tax which the municipalities can set freely. A central government grant system, consisting of 20 percent of total revenue, is used to equalize local cost and revenue disparities.

Mergers between municipalities are voluntarily. If a proposed merger gains a majority in all the participating councils, the merger goes through and if not, the municipalities continue as they were. We analyze municipal elections before and after the mergers that took place between the 2004 and 2008 municipal elections. Between these two elections, there were 47 municipal mergers involving 130 municipalities. The number of municipalities in a given merger ranged from 2 to 10 municipalities. Between these elections, the number of municipalities diminished from 432 to 348.

Our focus is not on the reasons behind this recent merger wave. In public discussion, the merger wave is often seen as a result of increasing fiscal pressure due to differences in population trends and aging across municipalities making it difficult for small and poor municipalities to cope with their responsibilities. Saarimaa and Tukiainen (2014) describe the determinants of these mergers and find evidence suggesting that fiscal pressure, voter preferences and local democracy considerations influence the merger decisions. Hyytinen et al. (2014) study these decisions at the individual councilor level and find that councilors' re-election concerns play a role.

Municipal councils are the main seat of power in the Finnish municipal decision making. Finland has a proportional representation (PR) system with

eight parties that dominate national and municipal politics. In the 2004 municipal elections, the three largest parties (the Centre Party, the Social Democrats and the National Coalition) received roughly 68 percent of the votes with roughly similar shares. All municipalities have the elections on the fourth Sunday of October. The council term lasts for four years starting from January after the elections. Only permanent residents of a municipality can vote or run for a council seat. Each municipality has only one electoral district (i.e. constituency) and no geographic quotas are in place, even after a merger.

The municipal elections use an open-list method. The crucial feature for our analysis is that each voter casts a single vote to a single individual candidate. Importantly, voters cannot vote for a party without specifying a candidate. Council seats are allocated to parties based on the party vote shares in accordance with competitive indices set by the d'Hondt method. Thus, voters determine the position of the candidates within the party list, whereas parties are allocated seats according to the sum of votes over the individual candidates. The lists are presented to voters in alphabetical order so the parties cannot signal their preferred order using the list. Of course, parties may act as gatekeepers in deciding who gets to run.

In systems with closed lists, analysis of voter preferences over individual candidates would not be possible because the parties determine the list rankings. In this case, however, the analysis of strategic party responses would still be possible (see e.g. Galasso and Nannicini 2015). Thus, electoral boundary reforms together with open list elections offer a unique opportunity to study voter preferences over individual candidates.

3. Mergers as electoral boundary reforms

Mergers like all electoral reforms bring about both mechanical and psychological effects. Since our focus is on local representation, the mechanical effect of interest refers to the way the reform changes the extent of representation from the perspective of the pre-merger municipalities. These

mechanical effects arise because the reform changes mechanically the set of voters that are able to vote for given candidates, the set of candidates that compete over council seats and the number of available council seats (relative to number of voters). The way a given merger changes the latter two components is driven by electoral rules governing the council size and the maximum number of candidates that parties are allowed to nominate. In Finland, the municipal council size is an increasing but concave step function of municipality's population, whereas the maximum number of candidates per party or list size is 1.5 times the council size.⁷ Typically the constraint on the list size is binding only in the larger municipalities.

Our main interest lies on the psychological effects, i.e. how different political actors respond to these mechanical effects. We concentrate on voter behavior, but at the same time we need to carefully consider the role that candidates and parties, as the supply side of politics, play in shaping the voters' new choice set. After a merger is decided, candidates and parties make their decisions concerning the composition of party lists and campaigning by taking into account the mechanical effects. These responses together with the mechanical effects determine the new choice set that voters face in the 2008 elections.

From the point of view of voters and local representation, the most important mechanical effects are related to the probability of electing a local candidate or the expected number of elected local candidates and changes in the set of candidates to choose from. We can construct a measure of the mechanical effects of interest by calculating counterfactual election outcomes for each individual candidate using actual votes and candidates from the 2004 elections,

⁷ The council size is determined as follows: 13, 15 or 17 seats for a municipal population of 2000 or less, 21 for 2,001–4,000; 27 for 4,001–8,000; 35 for 8,001–15,000; 43 for 15,001–30,000; 51 for 30,001–60,000; 59 for 60,001–120,000; 67 for 120,001–250,000; 75 for 250,001–400,000 and 85 for over 400,000. As an example, consider two municipalities with populations of 3,000 and 25,000, respectively. Before the merger, the council sizes of these municipalities are 21 and 43. After the merger, the council size will be 43.

but assuming that the mergers had taken place.⁸ Using these counterfactual election outcomes, we can calculate the share of the 2004 pre-merger candidates that would make it into the new post-merger council with their 2004 votes. This share is measured at the 2004 pre-merger municipality level.⁹ Formally, our treatment variable for municipality i that participates in merger j (i.e. the new municipality) is

$$(1) \quad \textit{Seatloss}_{ij} = 1 - \frac{\textit{councilors from } i \textit{ in council } j}{\textit{council size in } j},$$

where the new council size in merger j is dictated by the council size rule and the population of the new merged municipality. This measure equals 0 if municipality i would get all the council seats in the post-merger council (effectively no treatment) and it equals one if it gets none of the seats (maximum treatment intensity). The variable is equal to zero also for the municipalities that did not merge.

Due to the election system, the *Seatloss* measure mainly captures situations where the benefit of vote concentration is getting local candidates past the non-local candidates in *within* party rankings. However, within party concentration does not increase local representation if parties have very different support bases in different municipalities within a merger. Fortunately, the three largest parties have significant support base in almost all the municipalities making this concern irrelevant in practice (see Figure A1 in the Appendix).

⁸ Hyytinen et al. (2014) do similar calculations, but introduce candidate level uncertainty using a bootstrap procedure. Fiva and Folke (2014) also calculate counterfactual elections when they study the effects of a reform in election rules.

⁹ We believe that this is a salient measure from the voters' perspective. For example, Hyytinen et al. (2014) report a number of instances where local newspapers ran similar counterfactual elections before the first elections after a merger and reported what the new council composition would be. Also prior evidence from political science literature (e.g. Lago 2008) suggests that, in PR systems, voters use past election outcomes when forming expectations over future elections.

4. Econometric analysis

4.1. Data

Our main data source is the election database maintained by the Ministry of Justice. These data include information on votes received by individual candidates from two municipal elections held in October of 2004 and 2008.¹⁰ We have augmented the data with a rich set of candidate characteristics, including their addresses. These data were obtained from The Local Government Pensions Institution (KEVA), Statistics Finland, The Finnish Tax Authority and The Population Register Centre. In addition to election data, we use municipal characteristic to study whether voters' reactions are heterogeneous with respect to differences among merging municipalities. These data were obtained from Statistics Finland.¹¹

The 2008 municipal elections were held using the new merged municipalities as constituencies.¹² Municipalities are divided into polling districts, which simply define the location where people go to vote. The election data is registered and publicly available at the polling district and candidate level (also votes given in advance are registered to the correct polling districts). Since these polling districts do not change because of the mergers, we know the location of voters also after the mergers and can build a balanced panel data set where the cross-sectional units are the municipalities in 2004, i.e. before the mergers.¹³

4.2. Descriptive statistics

We start the empirical analysis by reporting descriptive statistics on the *Seatloss* measure and trends in the pre-merger municipal level vote distributions. In

¹⁰ We also use data from the 1996 and 2000 municipal elections to evaluate pre-treatment trends.

¹¹ Descriptive statistics for municipality characteristics are reported in Table A1 in the Appendix.

¹² In most cases, the municipalities merged officially at the start of the calendar year 2009. However, also in these cases the new municipality division was used in the 2008 elections.

¹³ In some cases, the polling districts changed and we were unable to trace back the old municipal division. In these rare cases, we drop the entire merger from the analysis.

Table 1, we have divided the merger group into three equal-sized subgroups based on the (ordered) *Seatloss* variable. The grouping depicts the incentives that voters have for vote concentration. The weak incentives group includes municipalities who can expect to do relatively well in the next elections in terms of local representation (low values of *Seatloss*) while the strong incentive group can expect to do poorly (high values of *Seatloss*).

The mechanical effects of the reform in terms of local representation are substantial. The municipalities in the weak incentives group would get, on average, about 80 percent of the council seats while this share is less than 2 percent for the municipalities in the strong incentives group. In fact, half of the 40 municipalities in the strong incentives group would gain no representatives into the post-merger council, if the candidates and voters behaved exactly as they did in the pre-merger elections. From Table 1, we also see that the municipalities in the strong incentives group are small and part of relatively large mergers, both in terms of overall merger population and the number of participating municipalities. Table 1 also includes a large number of municipality characteristics that will be used in robustness checks.

Table 1. Descriptive statistics, 2004.

	Merger = 0		Weak		Medium		Strong	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Number of observations	287		40		39		41	
Main outcomes:								
Maximum vote share	0.061	0.022	0.049	0.018	0.065	0.027	0.074	0.025
Herfindahl index	0.025	0.011	0.016	0.007	0.029	0.014	0.038	0.017
Merger characteristics:								
Merger population			29,787	28,973	29,746	30,961	44,052	28,832
Number of municipalities	1.00	0.00	2.79	1.52	3.64	2.24	4.75	2.56
Municipality characteristics:								
Seatloss	0	0	0.194	0.153	0.770	0.117	0.981	0.022
Municipal population	12,865	40,225	23,327	25,389	6,653	7,637	2,471	1,993
Debt stock (€per capita)	1,183	750	1,117	720	1,282	1,083	967	799
Cash reserves (€per capita)	504	587	377	438	394	546	535	588
Operating margin (€per capita)	-3,574	416	-3,412	323	-3,562	412	-3,538	404
Municipal tax rate (%)	18.60	0.57	18.33	0.71	18.51	0.59	18.45	0.66
Investment expenses (€capita)	450	359	445	201	360	211	411	386
Taxable income (€per capita)	9,932	2,059	11,323	1,565	10,263	1,617	9,430	1,269
Corporate income tax base (€1000)	135	87.5	175	218	138	90.3	114	69.1
Council characteristics:								
Share of incumbents	0.26	0.07	0.21	0.07	0.27	0.09	0.33	0.12
Share with a university degree	0.11	0.07	0.16	0.07	0.11	0.06	0.09	0.05
Mean income	22,271	4,047	24,529	2,755	22,258	3,119	21,101	2,635
Mean age	46.85	2.08	46.92	1.52	45.80	2.08	46.00	2.23
Share of females	0.39	0.05	0.39	0.04	0.40	0.06	0.39	0.07
Share of municipal employees	0.22	0.06	0.22	0.05	0.22	0.08	0.19	0.08

Notes: Weak, Medium and Strong refer to three equal-sized subgroups based on the (ordered) *Seatloss* variable.

Because our main interest lies on whether voters concentrate their votes to local candidates in response to the reform, we first describe graphically how the vote distributions evolve over time in the different groups explained above. To this end, we use two outcomes to measure the concentration of votes at the pre-merger municipal level. The first measure is simply the vote share of the most popular candidate in the municipality (maximum vote share). Especially in the strong incentives groups, these measures are directly related to the vote shares of the marginal local candidate(s) at the election threshold. For example, in a

municipality that expects to lose all the seats ($Seatloss = 1$), the most popular candidate is also likely to be the marginal local candidate. The second measure is the Herfindahl index, which accounts for the situations where more than one local candidate is marginal.¹⁴

Figure 1 illustrates these trends for the four municipality groups, where the dots represent group specific means in a given election year. Figure 1 can be seen as a graphical simplification of the econometric DID analysis reported later on where we can fully exploit the continuity of the *Seatloss* measure. The Finnish mergers were decided voluntarily, which raises issues of non-random selection that may bias our results. Such selection may relate both to the decision to merge and to the treatment intensity. However, both outcomes have common trends across the different groups in the pre-treatment period (1996–2004 elections) when no mergers took place.¹⁵ This finding supports the most important identification assumption in DID, which is that the outcomes would follow the same time trend in the absence of treatment.¹⁶

After the mergers, there is no change in vote concentration in the weak incentive group while we see a dramatic concentration in the strong incentive group. The change in the medium incentives group is also substantial. This is our first piece of evidence that the vote distributions change considerably when municipalities undergo a merger and that the change depends on the incentives that voters have for vote concentration measured by *Seatloss*. The results are consistent with our hypothesis that voters value local representation and take into account the expected extent of local representation in the post-merger council. However, voters are not the only political actors that may respond

¹⁴ The Herfindahl index is defined as $HI = \sum_{i=1}^N s_i^2$, $i = 1, \dots, N$, where s_i is the vote share of candidate i in a particular municipality and N is the total number of candidates in the municipality.

¹⁵ There were 6 mergers between 2000 and 2004 which are excluded from the analysis. The results are robust to including them.

¹⁶ In Figure A2 in the Appendix, we repeat this analysis using an alternative control group consisting of municipalities that did not merge, but voted for a merger between the 2004 and 2008 elections. The pre-treatment trend is very similar and there is no significant jump in the measures of the alternative control group.

strategically to the mechanical effects of the reform. This is why, in the next section, we analyze the role of each political actor in more detail.

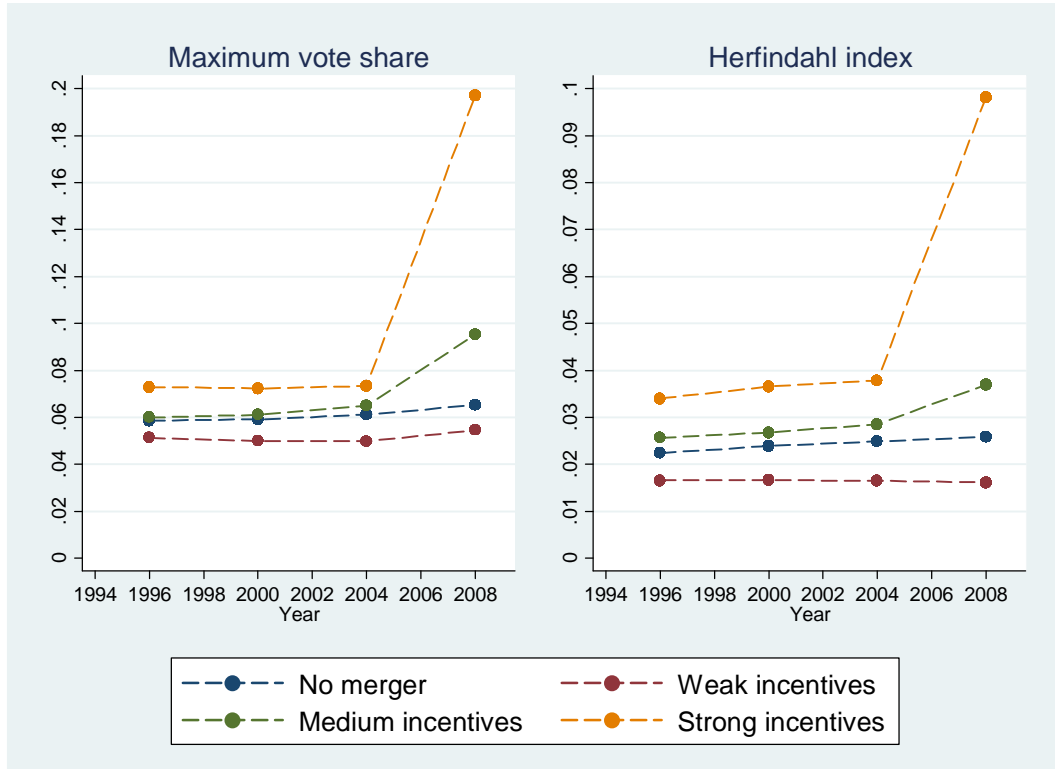


Figure 1. Trends in vote distributions in municipality groups, 1996–2008.

4.3. Econometric models

To analyze how different political actors respond to the mechanical effects of the reform, we study a variety of outcomes in a continuous treatment DID framework. Our first model specification can be written as

$$(2) \quad y_{it} = \alpha_0 + \alpha_1 Merger_i + \alpha_2 After_t + \alpha_3 Merger_i \cdot After_t + \beta_1 Seatloss_i + \beta_2 Seatloss_i \cdot After_t + u_{it},$$

where y_{it} is the outcome in question for municipality i (2004 municipal division) in year t , $Merger$ a dummy variable that equals one if the municipality

underwent a merger between the two elections, *After* a dummy variable that equals one if the data come from post-merger elections, *Seatloss* is the variable described above and u is the error term. The basic idea behind this specification is that, although *Seatloss* is the main treatment of interest, controlling for merging may be important because it may have a direct influence on the political scene in a municipality and it is of course correlated with *Seatloss*.¹⁷

In Eq. (2), the treatment effect is assumed to be constant. However, in the context of local elections the effect is likely to be heterogeneous with respect to voter preferences. To allow for heterogeneity, we can add interaction terms to Eq. (2):

$$(3) \quad \begin{aligned} y_{it} = & \alpha_0 + \alpha_1 \text{Merger}_i + \alpha_2 \text{After}_t + \alpha_3 \text{Merger}_i \cdot \text{After}_t \\ & + \gamma_1 \text{Seatloss}_i + \gamma_2 \text{Heterogeneity}_i \cdot \text{Seatloss}_i \\ & + \gamma_3 \text{Seatloss}_i \cdot \text{After}_t + \gamma_4 \text{Heterogeneity}_i \cdot \text{Seatloss}_i \cdot \text{After}_t + v_{it}, \end{aligned}$$

where the *Heterogeneity* measure depends on model specification.¹⁸

We measure preference heterogeneity using five variables. First, if councilors and voters consume services in the same location, a councilor living close to a voter is likely to share the voter's preferences over the *geographic location of public services* (elementary schools, health care facilities etc.).¹⁹ It is plausible to assume that after a merger there is pressure to concentrate at least some services to the business center of the largest municipality of a merger. Thus, the farther away the voters are from the business center of the largest

¹⁷ For example, an increase in jurisdiction size may have a direct effect on voters' behavior as suggested by Lassen and Serritzlew (2011). Alternatively, we can run these regressions using only the municipalities that merged. The results are largely the same with these approaches (not reported for brevity, but available from authors).

¹⁸ The underlying assumption in this specification is that preference heterogeneity only plays a role when there are strategic incentives for vote concentration. This assumption is not driving the results, because the results are robust to fully saturating the model with all the baselines and the interactions concerning the heterogeneity measures (i.e. *Heterogeneity* and *Heterogeneity*After*).

¹⁹ House values are tied to the quality of public services in the neighborhood and may be an incentive device that also aligns councilors' and voters' preferences (DiPasquale and Glaeser 1999).

municipality in the merger the stronger incentives they should have to concentrate votes and increase local representation. To measure these incentives, we calculated for each merged municipality the median Euclidian distance of all eligible voters to the business centers of their own pre-merger municipality and the largest municipality in their merger.²⁰ Our *Distance* measure is the difference of these median distances. It is equal to zero for the largest municipalities in each merger and for the municipalities that did not merge. Note also, that this measure can be negative in some rare cases, depending on the location of voters and the new municipality center.²¹

Second, in the case of Tiebout-sorting a councilor living close to a voter is more likely to share the preferences of the voter in terms of the *service-tax bundle* provided by the municipality. The more between municipality heterogeneity there is the more valuable is local representation.

Our first proxy for sorting based preference heterogeneity is simply an indicator whether a municipality and the largest municipality in the merger had a different largest party in the 2004 elected councils. We also use two policy variables, namely the difference in pre-merger tax rates and per capita municipal expenditures. Our final proxy is the difference in the municipal level mean of taxable income.²² The last three heterogeneity proxies are calculated as follows. For municipality i in merger j we define

$$(4) \quad \begin{aligned} Het_tax_{ij} &= |t_{ij} - \bar{t}_j|, \\ Het_exp_{ij} &= |exp_{ij} - \overline{exp}_j|, \\ Het_inc_{ij} &= |inc_{ij} - \overline{inc}_j|, \end{aligned}$$

²⁰ This calculation is based on the GIS Grid Database (250 m * 250 m grids) of Statistics Finland. In addition to coordinates, the data include information on the number of eligible voters (population above the age of 18) in each grid. This information together with coordinates of municipal centers enables us to calculate the median distance for eligible voters to the municipality centers.

²¹ This is possible, for example, if the bulk of the population lives close to a municipal border and the business center of the neighboring large municipality is also close to this border.

²² We do not use measures of ethnic, religious or racial heterogeneity, because neighboring municipalities are almost identical in these respects.

where \bar{t}_j , \overline{exp}_j and \overline{inc}_j refer to the population weighted means of municipal income tax rate, per capita expenditures and taxable income in merger j , respectively. Thus, these heterogeneity variables measure the difference between the pre-merger municipality and the consequent merger.

All of these measures are calculated using 2006 data. Of course, these measures are highly correlated so we include each heterogeneity measure separately in order to mitigate multicollinearity problems. Descriptive statistics of our heterogeneity measures are reported in Table A2 in the Appendix.

To fix ideas on how to interpret Eq. (3), we illustrate the role of heterogeneity measures with an example. Figure 2 depicts a map of a real merger that involved 10 municipalities. We focus on four municipalities which we denote simply as A, B, C and D. A is the largest municipality with a *Seatloss* of 0.40, so it stands to gain the majority in the merged municipality council. Municipalities B, C and D are all very small compared to the entire merger and *Seatloss* equals 1 for all of them.

The voters (or the median voter) in municipalities B and C live roughly equally far away from the center of municipality A with *Distance* measures of 15.0 and 18.3 km, respectively. Municipality D is much farther away from A with a *Distance* measure of 30.5 km. Our hypothesis is that the voters in D would concentrate their votes more than voters in the other municipalities.

This is indeed the case. The change in the maximum vote share between 2004 and 2008 is 0.003 for municipality A, 0.079 for B, 0.092 for municipality C and 0.287 for municipality D. In the next section, we show that these vote concentration patterns hold in the entire data and that the preference heterogeneity measures also play a crucial role in ruling out confounding explanations to voter responses.

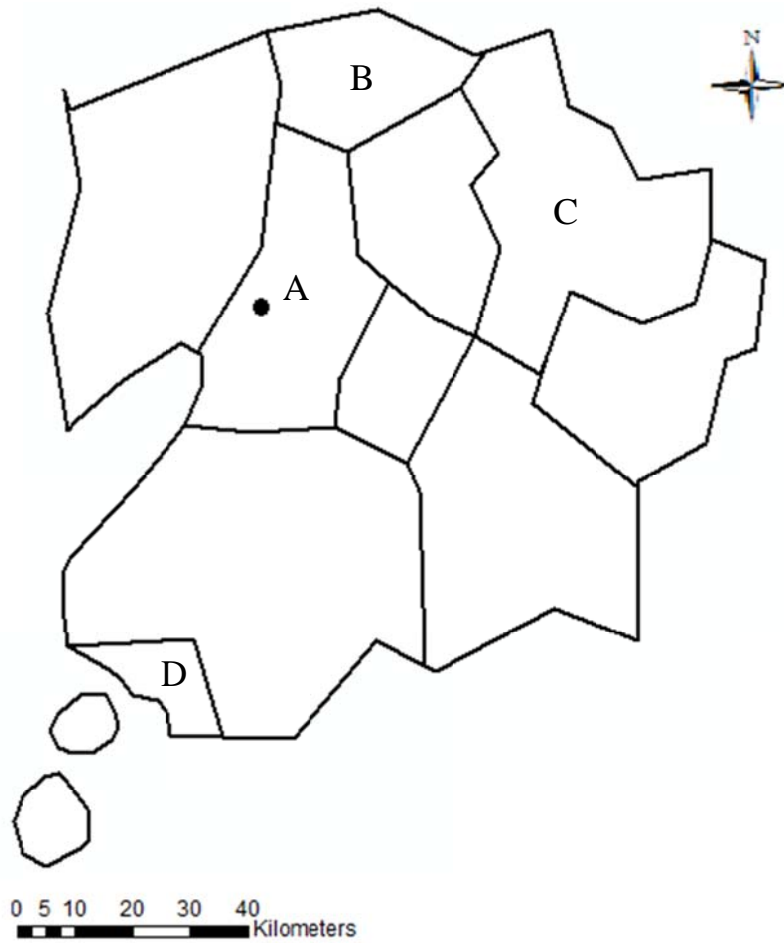


Figure 2. A map illustrating the research design for a single merger.

5. Results

5.1. Changes in the voters' choice set

In this subsection, we analyze how the reform affected the choice set of voters in terms of the number of available candidates and parties and candidate quality. The changes in the choice set arise both from the mechanical effects and psychological responses of candidates and parties, but we document only the total change. We study the effects separately from the perspective of all available candidates and parties and local candidates and parties, where local refers to pre-merger municipalities. Local candidates include both re-running local candidates and new local entrants. The analyses based on local candidates

are possible because we observe the address of each candidate and can allocate them, along with the vote data, to the pre-merger municipalities.

Table 2 presents the results for the number of candidates and parties based on the DID specification in Eq. (2). The results are as expected. From columns [1] and [3], we see that due to merging the overall choice set expands for voters in municipalities with high values of *Seatloss*. That is, the voters from relatively small merging municipalities have a higher number of candidates and parties to choose from in the post-merger elections than before. To clarify the interpretation of the results, we consider an example of two municipalities. Consider first a municipality with a *Seatloss* of 0.8. Our model predicts that this municipality had (roughly) 72 candidates ($95 + 103 - 0.8 \cdot 157$) before the merger. After the merger, the prediction is (roughly) equal to 265 ($72 + 2.3 + 1.4 + 0.8 \cdot 236$). For a municipality with a *Seatloss* of 0.2, these numbers are 166 and 217, respectively. Thus, the DID estimate for a treatment intensity of 0.6 is equal to $(265 - 72) - (217 - 166) = 142$, or $0.6 \cdot 236$.

These changes arise mainly because candidates and parties from the larger merger partners become available to these voters. At the same time, the number of local candidates goes down in these municipalities (column [2]), and the number of local parties increases slightly (column [4]). The fact that the number of local candidates decreases can be due to binding party list size, to parties' strategy in nominating candidates or to potential candidates themselves opting not to run. The small increase in the number of local parties may be due to new candidates that run for the parties that were previously available only in the merger partner. Notice that most of the coefficients are the same in columns [1] and [2] and in columns [3] and [4], because all candidates and parties are local in the 2004 elections (before the mergers) and also in 2008, unless the municipality has undergone a merger.

Table 2. Effects on the number of candidates and parties.

	Number of candidates	Number of local candidates	Number of parties	Number of local parties
	[1]	[2]	[3]	[4]
<i>Constant</i>	95.08*** [5.365]	95.08*** [5.365]	5.794*** [0.117]	5.794*** [0.117]
<i>Merger</i>	102.8*** [19.26]	102.8*** [19.26]	1.852*** [0.329]	1.852*** [0.329]
<i>Seatloss</i>	-157.3*** [19.177]	-157.3*** [19.177]	-3.443*** [0.394]	-3.443*** [0.394]
<i>After</i>	2.314*** [0.855]	2.314*** [0.855]	0.425*** [0.069]	0.425*** [0.069]
<i>Merger*After</i>	1.394 [10.291]	-4.051 [5.417]	-0.105 [0.210]	0.269 [0.195]
<i>Seatloss*After</i>	236.1*** [36.60]	-24.78*** [5.754]	3.431*** [0.325]	0.624** [0.293]
R^2	0.28	0.13	0.19	0.12
N	814	814	814	814

Notes: The regressions use two years of data from 2004 and 2008. The cross-sectional units are the pre-merger municipalities. Standard errors are clustered at the post-merger municipality level and reported in brackets. ***, ** and * indicate statistical significance at 1, 5 and 10 percent level, respectively.

Table 3 repeats the analyses of Table 2, but now we allow for treatment effect heterogeneity. Table 3 reports only the two coefficients of interest from the model specified in Eq. (3), i.e. *Seatloss*After* (γ_3) and *Seatloss*Heterogeneity*After* (γ_4). The results from Table 3 are consistent with Table 2 and indicate that changes in the voters' choice set depend on *Seatloss*, but importantly, the availability of *local* candidates and parties *does not* depend on any of the heterogeneity measures.

Table 3. Heterogeneous effects on the number of candidates and parties.

Heterogeneity measure:	Distance	Party	Tax rate	Expenditure	Income
Panel A: Number of candidates	[1]	[2]	[3]	[4]	[5]
<i>Seatloss*After</i>	258.8*** [69.91]	166.1*** [24.30]	217.8*** [41.23]	247.2*** [41.64]	171.8*** [55.60]
<i>Seatloss*Heterogeneity* After</i>	-0.957 [2.022]	117.4*** [41.29]	43.38 [46.98]	-20.76 [41.98]	30.08** [14.25]
Panel B: Number of local candidates	[6]	[7]	[8]	[9]	[10]
<i>Seatloss*After</i>	-32.04** [15.26]	-23.49*** [5.652]	-22.75*** [5.449]	-27.85*** [9.238]	-26.80** [11.52]
<i>Seatloss*Heterogeneity* After</i>	0.306 [0.520]	-2.173 [5.160]	-4.848 [11.97]	5.730 [9.746]	0.945 [3.846]
Panel C: Number of parties	[11]	[12]	[13]	[14]	[15]
<i>Seatloss*After</i>	2.465*** [0.707]	3.471*** [0.413]	3.111*** [0.358]	3.031*** [0.437]	2.843*** [0.444]
<i>Seatloss*Heterogeneity* After</i>	0.041 [0.026]	-0.069 [0.435]	0.761 [0.755]	0.746 [0.699]	0.275* [0.157]
Panel D: Number of local parties	[16]	[17]	[18]	[19]	[20]
<i>Seatloss*After</i>	0.372 [0.642]	0.710** [0.346]	0.607 [0.396]	0.421 [0.434]	0.51 [0.518]
<i>Seatloss*Heterogeneity* After</i>	0.011 [0.020]	-0.145 [0.363]	0.040 [0.734]	0.378 [0.490]	0.053 [0.158]
N	814	814	814	814	814

Notes: The regressions use two years of data from 2004 and 2008. The cross-sectional units are the pre-merger municipalities. Standard errors are clustered at the post-merger municipality level and reported in brackets. ***, ** and * indicate statistical significance at 1, 5 and 10 percent level, respectively.

Next we turn to candidate quality. In Table 4, we present results for three quality measures: the share of incumbents, the share of candidates with a university degree and mean income of the candidates.²³ Again we look separately at the changes in overall candidate quality and local candidate quality. As before, the results related to all candidates arise mainly from mixing the candidate sets of the merging municipalities. The overall candidate quality

²³ According to Eggers et al. (2015) incumbency status is by far the most important candidate quality measure. However, the richness of our data allows us to use a number of additional measures.

increases based on education and income (columns [3] and [5]). The negative coefficient for *Seatloss*After* in column [1] reflects the lower share of incumbents in larger municipalities due to larger number of candidates relative to council seats. Of course in terms of numbers, voters from small municipalities have more incumbents to choose from after a merger. Table 4 also reveals that after the merger, local candidates are, on average, of higher quality in the merging municipalities compared to pre-merger elections. The shares of incumbents and candidates with a university degree increase among local candidates as does their mean income.

Table 4. Effects on candidate quality.

	Incumbents		University degree		Income	
	All	Local	All	Local	All	Local
	[1]	[2]	[3]	[4]	[5]	[6]
<i>Constant</i>	0.260*** [0.004]	0.260*** [0.004]	0.113*** [0.004]	0.113*** [0.004]	22,271*** [239.5]	22,271*** [239.5]
<i>Merger</i>	-0.079*** [0.013]	-0.079*** [0.013]	0.069*** [0.013]	0.069*** [0.013]	2900*** [597.4]	2900*** [597.4]
<i>Seatloss</i>	0.137*** [0.024]	0.137*** [0.024]	-0.097*** [0.014]	-0.097*** [0.014]	-3923*** [626.8]	-3923*** [626.8]
<i>After</i>	-0.002 [0.004]	-0.002 [0.004]	0.016*** [0.003]	0.016*** [0.003]	1971*** [154.0]	1971*** [154.0]
<i>Merger*After</i>	0.104*** [0.013]	-0.008 [0.012]	-0.022** [0.009]	-0.007 [0.010]	-162.0 [419.8]	532.9 [485.9]
<i>Seatloss*After</i>	-0.114*** [0.026]	0.125*** [0.025]	0.107*** [0.015]	0.047*** [0.018]	4880*** [554.2]	1618** [793.6]
<i>R</i> ²	0.08	0.27	0.13	0.08	0.19	0.12
<i>N</i>	814	814	814	814	814	814

Notes: The regressions use two years of data from 2004 and 2008. The cross-sectional units are the pre-merger municipalities. Standard errors are clustered at the post-merger municipality level and reported in brackets. ***, ** and * indicate statistical significance at 1, 5 and 10 percent level, respectively.

Again, in Table 5 we allow for treatment effect heterogeneity. The quality of candidates that become available in the relatively small municipalities from the larger municipalities due to the reform seems to depend on distance and

income difference. For example, the municipalities that are far away from the largest municipality in a merger have fewer highly educated candidates than their larger neighbors (column [11]). However, again the changes in the quality of *local* candidates *are not* related to the heterogeneity measures (Panels B, D and F). Results based on additional candidate quality measures are the same (see Table A2 in the Appendix).

Table 5. Heterogeneous effects on candidate quality.

Heterogeneity measure:	Distance	Party	Tax rate	Expenditure	Income
Panel A: Incumbents, all	[1]	[2]	[3]	[4]	[5]
<i>Seatloss*After</i>	-0.010 [0.032]	-0.129*** [0.035]	-0.075** [0.032]	-0.078*** [0.025]	-0.025 [0.031]
<i>Seatloss*Heterogeneity* After</i>	-0.004*** [0.001]	0.026 [0.038]	-0.092 [0.060]	-0.068 [0.048]	-0.041*** [0.012]
Panel B: Incumbents, local	[6]	[7]	[8]	[9]	[10]
<i>Seatloss*After</i>	0.152*** [0.041]	0.102*** [0.030]	0.140*** [0.029]	0.138*** [0.030]	0.124*** [0.030]
<i>Seatloss*Heterogeneity* After</i>	-0.001 [0.002]	0.037 [0.033]	-0.036 [0.073]	-0.025 [0.043]	0.000 [0.013]
Panel C: University, all	[11]	[12]	[13]	[14]	[15]
<i>Seatloss*After</i>	0.036** [0.018]	0.107*** [0.023]	0.092*** [0.014]	0.119*** [0.016]	0.046*** [0.016]
<i>Seatloss*Heterogeneity* After</i>	0.003*** [0.001]	0.001 [0.020]	0.035 [0.032]	-0.022 [0.018]	0.028*** [0.006]
Panel D: University, local	[16]	[17]	[18]	[19]	[20]
<i>Seatloss*After</i>	0.037 [0.023]	0.060*** [0.023]	0.071*** [0.026]	0.055*** [0.018]	0.062** [0.028]
<i>Seatloss*Heterogeneity* After</i>	0.0004 [0.001]	-0.022 [0.018]	-0.057 [0.040]	-0.014 [0.024]	-0.007 [0.012]
Panel E: Income, all	[21]	[22]	[23]	[24]	[25]
<i>Seatloss*After</i>	3206*** [1226]	3997*** [663.4]	4006*** [750.2]	5276*** [918.5]	1878** [873.7]
<i>Seatloss*Heterogeneity* After</i>	70.61 [44.60]	1483* [803.2]	2081* [1108]	-739.1 [1130]	1404*** [260.6]
Panel F: Income, local	[26]	[27]	[28]	[29]	[30]
<i>Seatloss*After</i>	2901*** [940.4]	550.4 [854.6]	2187* [1236]	1635* [953.2]	3019*** [996.0]
<i>Seatloss*Heterogeneity* After</i>	-54.07* [31.45]	1792 [1162]	-1354 [2303]	-31.20 [1313]	-655.5 [517.7]
N	814	814	814	814	814

Notes: The regressions use two years of data from 2004 and 2008. The cross-sectional units are the pre-merger municipalities. Standard errors are clustered at the post-merger municipality level and reported in brackets. ***, ** and * indicate statistical significance at 1, 5 and 10 percent level, respectively.

There are three important takeaways from this section. First, the boundary reforms dramatically change the choice set that voters' in the merging municipalities face. In relatively small municipalities, the choice set in terms of number of overall candidates and parties increases substantially, but the number of local candidates decreases.

Second, the quality of both overall and local candidates changes considerably in relatively small municipalities. The new candidates from their merger partners are of higher quality and so is the pool of local candidates when compared to pre-merger local candidates. These changes reflect, at least partly, the strategic responses from parties and candidates to the mechanical effects of the reform. While they are interesting as such, these responses are potential confounders when we analyze voters' reactions to changes in the choice set and whether we can interpret the results as evidence for local preferences and strategic voting. In other words, the vote concentration patterns in Figure 1 may simply reflect changes in the candidate quality, not strategic efforts by voters to ensure local representation.

Finally, it is equally important to note that the changes in the number and quality of *local* candidates *are not* related to any of the preference heterogeneity measures (Tables 3 and 5). This means that parties and candidates respond to the mechanical effects (*Seatloss*), but the responses do not depend on meaningful measures of voter preferences for local representation. This finding plays a crucial role in our subsequent analysis of vote concentration.

5.2. Vote concentration

When analyzing voter responses, we study separately the vote concentration within three different candidate groups. First, as in Figure 1, we use the overall vote distribution where the votes can cross old municipality boundaries after a merger. Second, we use the vote distribution to all local candidates. From these vote distributions we have omitted any votes that cross pre-merger municipality boundaries. Finally, we use a set of local re-runners. These are the subset of candidates that ran in both 2004 and 2008 elections, and in both election years

lived in the same pre-merger municipality of interest. Thus, in this case for each pre-merger municipality, the set of candidates in the analysis is exactly the same in both years. Also for this sample, we omit all the votes that cross pre-merger municipality boundaries.

First we aim to understand whether voters prefer local candidates by looking at how many votes are given overall and how many to local candidates. In Table 6, we report the effects of the reform on the log of total amount of votes for the three different candidate groups. The log-specification is preferable, because of the huge variation in municipal population (minimum is 249 and maximum 564,521). First, we see that overall the total number of votes (roughly turnout) decreases in the relatively small municipalities, although the decrease is not statistically significant.²⁴ Second, the lower turnout due to the mergers in the relatively small municipalities is also reflected in how many votes in total are given to local candidates (column [2]). This means that some voters do find better matches from the merger partners and vote across (old) municipal boundaries. However, the group of local re-runners received more votes despite the substantial decrease in overall turnout. These results are in line both with detrimental effect of larger jurisdiction on political activity and with voters having preferences for local representation.

²⁴ This result echoes the results in Lassen and Serritzlew (2011) who report survey results (stated preferences) showing that jurisdiction size has detrimental effects on political efficacy. Our analysis goes a step further and shows that also turnout is affected (revealed preferences).

Table 6. Effects on the log of total number of votes.

	All candidates	Local candidates	Local re-runners
	[1]	[2]	[3]
<i>Constant</i>	7.953*** [0.057]	7.953*** [0.057]	7.452*** [0.059]
<i>Merger</i>	1.401*** [0.159]	1.401*** [0.159]	1.606*** [0.167]
<i>Seatloss</i>	-2.391*** [0.171]	-2.391*** [0.171]	-3.050*** [0.228]
<i>After</i>	0.034*** [0.006]	0.034*** [0.006]	0.022** [0.009]
<i>Merger*After</i>	0.061 [0.048]	-0.019 [0.045]	-0.146*** [0.055]
<i>Seatloss*After</i>	-0.140 [0.127]	-0.332*** [0.127]	0.481*** [0.165]
R^2	0.02	0.02	0.03
N	814	814	814

Notes: The regressions use two years of data from 2004 and 2008. The cross-sectional units are the pre-merger municipalities. Standard errors are clustered at the post-merger municipality level and reported in brackets. ***, ** and * indicate statistical significance at 1, 5 and 10 percent level, respectively.

In Table 7, we again allow for treatment effect heterogeneity in the (log) total number of votes. The table shows, that the effects of the reform on the total number of votes *are not* related to any of our heterogeneity measures in any of the candidate groups.

Table 7. Heterogeneous effects on the log of number of votes.

Heterogeneity measure:	Distance	Party	Tax rate	Expenditure	Income
Panel A: All candidates	[1]	[2]	[3]	[4]	[5]
<i>Seatloss*After</i>	-0.042 [0.354]	-0.192** [0.090]	-0.155 [0.122]	-0.222 [0.213]	-0.061 [0.262]
<i>Seatloss*Heterogeneity*</i> <i>After</i>	-0.004 [0.011]	0.088 [0.190]	0.036 [0.301]	0.154 [0.230]	-0.037 [0.076]
Panel B: Local candidates	[6]	[7]	[8]	[9]	[10]
<i>Seatloss*After</i>	-0.347 [0.357]	-0.342*** [0.085]	-0.356*** [0.125]	-0.393* [0.212]	-0.323 [0.263]
<i>Seatloss*Heterogeneity*</i> <i>After</i>	0.001 [0.011]	0.017 [0.192]	0.058 [0.322]	0.114 [0.228]	-0.004 [0.076]
Panel C: Local re-runners	[11]	[12]	[13]	[14]	[15]
<i>Seatloss*After</i>	0.095 [0.416]	0.474*** [0.169]	0.382** [0.149]	0.296 [0.249]	0.300 [0.317]
<i>Seatloss*Heterogeneity*</i> <i>After</i>	0.016 [0.014]	0.012 [0.228]	0.236 [0.336]	0.346 [0.265]	0.085 [0.092]
N	814	814	814	814	814

Notes: The regressions use two years of data from 2004 and 2008. The cross-sectional units are the pre-merger municipalities. Standard errors are clustered at the post-merger municipality level and reported in brackets. ***, ** and * indicate statistical significance at 1, 5 and 10 percent level, respectively.

Finally, we turn to vote concentration. Columns [1] and [2] of Table 8 are regression versions of Figure 1, where we study the effects on concentration within all the candidates. We also report concentration of votes within all local candidates and within local re-runners. The reform caused substantial vote concentration within all these candidate groups and the effects are statistically highly significant. For example, from column [1] we see that the maximum vote share increases by 9.2 (0.121 – 0.029) percentage points due to the reform on average in those municipalities that expect to have no local representatives in the post-merger council (*Seatloss* equal to one). Interestingly, the treatment effect is negative for those merged municipalities who do not expect to lose any seats (*Seatloss* equal to zero).²⁵

²⁵ This is consistent with strategic voting, because in relatively large municipalities a strategic voter would not want to waste the vote to the most popular candidate.

Table 8. Effects on vote distributions.

	<u>All candidates</u>		<u>Local candidates</u>		<u>Local re-runners</u>	
	Maximum vote share	Herfindahl index	Maximum vote share	Herfindahl index	Maximum vote share	Herfindahl index
	[1]	[2]	[3]	[4]	[5]	[6]
<i>Constant</i>	0.061*** [0.001]	0.025*** [0.001]	0.061*** [0.001]	0.025*** [0.001]	0.095*** [0.002]	0.045*** [0.001]
<i>Merger</i>	-0.019*** [0.003]	-0.014*** [0.001]	-0.019*** [0.003]	-0.014*** [0.001]	-0.060*** [0.008]	-0.047*** [0.008]
<i>Seatloss</i>	0.033*** [0.005]	0.026*** [0.003]	0.033*** [0.005]	0.026*** [0.003]	0.156*** [0.024]	0.128*** [0.025]
<i>After</i>	0.004*** [0.001]	0.001*** [0.000]	0.004*** [0.001]	0.001*** [0.000]	0.004** [0.002]	0.002*** [0.000]
<i>Merger*After</i>	-0.029*** [0.008]	-0.017*** [0.006]	-0.037*** [0.009]	-0.027*** [0.008]	-0.010 [0.006]	-0.010*** [0.003]
<i>Seatloss*After</i>	0.121*** [0.023]	0.060*** [0.018]	0.176*** [0.027]	0.115*** [0.024]	0.079*** [0.016]	0.050*** [0.011]
R^2	0.35	0.23	0.45	0.35	0.38	0.34
N	814	814	814	814	814	814

Notes: The regressions use two years of data from 2004 and 2008. The cross-sectional units are the pre-merger municipalities. Standard errors are clustered at the post-merger municipality level and reported in brackets. ***, ** and * indicate statistical significance at 1, 5 and 10 percent level, respectively.

Table 9 presents the treatment effect heterogeneity results based on Eq. (3). We draw three insights from Table 9. First, vote concentration increases as the median change in the voters' distance to municipality center increases. This effect is also very large: an additional 10 km in distance increases the maximum vote share by roughly 5 percentage points (column [1]). In other words, each additional 10 km roughly doubles the maximum vote share from its baseline. Notice also that when *Distance* is close to zero there is no vote concentration, even in municipalities with high values of *Seatloss*. This suggests that voters in these municipalities have no need to act strategically because their distance to local services is unlikely to increase after the merger.

Second, concentration increases with income differences and also this effect is quantitatively large. At a given level of *Seatloss*, a one standard

deviation (1,085 Euros) increase in the income difference increases the maximum vote share by 3.5 percentage points, again a substantial increase from the baseline. The same patterns emerge when the Herfindahl index is used as the outcome.

Finally, we find no heterogeneity in the treatment effect with respect to our direct policy measures (party, tax rate and per capita expenditures). The results are again very similar when using the outcomes calculated based on subsets of local candidates (Panels C through F). Together these results suggest that voters care about the geographic location of public services and that there is between municipality preference heterogeneity over services.²⁶ Of course, remotely situated small municipalities are, on average, poorer than their merger partners, which means that distance and income measures are correlated.²⁷

²⁶ We also estimated these models using an extensive set of control variables, including municipality characteristics and mean candidate characteristics (See Table A4 in the Appendix). Adding controls does not change our results. Furthermore, because voter turnout decreased, we also estimated the vote concentration regressions using the 2004 number of total votes when calculating candidates' vote shares. Reassuringly, the results remain the same (not reported here for brevity, but available from authors).

²⁷ When we include both distance and income into the same regression the coefficient on income (*Seatloss*Income*After*) goes effectively to zero, but the coefficient on distance (*Seatloss*Distance*After*) diminishes only slightly. The *p*-value for distance in this regression is 0.065. This suggests that distance to services is the most important factor that voters care about.

Table 9. Heterogeneous effects on vote distributions.

Heterogeneity measure:	Distance	Party	Tax rate	Expenditure	Income
Panel A: All, Max share	[1]	[2]	[3]	[4]	[5]
<i>Seatloss*After</i>	0.009 [0.035]	0.130*** [0.036]	0.091*** [0.014]	0.104*** [0.017]	0.052*** [0.020]
<i>Seatloss*Heterogeneity*</i> <i>After</i>	0.005** [0.002]	-0.016 [0.029]	0.071 [0.054]	0.032 [0.038]	0.032*** [0.009]
Panel B: All, HI	[6]	[7]	[8]	[9]	[10]
<i>Seatloss*After</i>	-0.029 [0.030]	0.072** [0.030]	0.040*** [0.007]	0.043*** [0.009]	0.020* [0.011]
<i>Seatloss*Heterogeneity*</i> <i>After</i>	0.004** [0.002]	-0.021 [0.023]	0.048 [0.043]	0.030 [0.029]	0.018*** [0.006]
Panel C: Local, Max share	[11]	[12]	[13]	[14]	[15]
<i>Seatloss*After</i>	0.050 [0.040]	0.175*** [0.041]	0.140*** [0.023]	0.149*** [0.023]	0.096*** [0.031]
<i>Seatloss*Heterogeneity*</i> <i>After</i>	0.005*** [0.002]	0.001 [0.037]	0.084 [0.065]	0.049 [0.049]	0.037*** [0.012]
Panel D: Local, HI	[16]	[17]	[18]	[19]	[20]
<i>Seatloss*After</i>	-0.003 [0.038]	0.119*** [0.038]	0.084*** [0.015]	0.088*** [0.017]	0.057** [0.023]
<i>Seatloss*Heterogeneity*</i> <i>After</i>	0.005** [0.002]	-0.006 [0.032]	0.075 [0.057]	0.052 [0.042]	0.027*** [0.010]
Panel E: Re-runners, Max share	[21]	[22]	[23]	[24]	[25]
<i>Seatloss*After</i>	0.028 [0.025]	0.063*** [0.019]	0.057*** [0.021]	0.068*** [0.025]	0.031 [0.032]
<i>Seatloss*Heterogeneity*</i> <i>After</i>	0.002*** [0.001]	0.027 [0.021]	0.052 [0.037]	0.021 [0.034]	0.022** [0.009]
Panel F: Re-runners, HI	[26]	[27]	[28]	[29]	[30]
<i>Seatloss*After</i>	0.001 [0.018]	0.049*** [0.014]	0.042*** [0.014]	0.042*** [0.015]	0.018 [0.022]
<i>Seatloss*Heterogeneity*</i> <i>After</i>	0.002*** [0.001]	0.003 [0.013]	0.019 [0.027]	0.015 [0.021]	0.015** [0.006]
N	814	814	814	814	814

Notes: The regressions use two years of data from 2004 and 2008. The cross-sectional units are the pre-merger municipalities. Standard errors are clustered at the post-merger municipality level and reported in brackets. ***, ** and * indicate statistical significance at 1, 5 and 10 percent level, respectively.

5.3. Discussion and alternative explanations

How should we interpret the results in Tables 8 and 9 against the evidence concerning the voters' choice set changes reported in Tables 2–5? First, we discuss voter preferences for local representation and then turn to strategic behavior.

Local representation: From Table 2, we see that voters in relatively small merging municipalities face a much larger choice set in terms of overall number candidates and parties, but at the same time have fewer local candidates to choose from. In light of these numbers, if voters do not value local representation, we should probably observe less concentrated vote distributions after the mergers because voters are likely to find better matches from the larger number of alternatives. More concentrated vote distributions after the voters are presented with a larger choice set, as reported in Figure 1 and Table 8, imply strong preferences for local representation.

There are two alternative explanations for these findings. First, it could be that due to a merger some prominent national politicians or other 'superstars' become available to all voters of the merging municipalities. However, out of the 120 merged municipalities, in only three cases the most popular candidate after the merger lived in some other (pre-merger) municipality in the merger and none of these municipalities were in the strong incentives group. Second, we could observe vote concentration simply because voters have better information about the quality of local candidates and continue to vote for familiar local candidates. However, information advantage cannot drive vote concentration among local candidates and especially among local re-runners because all of these candidates should benefit equally from the local information advantage. More importantly, it is reassuring also from this perspective that the local candidate attrition and quality changes are orthogonal to the preference heterogeneity measures.

Strategic voting: Even though *Seatloss* directly measures strategic incentives to concentrate votes in order to increase local representation, whether

these results can be interpreted as evidence in favor of strategic voting is a question we need to address carefully. This is because the voters' choice set changes are correlated with *Seatloss* (Tables 2 and 4) and it could be that the choice set changes and preferences for local representation alone are driving the results. In other words, as some voters lose their old candidate they keep on voting for local candidates instead of the new ones from other municipalities, which results in the reported vote concentration patterns even if voters were sincere. Alternatively, the local candidate quality, as well as voters' preferences for candidate skills, may change along with *Seatloss*. The latter could happen, for example, because different political skills may be valuable in larger post-merger municipalities than in the smaller pre-merger municipalities. If this is the case, the concentration patterns may simply reflect voters' sincere demand for higher quality local candidates after a merger.

However, the results in Tables 3 and 5 together with Table 9 largely rule out these interpretations. From Tables 3 and 5, we see that the changes in the number and quality of *local* candidates are *not* related to preference heterogeneity measures (especially the interaction term of distance and *Seatloss* after the mergers), whereas, according Table 9, the vote concentration patterns clearly are. That is, we can rule out choice set confounders in Table 9 and conclude that voters respond to strategic concentration incentives when the rewards for local representation are high.

A further argument in favor of strategic voting is that the votes are more concentrated also *within* the set of local re-runners. The results indicate that the voters, whose former preferred candidate no longer runs, vote popular local re-runners disproportionately relative to the candidates' popularity in the pre-merger elections. Alternatively, concentration among local re-runners means that some voters abandon their former candidate, even when the candidate reruns, in order to vote for a candidate with a legitimate chance of election. Either way, this evidence is consistent with strategic voting.

There are three further alternative explanations for our results concerning strategic voting. The first alternative is that parties or candidates respond strategically by changing campaigning tactics, which is unobservable to us. The logic of this concern is the following: Candidates who have a genuine chance of getting elected may exert more campaigning effort than other candidates. If these candidates exert more effort in a disproportionate way relative to their popularity in the pre-merger elections and if voters are very responsive to campaigning, this could explain our concentration results (overall and within local re-runners).²⁸ However, the finding that the concentration among local re-runners increases with income differences and especially with distance is not consistent with candidates' campaigning effort, whereas it is consistent with voter preferences for local representation. Candidates who care only for political power should not respond to preference heterogeneity measures unless also the benefits of holding office are correlated with these measures.²⁹ Of course this is an indirect test and we cannot rule out confounding campaigning responses entirely.

The second alternative example of a sincere response is that voters may simply reward candidates that supported a successful merger. However, 90 percent of the 2004 councilors in the re-runners sample voted in favor of the mergers in the council meetings, and thus, there is not enough variation in councilors' voting behavior to explain the variation in the concentration patterns we observe.

Third, voters may reward politicians who bring home pork by strategic overspending prior to merging, which is then funded by the new merger partners. Saarimaa and Tukiainen (2015) show that this is indeed the case in Finland and that such free-riding is strongly correlated with *Seatloss*. However, in Table A4 we report regression results where we directly control for

²⁸ If campaigning is mostly related to conferring information on election probabilities, campaigning can be seen as a coordination device which facilitates strategic voting.

²⁹ Moreover, previous empirical evidence suggests that it is quite difficult to influence voter behavior with campaigning (Levitt 1994; Gerber et al. 2003 and Krasno and Green 2008).

municipal debt and spending and other characteristics and the results remain the same.

In addition, as pointed out by Kawai and Watanabe (2013) it is important to distinguish strategic voting from misaligned voting. For some strategic voters, their sincere and strategic choice may coincide. Misaligned voters are those whose strategic choice differs from their sincere choice. Our DID approach can only detect misaligned voting, because we identify changes in voting behavior due to changes in election probabilities (*Seatloss*). At the same time, estimating the percentage of strategic voters is beyond the scope of this paper.

6. Conclusions

In this paper, we analyze the value of local political representation to voters by studying how voters in local municipal council elections reacted to a recent wave of municipality mergers in Finland. A municipal merger can be seen as an electoral boundary reform that expands the choice set available to voters and at the same time intensifies political competition. We find, using DID methods, that voters in merging municipalities concentrate their votes to strong local candidates compared to voters in municipalities that did not merge. Moreover, the concentration effect is clearly stronger in municipalities that were less likely to gain local representation in the post-merger councils based on counterfactual election calculations. This happened despite the fact that the voters in the merged municipalities had a much larger set of candidates and parties to choose from after a merger.

We also find that the concentration effect is larger in municipalities where the benefits of local representation to voters are large. This result allows us to disentangle voters' behavioral responses from the responses of other political actors. We interpret these results so that voters value local representation and that some voters vote strategically in order to guarantee it.

Besides providing novel evidence on both the importance of preferences for local representation and strategic voting, the results have implications for merger policy. The upside of larger municipalities is that they may internalize inter-jurisdictional spillovers and facilitate exploitation of scale economies, but the downside is that they lead to an increasing mismatch of preferences and public services if there are spatial differences in voter preferences. A number of papers have shown that this type of heterogeneity is important (e.g. Alesina et al. 2004; Rodden 2010; Saarimaa and Tukiainen 2014).

Our results contribute to this literature by shedding further light on the type of preference heterogeneity among voters that is relevant for merger policy and by showing that voters perceive local representation to be important in transferring these preferences into policy outcomes. Furthermore, concerns over deteriorating local democracy due to mergers are important due to preferences for local representation, but observed vote concentration somewhat alleviates these concerns. An interesting future avenue for research would be to analyze whether local representation has an effect on the subsequent policy decisions in the merged municipalities.

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Supporting information (Online)

Appendix. Descriptive statistics and additional results.

Table A1. Descriptive statistics for heterogeneity measures (N = 120).

	Mean	Std. Dev.	Min	Max
Distance (km) ^a	11.47	12.40	-1.711	50.03
Different largest party ^b	0.292	0.456	0.000	1.000
Difference in tax rate	0.285	0.283	0.000	1.479
Difference in expenditures (€per capita)	0.313	0.346	0.001	1.695
Difference in taxable income (€per capita)	1.087	1.085	0.007	5.259

^a Difference between the median distances of eligible voters to the center of the pre-merger municipality and the largest municipality in the merger. It equals zero for the largest municipality.

^b Dummy that equals 1 if a municipality had a different largest party than the largest municipality in a merger and zero otherwise.

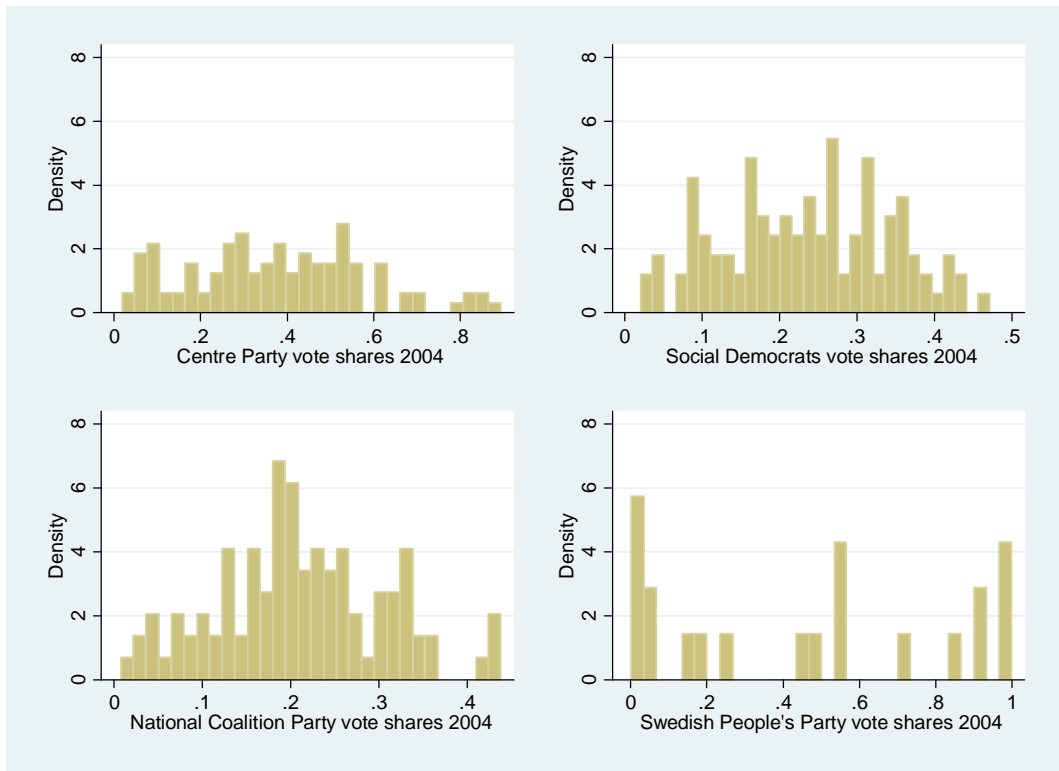


Figure A1. Histograms of party vote shares in 2004.

Notes: The histograms are for the three largest parties and the Swedish People's Party, which is a large party in the municipalities with a Swedish speaking majority.

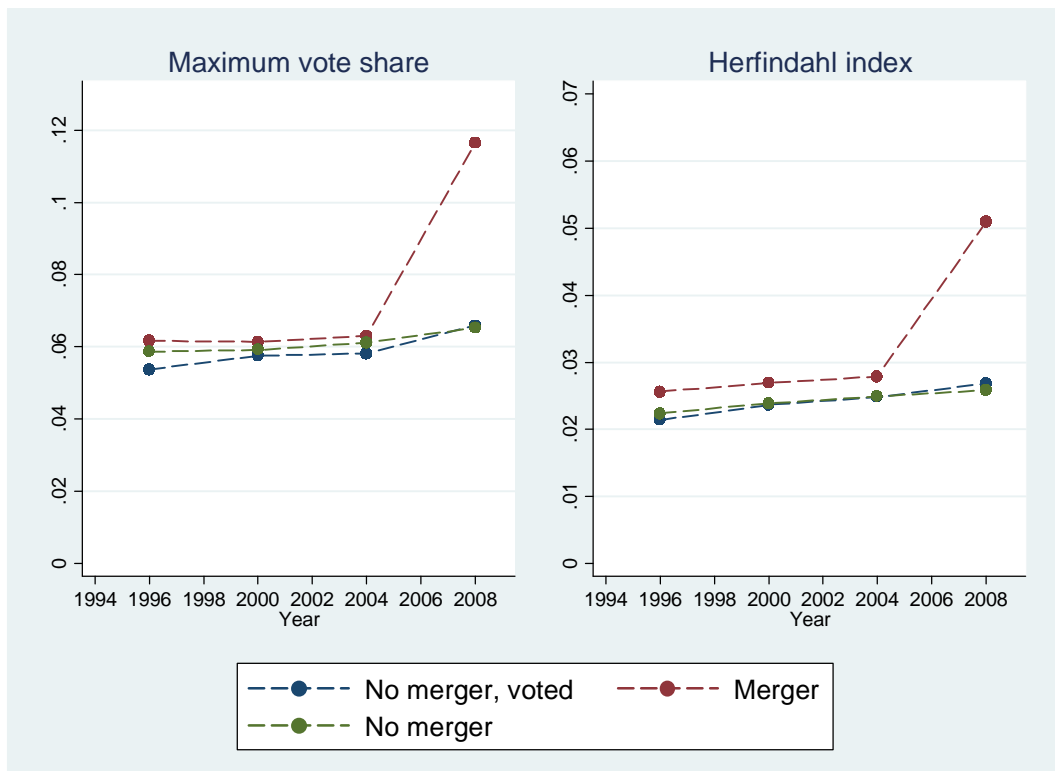


Figure A2. Vote distribution trends in an alternative control group, 1996–2008.

Notes: The alternative control group consists of municipalities that did not merge, but whose councils voted for a merger between the 2004 and 2008 elections. The merger group includes all mergers, regardless of *Seatloss*.

Table A2. Heterogeneous effects on additional measures of candidate quality.

Heterogeneity measure:	Distance	Party	Tax rate	Expenditure	Income
Panel A: Age, all	[1]	[2]	[3]	[4]	[5]
<i>Seatloss*After</i>	2.489*** [0.657]	2.232*** [0.649]	2.567*** [0.680]	1.963*** [0.532]	3.163*** [0.706]
<i>Seatloss*Heterogeneity*</i> <i>After</i>	-0.041* [0.022]	-1.194** [0.567]	-2.489** [1.164]	-0.826 [0.688]	-0.768*** [0.224]
Panel B: Age, local	[6]	[7]	[8]	[9]	[10]
<i>Seatloss*After</i>	3.949*** [0.660]	3.659*** [0.734]	3.699*** [0.748]	3.401*** [0.585]	4.166*** [0.687]
<i>Seatloss*Heterogeneity*</i> <i>After</i>	-0.029 [0.025]	-0.658 [0.627]	-1.029 [1.086]	-0.250 [0.810]	-0.421 [0.265]
Panel C: Female, all	[11]	[12]	[13]	[14]	[15]
<i>Seatloss*After</i>	-0.006 [0.020]	0.003 [0.016]	-0.002 [0.016]	0.013 [0.016]	-0.019 [0.017]
<i>Seatloss*Heterogeneity*</i> <i>After</i>	0.001 [0.001]	0.013 [0.016]	0.031 [0.034]	-0.002 [0.021]	0.014* [0.007]
Panel D: Female, local	[16]	[17]	[18]	[19]	[20]
<i>Seatloss*After</i>	-0.031 [0.027]	-0.003 [0.031]	0.011 [0.029]	-0.016 [0.022]	-0.005 [0.032]
<i>Seatloss*Heterogeneity*</i> <i>After</i>	0.002 [0.001]	0.015 [0.027]	-0.012 [0.041]	0.040 [0.043]	0.005 [0.010]
Panel E: Mun. Employee, all	[21]	[22]	[23]	[24]	[25]
<i>Seatloss*After</i>	0.038* [0.023]	0.028* [0.015]	0.031 [0.019]	0.024 [0.021]	0.038 [0.025]
<i>Seatloss*Heterogeneity*</i> <i>After</i>	0.0001 [0.001]	0.022 [0.017]	0.023 [0.036]	0.032 [0.030]	0.001 [0.009]
Panel F: Mun. Employee, local	[26]	[27]	[28]	[29]	[30]
<i>Seatloss*After</i>	0.030 [0.028]	-0.019 [0.021]	0.009 [0.021]	-0.034 [0.024]	0.017 [0.022]
<i>Seatloss*Heterogeneity*</i> <i>After</i>	-0.002* [0.001]	0.022 [0.022]	-0.037 [0.047]	0.051 [0.041]	-0.011 [0.010]
N	814	814	814	814	814

Notes: The regressions use two years of data from 2004 and 2008. The cross-sectional units are the pre-merger municipalities. Standard errors are clustered at the post-merger municipality level and reported in brackets. ***, ** and * indicate statistical significance at 1, 5 and 10 percent level, respectively

Table A3. Heterogeneous effects on vote distributions with control variables.

Heterogeneity measure:	Distance	Party	Tax rate	Expenditure	Income
Panel A: All, Max share	[1]	[2]	[3]	[4]	[5]
<i>Seatloss*After</i>	-0.001 [0.029]	0.117*** [0.033]	0.057*** [0.012]	0.068*** [0.017]	0.031 [0.024]
<i>Seatloss*Heterogeneity* After</i>	0.005** [0.002]	-0.023 [0.029]	0.113*** [0.042]	0.069 [0.043]	0.033*** [0.006]
Panel B: All, HI	[6]	[7]	[8]	[9]	[10]
<i>Seatloss*After</i>	-0.042* [0.023]	0.064** [0.028]	0.018** [0.007]	0.020** [0.008]	0.009 [0.019]
<i>Seatloss*Heterogeneity* After</i>	0.004** [0.002]	-0.030 [0.022]	0.070** [0.034]	0.053 [0.037]	0.018*** [0.003]
Panel C: Local, Max share	[11]	[12]	[13]	[14]	[15]
<i>Seatloss*After</i>	0.047 [0.040]	0.165*** [0.042]	0.108*** [0.017]	0.112*** [0.022]	0.075** [0.032]
<i>Seatloss*Heterogeneity* After</i>	0.005*** [0.002]	-0.002 [0.036]	0.132*** [0.051]	0.099* [0.052]	0.041*** [0.008]
Panel D: Local, HI	[16]	[17]	[18]	[19]	[20]
<i>Seatloss*After</i>	-0.011 [0.033]	0.117*** [0.039]	0.066*** [0.011]	0.063*** [0.014]	0.047* [0.028]
<i>Seatloss*Heterogeneity* After</i>	0.005*** [0.002]	-0.015 [0.032]	0.101** [0.046]	0.090** [0.045]	0.029*** [0.006]
Panel E: Re-runners, Max share	[21]	[22]	[23]	[24]	[25]
<i>Seatloss*After</i>	-0.010 [0.030]	0.038 [0.025]	-0.001 [0.021]	0.032 [0.031]	-0.021 [0.033]
<i>Seatloss*Heterogeneity* After</i>	0.003** [0.001]	0.009 [0.026]	0.105** [0.046]	0.023 [0.032]	0.030*** [0.010]
Panel F: Re-runners, HI	[26]	[27]	[28]	[29]	[30]
<i>Seatloss*After</i>	-0.046** [0.022]	0.021 [0.020]	-0.013 [0.018]	0.011 [0.019]	-0.031 [0.025]
<i>Seatloss*Heterogeneity* After</i>	0.003*** [0.001]	-0.014 [0.018]	0.063 [0.040]	0.009 [0.018]	0.021*** [0.007]
N	730	730	730	730	730

Notes: This table reproduces the results from Table 9 with control variables. These models can be estimated only for the subset of mergers that took effect at the start of 2009. For earlier mergers we do not have data on municipality characteristics for the election year 2008 as they ceased to exist and municipality characteristics are not available at the pre-merger level after merging. The control variables include the municipality and means of candidate characteristics reported in Table A1. Candidate characteristics may be bad controls (i.e. alternative outcomes) so the results from these models should only be seen as robustness tests. Standard errors are clustered at the post-merger municipality level and reported in brackets. ***, ** and * indicate statistical significance at 1, 5 and 10 percent level, respectively.