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LOCAL REPRESENTATION AND STRATEGIC VOTING: EVIDENCE FROM ELECTORAL BOUNDARY REFORMS [*]

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ABSTRACT: We use Finnish local election voting data to analyze whether voters value local representation and act strategically to guarantee it. To identify such preferences and behavior, we exploit municipal mergers as natural experiments, which increase the number of candidates and parties available to voters and intensify political competition. Using difference-in-differences strategy, we find that voters in merged municipalities start to concentrate their votes to local candidates despite the larger choice set, whereas the vote distributions in the municipalities that did not merge remain the same. Moreover, the concentration effect is clearly larger in municipalities that are less likely to gain local representation in the post-merger councils. We also find that the effect increases both as the geographical distance and income heterogeneity between merging municipalities increases. We interpret these results as evidence of both preferences for local representation and strategic voting.

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1 Introduction

Received literature shows that representation in a legislative body matters for the geographic distribution of centralized spending and the type of spending in general.[1] For several reasons, representation should also matter 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 public sector offers.[2] In addition to the type and level of local services, 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 an own representative to ensure their own share of the spending (Weingast et al. 1981) and to prevent others from spending too much (Baron and Ferejohn 1987 and 1989).

In this paper, we analyze the value of local political representation to voters by studying how voters in local municipal elections reacted to a recent wave of municipality mergers in Finland.[3] A municipal merger can be seen as an electoral boundary reform that 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. These boundary reforms create an interesting set-up to study voters' behavior and their preferences for local representation for a number of reasons.

First, because in the merged municipalities voters can also vote for new non-local candidates, mergers can be seen as an expansion of the voters' choice set. If the location of candidates is not relevant to voters, at least some voters should find a better match

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[1] See e.g. Knight (2004, 2005 and 2008) and Albouy (2013) for theoretical and empirical evidence on the geographic distribution of centralized spending and Pande (2003), Besley et al. (2004) and Chattopadhyay and Duflo (2004) concerning spending types that benefit disadvantaged and minority groups.

[2] Similarly, in the spirit of Alesina and Spolaore (1997), local government borders could have been originally drawn in such a way that within jurisdiction preference heterogeneity is smaller than between jurisdiction heterogeneity. More precisely, in Alesina and Spolaore (1997) jurisdiction size is a tradeoff between preference heterogeneity and economies of scale in producing the public good.

[3] 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 (2012). 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) study incumbency advantage and Hayes and McKee (2009) turnout. Hyytinen, Saarimaa and Tukiainen (2013) study how the expected change in councilors' seat competitiveness affected their *ex ante* voting behavior over the mergers analyzed in this paper.

from the new larger set of alternatives. If so, the vote distribution of a municipality should be less concentrated after a merger as votes are scattered to a larger number of candidates. On the other hand, if 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, f we observe a voter choosing a local candidate over a non-local candidate when both are available, we can interpret this choice as revealing 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 number of representatives from voters' pre-merger municipalities in the post-merger municipality 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.[4] To sum up, mergers are likely to lead to vote concentration if voters are sincere and value local representation. Moreover, vote concentration should be stronger if voters are strategic. Previous empirical evidence concerning valuation for local representation is largely missing in the literature. Neither do we have much evidence based on natural experiments concerning strategic voting.

Our econometric analysis exploits the fact that in the Finnish municipal elections council seats are allocated using the open-list D'Hondt method. For our purposes, the essential feature of the Finnish system is that each voter gives a single vote to a single candidate, and thus, voters (not parties) decide which candidates are elected from a given list.[5] Furthermore, municipalities are divided into polling districts that are used for vote counting and voting location purposes only and do not change due to a merger. We observe votes at the individual candidate and polling district level both before (2004) and after (2008) the merger wave. By using polling districts we are able decompose a merged municipality into the original pre-merger municipalities and trace

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[4] This means that some voters abandoned their preferred "sincere" choice because they wanted to influence the elections outcome. I.e. instead of voting for their preferred candidate they voted for a candidate with a legitimate chance of winning a seat. More empirical evidence on strategic voting can be found e.g. in Cox (1997), Fujiwara (2011) and Kawai and Watanabe (2013).

[5] Furthermore, voters cannot vote for a party without specifying a candidate. In the case of closed-lists, our analysis would not be possible, because parties choose the ranking of individual candidates.

back the vote distributions of candidates at the pre-merger municipal level for both elections. These features of the data facilitate a difference-in-differences (DID) analysis where the unit of observation is the pre-merger municipality and voting data come from elections before and after the merger wave. In addition, we calculate counterfactual election outcomes based on the pre-merger vote distributions and candidates while treating the mergers as new electoral districts. This gives us a measure of the intensity of the treatment a municipality receives due to a merger in terms of expected electoral success when there are no behavioral responses by voters or candidates.

We measure vote concentration by the maximum candidate vote share and the Herfindahl index of the candidates' vote shares. Our key empirical finding is 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 municipalities that did not merge. More importantly, the concentration effect is clearly stronger in municipalities that are less likely to gain local representation in the post-merger councils based on counterfactual elections. 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 expect a substantial loss (typically small municipalities merging with larger partners). This happened despite the fact that the voters in the merged municipalities had much a larger set of candidates and parties to choose from after a merger.

We also show 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 over two representatives (maximum being 6) and only one of these municipalities failed to gain a single one.

Finally, we are interested in why voters value local representation. To this end, we analyze whether the observed vote concentration patterns are consistent with voters' preferences in terms of local service-tax bundles and location of local services. We find that the effect of our treatment on vote concentration increases both as the geographical distance and income heterogeneity between merging municipalities increases. The first result suggests that voters care about the geographic location of public services and the

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second that there is between municipality preference heterogeneity over services. While there is a vast literature showing that households value local services, to our knowledge, this is the first paper to offer plausible causal evidence concerning preferences for local representation that uses actual voting data, instead of survey or house price data.[6] The latter observation can be seen as evidence of Tiebout sorting.

The mergers in our analysis were voluntarily decided at the local level and they may be a non-randomly selected sample, which raises some issues concerning validity of DID. Reassuringly, our results are highly robust and valid in the light of the usual DID common pre-trend tests, placebo regressions based on earlier elections (1996 and 2000), alternative control group (municipalities that considered merging, but eventually did not), controlling for observables and within merger group analysis.

There are several competing explanations for our findings and we need to carefully consider whether we are actually observing a strategic response from the voters to changes in political competition and whether this response is related to local representation. The confounders include behavioral responses from candidates and parties, informational advantage of local candidates and change in type of candidate that voters prefer due to a merger, and change in the amount of available local candidates. We discuss these issues at length and provide additional econometric evidence that supports our interpretation in a separate subsection. Most importantly, we can replicate our concentration results using only the subset of candidates that we can identify as being local, because they ran in both the pre- and post-merger elections. This analysis effectively rules out many of these concerns as we elaborate below. We conclude from our findings 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 rest of the paper is organized as follows. In Section 2, we present a short overview of the institutional setting of Finland concerning municipalities, election mechanisms and the merger process. The section also contains theoretical arguments on why local representation may matter to voters and how this should be reflected in voting behavior. In Section 3, we summarize our data shortly and we present our econometric

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[6] A typical approach in the literature has been to show that the quality of neighborhood services capitalizes to house values. See e.g. Black and Machin (2011) and the references therein.

strategy and results. We discuss the results and possible confounders in Section 4 and Section 5 concludes.

2 Institutional background, local representation and voting
2.1 Why local representation matters?

In Finland, public goods and services are provided by two tiers of government where municipalities constitute the local level. Because of the variety of tasks assigned to them, municipalities are of considerable importance to the whole economy. The GDP share of municipality spending is roughly 18 percent and they employ around 20 percent of the total workforce. The bulk of Finnish municipalities' expenditures come from producing social and health care services and primary education. In most of these services, in addition to costs, quantity and quality, also the location of services should be relevant for the citizens. Municipalities fund their spending mostly through their own revenue sources. 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 overall revenue is used to equalize local cost and revenue disparities.

Municipal councils are the main seat of power in Finnish municipal decision making. Due to extensive tasks and power in setting taxes, municipal councils are relatively powerful compared to local politicians in many other countries. Councils' importance implies that also local political representation in the council is important and for a variety of reasons it may be particularly important after a merger. Even though the municipal council makes all the decisions, a municipal board has an important preparatory role. Political parties gain representation both in the council and in the municipal board proportional to their electoral success.

Mergers between municipalities are voluntary.[7] We analyze voting in municipal elections in mergers that took place between the 2004 and 2008 municipal elections. Between these two elections, there were 47 municipal mergers involving 130

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[7] A typical merger process is as follows: After an initial feasibility study, municipal boards make a proposal of the merger to the municipal councils. This proposal is voted on by the councils. If the proposed merger gains a majority in all the participating councils, the merger goes through. If not, all the municipalities continue as they were. For more details, see Hyytinen, Saarimaa and Tukiainen (2013).

municipalities. The number of municipalities in a given merger ranged from 2 to 10 municipalities. As a result, the number of municipalities diminished from 432 to 348.

In this study, we are not focusing on the reasons behind this recent merger wave. In public discussion, it has been seen mainly as a result of increasing fiscal pressure due to differences in population trends and aging across municipalities, which makes small and poor municipalities unable to provide the large set of public services they are responsible for. This pressure is certainly real since small municipalities share the same responsibilities as the large ones. Moreover, new central government policies, such as large merger subsidies may have encouraged merging. Saarimaa and Tukiainen (2013) describe the determinants of these mergers at an aggregate level. They find evidence suggesting that fiscal pressure, voter preferences and local democracy considerations influence the eventual map, but less evidence of scale economies driving the mergers. Hyytinen, Saarimaa and Tukiainen (2013) study the merger decisions at individual candidate level and find that councilors' re-election concerns play a role.

Due to extensive tasks of the Finnish municipalities voters may benefit from having a local representative in the council for a number of reasons. The first reason is related to the *common pool problem* first formalized by Weingast, Shepsle and Johnsen (1981). If there are identifiable (geographic) local groups within a municipality that benefit from spending in their area and if the spending is financed globally by all taxpayers in the municipality, having a local representative may be instrumental in receiving the benefits from local spending. Baron and Ferejohn (1987 and 1989) show that the common pool creates incentives, not only to increase own-district spending, but also to restrain the spending in other districts.[8] In the case of municipal mergers, the citizens of different pre-merger municipalities can be clearly seen as representing different local groups.

Second, if households with similar preferences have a tendency to sort into same municipalities (or neighborhoods) as suggested by Tiebout (1956), 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.[9] By service-tax bundle we refer both to

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[8] See also Knight (2008).
[9] See e.g. Epple, Romer and Sieg (2001), and Bayer and McMillan (2012) on sorting according to neighborhood quality and observable household characteristics.

the overall size of the local public sector, but also how spending is divided across different services, such as elementary schools or primary health care.

Finland is quite homogeneous with respect to measures concerning voter heterogeneity previously analyzed in the literature (e.g. Alesina, Baqir and Hoxby 2004). In particular, due to historically low immigration levels, neighboring municipalities are observably almost identical in ethnical, religious or racial heterogeneity measures. Also income differences are quite small in Finland relative to many other countries. Nonetheless, there is variation in regional income levels, and also in age and occupation structure, for example.

Third, if councilors and voters consume similar services and dislike travel costs, a councilor living close to a voter is more likely to share the voter's preferences over the *geographic location of public services* (schools, primary health care centers etc.). Furthermore, since house values are tied to the prevalence and quality of (public) services in the neighborhood, house value becomes an incentive device that may align councilors' and voters' preferences. This can be easily seen when both the councilor and the voter are homeowners. In this case, both have a desire to promote policies that increase their house value.[10] The closer the councilor lives to the voter, the more correlated their travel costs and house values are, and because of this, the more aligned are the incentives of the councilor with the voter's preferences. Moreover, both parties do not have to be homeowners in order for this incentive mechanism to work. For example, a voter with school-aged children may be more likely to vote for a local homeowner councilor without children than a councilor with children that lives in another neighborhood. The logic is that the homeowner councilor has incentives to promote investments into the local school because it makes the neighborhood more attractive and raises neighborhood house prices.[11] Therefore, even in the case where otherwise homogenous agents are scattered more or less randomly across space, the common pool aspect of post merger municipal spending should make candidates' location an important aspect when voters choose who to vote for.

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[10] See e.g. DiPasquale and Glaeser (1999).
[11] For example, Hilber and Mayer (2008) find empirical evidence that even households without children promote investments into local schools because the investments raise their house values. See also Fischel (2001).

2.2   Election system, mergers and voting behavior

Finland has a multi-party system and currently there are eight parties in the Finnish parliament and these parties also dominate 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.[12]

The municipal elections in Finland 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. The seats of a given district are allocated based on party vote shares to the candidates in accordance with competitive indices set by the d'Hondt method. Thus, voters determine the position of the candidates in the party list, whereas parties are allocated seats according to the sum of votes over the individual candidates.

Each municipality has only one electoral district (i.e. constituency) and no geographic quotas are in place. This applies also to the merged municipalities. However, most municipalities have many polling districts, which simply define the location where people go to vote (e.g. local school). 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 district). Since these polling districts do not change because of the mergers, we know the location of voters also after the mergers.

What should we expect to see after a municipality merger if voters value local representation? Mergers can be seen as electoral boundary reforms that change 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 council seats (relative to number of voters). The way a given merger changes the latter two components is driven by electoral rules governing council size and the maximum number of candidates that parties are allowed to nominate. In Finland, the municipal council size is an increasing step function of municipality's population as can be seen from Table 1, whereas the maximum number of candidates per party or list size is 1.5 times the council size. The

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[12] In the 2011 parliamentary election, the Finns Party became the third largest party in the parliament overtaking the Centre Party.

list size restriction is binding only in larger municipalities and larger parties. However, it often becomes binding due to a merger.

Table 1. Council size and maximum list size.

Municipality population	Council size	Maximum list size
Less or equal to 2,000	13, 15, or 17	25
2,001–4,000	21	31
4,001–8,000	27	40
8,001–15,000	35	52
15,001–30,000	43	64
30,001–60,000	51	76
60,001–120,000	59	88
120,001–250,000	67	100
250,001–400,000	75	112
Over 400,000	85	127

The mechanical change induced by a merger and electoral rules may in turn induce a behavioral response from parties, candidates and voters. From the point of view of voters and local representation, the most important changes 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.

As an example, consider two municipalities that merge. One has a population of, say, 3,000 and the other 25,000. From Table 1 we see that before the merger, the council sizes of these municipalities are 21 and 43, respectively. After the merger, the council size will also be 43. As whole, a merger results in a reduction in the number of councilors and typically the number of candidates. However, from the point of view of voters the overall number of candidates may increase and typically does increase substantially in the case of small municipalities that merge with a larger partner. In our example, this means that the voters from the smaller municipality can now vote for candidates coming from the larger merger partner. This is exactly the type of setup one would like to have in order to test preferences, because we observe voters' choices before and after they are presented with a new choice set.

We can draw the following testable hypotheses concerning voters' response depending on whether voters are sincere or strategic. Consider first the case of sincere voters who do not take into account the election probability of their candidate, but

simply vote for the most suitable candidate. If voters do not value local representation, but make their voting decisions based on other criteria, such as candidate quality or party affiliation, we should see no change in the vote distribution or that the vote distribution of a municipality is less concentrated in the post-merger elections than it was in the pre-merger elections. This is because it is likely that some voters will find a better match from the new and larger choice set. If, on the other hand, voters value local representation and if the number of local candidates diminishes after a merger, we should observe a more concentrated vote distribution, especially in smaller municipalities. That is, even when the number of choices increases for voters, the vote distribution should be more concentrated so that votes are concentrated to fewer local candidates.

What about the case of strategic voters? Again, if local representation does not matter, we should not expect vote concentration.[13] If voters value local representation and if they act strategically to secure local representation, we should observe vote concentration also *within* the group of local candidates. In this case, some voters would abandon their "sincere" local choice and vote for a candidate that has a legitimate chance of winning a seat from a non-local candidate. Again we should see this especially among smaller municipalities where the expected number of elected local representatives goes down more.

To sum up, if local representation matters we should observe vote concentration after a merger, especially in smaller municipalities. If voters are strategic and value local representation, we should see vote concentration also within local candidates. Vote concentration may also depend on the different mechanisms described in the previous section. In the empirical part of the paper, we test these hypotheses by analyzing how municipalities vote distributions change due the mergers.

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[13] What happens exactly depends on how pivotal probabilities change due a merger.

3 Econometric analysis

3.1 Data and outcomes of interest

Our main data source is the election database maintained by the Ministry of Justice.[14] The data include information on votes received by individual candidates from two municipal elections held in October of 2004 and 2008. The 2008 municipal elections were held using the new merged municipalities as constituencies.[15] We also have data from the 1996 and 2000 municipal elections, which will be used in pre-treatment trend analysis and in a placebo test. In addition to election data, we use municipal characteristic to study whether voters' reactions are heterogeneous with respect to observable differences among merging municipalities. We also use municipal characteristics as control variables in some specifications. These data are produced by Statistics Finland.

Since municipalities are divided into (time invariant) polling districts we can build a panel data set where the cross-sectional units are the municipalities in 2004, i.e. before the mergers.[16] That is, we can trace back which candidates received votes from the pre-merger municipalities also in the post-merger elections in 2008. Even though we do not know the location of the candidates, information on the location of the votes facilitates our empirical analysis.

Our main interest lies on whether voters concentrate their votes to particular candidates. To this end, we use two outcomes to measure the concentration of votes that are defined as

(1)
$$C = \max(s_i), \ i = 1, ..., N \text{ and}$$
$$H = \sum_{i=1}^{N} s_i^2,$$

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. The first measure (C) is simply the vote share

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[14] Similar data are also freely available online at Statistics Finland's website.
[15] In many 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.
[16] In some cases, the polling districts changed and we were unable to trace back the old municipal division. In these cases, we drop the entire merger from the analysis.

of the most popular candidate. The second measure we use is the Herfindahl index (H). The larger H is the more concentrated the vote distribution is. These measures are (roughly) invariant to other changes that occur because of the merger, such as changes in council size and number of candidates. This is important because concentration measures that are not invariant to the number of candidates would capture mechanical effects that are not due to changes in voter behavior.[17]

3.2 Main results

We start with a simple DID strategy with a control (no merger) and a treatment group (merger) with two time periods. The econometric model can be written as

$$(2) \qquad y_{it} = \alpha_0 + \alpha_1 merger_i + \alpha_2 after_t + \alpha_3 merger_i \cdot after_t + \varepsilon_{it},$$

where y_{it} is the outcome in question for municipality i (2004 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 and u is the error term.

A simple *merger* dummy variable is of course a coarse measure of the treatment that voters in the municipalities receive as a result of a merger. If voters value local representation, we should observe voters from small municipalities in a given merger to concentrate their votes more than voters from larger municipalities simply because smaller municipalities have a lower chance of electing representatives to the post-merger council.

In order to test this, we need a measure that captures these differences. To this end, we used actual election rules (open-list D'Hondt) and calculated hypothetical election outcomes for each individual candidate using actual votes and candidates from the 2004 elections, but assumed that the mergers had taken place. From these 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

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[17] For example, the Gini index would not be a very good measure in our case because it is sensitive to the number of candidates especially if a lot of the candidates receive very little or no votes. In fact, our results are even stronger if we use the Gini index as an outcome.

2004 pre-merger municipality level. Our treatment variable is 1 minus the share of 2004 candidates that would make into the post-merger council with 2004 votes. This variable equals 0 if all candidates from a municipality would make it into the post-merger council (effectively no treatment) and it equals one if none of them would (maximum treatment). In other words, this variable measures the expected share of local representatives that a municipality would lose if all the voters and candidates would behave in the 2008 elections exactly as they did in the 2004 elections. Descriptive statistics of this measure are reported in Table A1 in Appendix A. On average a municipality loses almost 66 percent of their council seats if the post-merger elections were held with the exact same candidates and vote distributions.

Due to the particular election system, this measure of treatment intensity mainly captures situations where the benefit of vote concentration is related to getting their local candidates past the non-local candidates in within party rankings. However, within party concentration does not increase local representation in the case that parties have very different support bases in different municipalities. As an example, consider a merger where all voters from a small municipality A support party L, and in a large municipality B, all support party R. In this case, within party vote concentration would not increase local representation, even though the smaller municipality gets a large treatment according to our measure. Instead, local representation would be determined solely by the between party allocation of seats. Fortunately, in our data, the three largest parties have significant support base in almost all the municipalities, thus making this concern irrelevant in practice (see Figure A1 in Appendix A). Moreover, candidates or voters may also change the party. In that case, our measure would be relevant even in our extreme example.

In this part of the analysis, we confine ourselves to the subsample of merged municipalities and estimate the following model[18]

$$(3) \qquad y_{it} = \beta_0 + \beta_1 seatshare_i + \beta_2 after_t + \beta_3 seathare_i \cdot after_t + u_{it},$$

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[18] This specification produces exactly the same results as a model where we include the non-merged municipalities and included dummies and interactions for merging as in Eq. (2).

where *seatshare* is variable described above. The higher the value of *seatshare* is the more incentives voters should have for vote concentration.

We start with graphical analysis.[19] In Panel A of Figure 1, we show the trends in the maximum vote share and the Herfindahl index for the group of municipalities that merged between the 2004 and 2008 municipal elections and for those who did not. The dots in the Figure represent group specific means. In Panel B, we have divided the merger group into three equal-sized subgroups based on the (ordered) *seatshare* variable. The low incentives group refers to municipalities who expect to do relatively well in the next elections in terms of local representation (low values of seatshare) while the high incentive group expect to do poorly (high values of *seatshare*).

Both of our outcomes clearly have a common trend (or no trend) in the pre-treatment period (1996, 2000 and 2004 elections) when no mergers took place.[20] Furthermore, there is a huge jump in both variables in 2008 in the merger group compared to previous years as both means almost double in size. A similar picture arises within the merger group. The common pre-trends assumption seems to be valid also for this grouping. Interestingly, there is no change in vote concentration among the municipalities in the low incentive group while we see a dramatic concentration in the high incentive group. The change in the median incentives group is also substantial. This is our first piece of convincing 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.[21]

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[19] In Appendix B, we illustrate these results using individual municipalities and candidates.

[20] There were 6 mergers between 2000 and 2004. These municipalities are excluded from the common pre-trend analysis. The results are robust also to including them in the analysis.

[21] We tested the common pre-trends assumption also by using two placebo treatments and the basic DID models based on Eq. (2). These models are estimated as if the mergers took place either between the 1996 and 2000 elections or between the 2000 and 2004 elections. These results are reported in Table A2 in Appendix A. We find no effects from these placebo treatments, which is consistent with the pre-treatment common trends illustrated in Figure 1. In addition, we experimented with an alternative control group. Some municipalities that did not merge voted for a merger between the 2004 and 2008 elections, but these mergers did not gain the majority in all the participating municipalities and fell through. In Figure B2, we present the trends in the merger group and this alternative control group. The pre-treatment trends in both of our concentration measures look again very similar and there is no significant jump in the measures of the alternative control group.
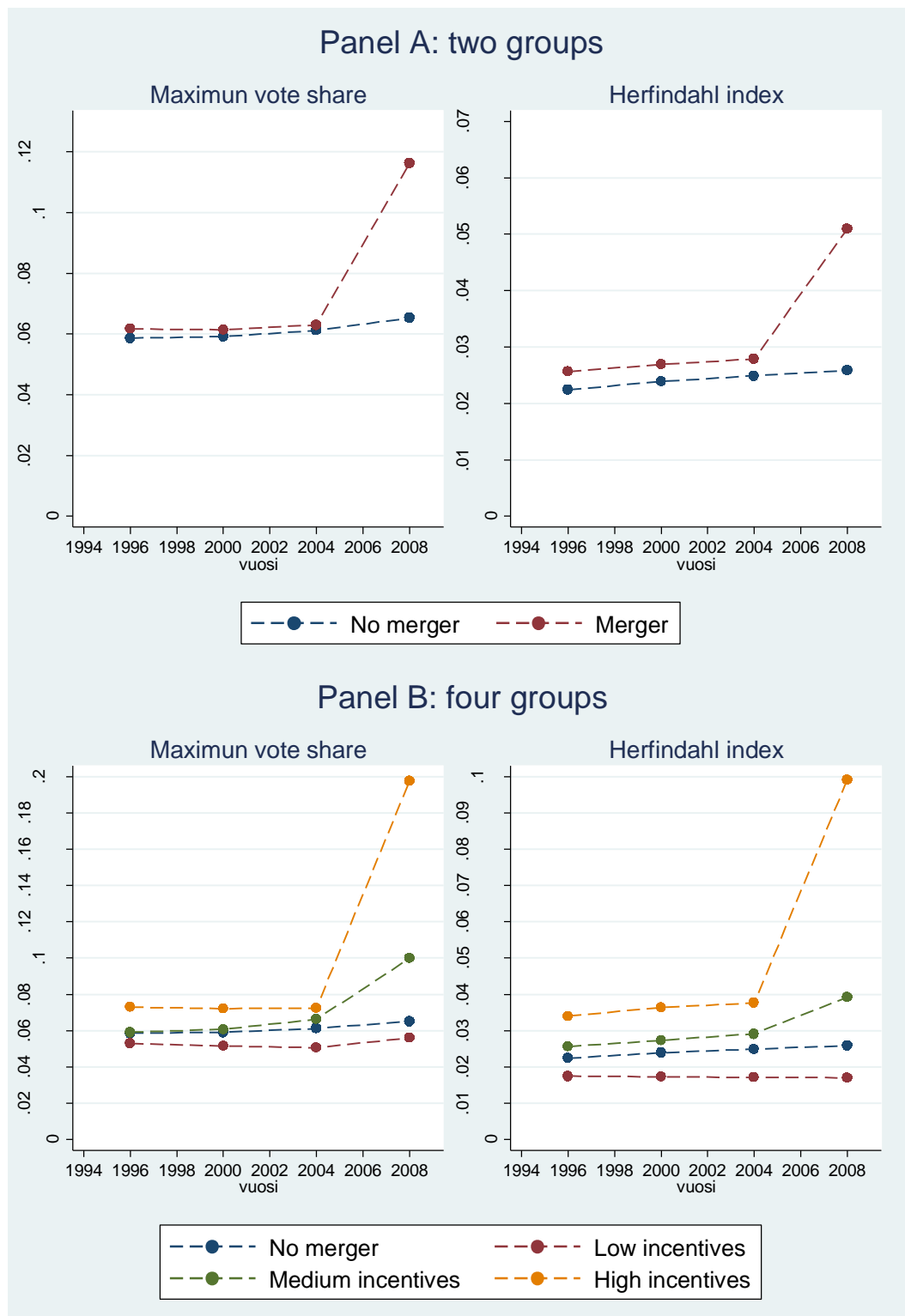
Figure 1. Trends in vote distributions in different municipality groups, 1996–2008.

In Table 2, we repeat these exercises using regressions to show that what we learn from Figure 1 is also statistically significant. Columns [1] and [2] present the results from the

specification in Eq. (2), whereas columns [3] and [4] present the results from the specification in Eq. (3). All the results are large and statistically highly significant.

From colums [3] and [4], we can see that the constant treatment effect (coefficient for *after*, because we look only at mergers) is actually negative for those municipalities who do not expect to lose any seats (*seatshare* equal to zero) and we observe about 9.6 percentage points increase (12.1–2.5) in the maximum vote share for those who expect to have no local representatives in the post merger council (*seatshare* equal to one).[22] Appendix B offers more detailed party and candidate level analysis concerning vote concentration.

Table 2. Results for vote concentration.

	Maximum vote share [1]	Herfindahl index [2]		Maximum vote share [3]	Herfindahl index [4]
constant	0.0610***	0.0249***	*constant*	0.0418***	0.0110***
	[0.0013]	[0.0006]		[0.0030]	[0.0014]
merger	0.0016	0.0028*	*seat share*	0.0321***	0.0257***
	[0.0026]	[0.0016]		[0.0049]	[0.0029]
after	0.0042***	0.0010***	*after*	-0.0252***	-0.0158***
	[0.0013]	[0.0003]		[0.0073]	[0.0051]
*merger*after*	0.0496***	0.0223***	*seat share**	0.1214***	0.0601***
	[0.0084]	[0.0060]	*after*	[0.0200]	[0.0158]
R^2	0.15	0.08		0.36	0.21
N	814	814		240	240

Notes: The results are from OLS models. Clustered standard errors are reported in brackets. ***, ** and * indicate statistical significance at 1, 5 and 10 percent level, respectively.

3.3 Treatment effect heterogeneity

We also analyze heterogeneity in the treatment effect of the variable *seatshare*. That is, we are not interested in the direct effect of various heterogeneity measures on vote concentration, but assume that heterogeneity only plays a role when there is a need for

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[22] We estimated all the models where we added the following municipality characteristics as control variables: debt, expenditures, tax rate, taxable income and corporate tax revenues. These models can be estimated only for the mergers that took effect at the start of 2009. For earlier mergers we do not have data on municipality characteristics for 2008. Adding municipality controls does not change our results.

vote concentration in order to increase local representation.[23] Again, we conduct this analysis only within the subsample of merged municipalities. The models where we allow for heterogeneous treatment effects can be written as

(4)
$$y_{it} = \gamma_0 + \gamma_1 seatshare_i + \gamma_2 seatshare_i \cdot heterogeneity_i +$$
$$\gamma_3 after_t + \gamma_4 seatshare_i \cdot after_t + \gamma_5 seatshare_i \cdot heterogeneity_i \cdot after_t + v_{it},$$

where the *heterogeneity* measure varies according specification.

We measure preference heterogeneity using five variables. Our first measure of heterogeneity is related to voters' geographic location. 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, based on the discussion in Section 2, the farther away the voters are from the center of the largest 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 centers of their own pre-merger municipality and the largest municipality in their merger.[24] We use the difference in these median distances as our distance measure.

In addition to preferences over the location of services, the level, type and quality of services may matter. If households have sorted into municipalities in the spirit of Tiebout, i.e. according to preferences over local public goods, it should be reflected as heterogeneity in the treatment effect of the variable *seatshare*. The more between municipality heterogeneity there is the more valuable is local representation. Therefore we analyze whether vote concentration depends on between municipality differences in variables that serve as proxies for preference heterogeneity. Our first measure is simply an indicator whether a merged municipality and the largest municipality in the same merger had the same largest party in the 2004 elected councils. If voters care for party

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[23] The results do not change if we control also for the baseline heterogeneity and change in heterogeneity.
[24] This calculation is based the GIS Grid Database (250 m * 250 m grids) produced by Statistics Finland. In addition to latitude and longitude coordinates, the data include information on the number of eligible voters (i.e. Finnish population above the age of 18) in each grid for the whole of Finland. This information together with coordinates of municipal centers enables us to calculate the median distance for eligible voters to the municipality centers.

representation rather than local representation, similar party preferences should decrease the need for vote concentration.

We also use two policy variables, namely the difference in pre-merger tax rates and per capita municipal expenditures. Expenditures could reflect differences in service requirements due to different age structure for example. Our final proxy is the difference in the municipal level mean of taxable income. The last three heterogeneity measures are calculated as follows. For municipality i in merger m we define

$$
\begin{aligned}
het\_tax_{im} &= \left| t_{im} - \bar{t}_m \right|, \\
het\_exp_{im} &= \left| exp_{im} - \overline{exp}_m \right|, \\
het\_inc_{im} &= \left| inc_{im} - \overline{inc}_m \right|,
\end{aligned}
$$

(5)

where $\bar{t}_m$, $\overline{exp}_m$ and $\overline{inc}_m$ refer to the population weighted mean municipal income tax rate, per capita expenditures and taxable income in merger m, respectively. Thus, these heterogeneity variables measure the difference between the pre-merger municipality and the consequent merger. Because the mean is weighted with population the difference is going to be the smaller the larger municipality i is relative to other municipalities in the merger for given values of heterogeneity measures. This is a natural measure because larger municipalities are more likely to be well represented in the post-merger councils, and thus, voters in larger municipalities should be less sensitive to these differences.[25] In other words, we assume that a given difference in, say, tax rates is going to matter more for voters from a smaller municipality. All of these measures are calculated using 2006 values. Table A1 in Appendix A reports descriptive statistics of our heterogeneity measures.

Table 3 presents the treatment effect heterogeneity results based on Eq. (4). Columns [1] to [10] report results from separate regressions. We draw three insights from Table 3. First, vote concentration increases as the median change in distance to municipality centre of eligible voters' increases. This effect is also very large: an additional 10 km in distance increases the maximum vote share by roughly 5 percentage

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[25] We experimented with different weighting schemes and different ways to measure heterogeneity. The results are largely the same.

points. In other words, each additional 10 km roughly doubles the maximum vote share from its baseline.

Second, concentration increases with income differences and the effect is quantitatively large. At a given level of *seatshare*, a one standard deviation (1085 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 if the Herfindahl index is used as the outcome, instead of the maximum vote share (see panel B in the Table 4). The fact that the treatment effect increases with income differences is not surprising, because under a flat local income tax high income citizens contribute more to the financing of public services. Finally, we find no heterogeneity in the treatment effect with respect to our direct policy measures (party, tax rate and per capita expenditures).

Since none of our heterogeneity measures are randomized, the results may suffer from omitted variable bias. Thus, we cannot interpret their possible effect on the level of the treatment effect as causal. We simply can infer that the treatment effect varies in different merger situations. However, the likely candidates for omitted variables are also related to voter heterogeneity measures. Therefore, the results can be safely interpreted as evidence of some type of preference heterogeneity among voters of different municipalities.

Table 3. Results for heterogeneous treatment effects.

Heterogeneity measure:	Distance	Party	Tax rate	Expenditure	Income
	Panel A: Maximum vote share				
	[1]	[2]	[3]	[4]	[5]
constant	0.0453***	0.0402***	0.0416***	0.0420***	0.0425***
	[0.0032]	[0.0030]	[0.0030]	[0.0030]	[0.0031]
seat share	0.0152**	0.0400***	0.0336***	0.0307***	0.0288***
	[0.0074]	[0.0061]	[0.0068]	[0.0064]	[0.0073]
*seat share * heterogeneity*	0.0007***	-0.0133**	-0.0036	0.0026	0.0015
	[0.0003]	[0.0060]	[0.0111]	[0.0089]	[0.0026]
after	-0.0016	-0.0272***	-0.0219***	-0.0224***	-0.0106*
	[0.0074]	[0.0090]	[0.0062]	[0.0057]	[0.0059]
*seat share * after*	0.0084	0.1315***	0.0919***	0.1044***	0.0527***
	[0.0363]	[0.0304]	[0.0166]	[0.0165]	[0.0191]
*seat share * heterogeneity * after*	0.0048**	-0.0169	0.0704	0.0318	0.0322***
	[0.0020]	[0.0261]	[0.0502]	[0.0426]	[0.0078]
R^2	0.54	0.37	0.38	0.37	0.43
N	240	240	240	240	240
	Panel B: Herfindahl index				
	[6]	[7]	[8]	[9]	[10]
constant	0.0139***	0.0103***	0.0112***	0.0117***	0.0119***
	[0.0015]	[0.0014]	[0.0013]	[0.0014]	[0.0014]
seat share	0.0115***	0.0289***	0.0235***	0.0208***	0.0213***
	[0.0042]	[0.0035]	[0.0037]	[0.0038]	[0.0041]
*seat share * heterogeneity*	0.0006***	-0.0054	0.0053	0.0091	0.0021
	[0.0001]	[0.0039]	[0.0084]	[0.0065]	[0.0017]
after	0.0028	-0.0185***	-0.0136***	-0.0132***	-0.0074**
	[0.0059]	[0.0071]	[0.0038]	[0.0032]	[0.0036]
*seat share * after*	-0.0291	0.0733***	0.0403***	0.0440***	0.0206*
	[0.0322]	[0.0259]	[0.0098]	[0.0093]	[0.0116]
*seat share * heterogeneity * after*	0.0038**	-0.0222	0.0472	0.0301	0.0185***
	[0.0018]	[0.0202]	[0.0398]	[0.0333]	[0.0052]
R^2	0.44	0.23	0.24	0.23	0.26
N	240	240	240	240	240

Notes: The results are from OLS models. Clustered standard errors are reported in brackets. ***, ** and * indicate statistical significance at 1, 5 and 10 percent level, respectively.

4 Discussion and validity checks

4.1 Local representation

There are several competing explanations for our findings concerning both local representation and strategic voting. In order to fix ideas, consider first what type of an experiment would identify both preferences for local representation and strategic voting and how our natural experiment relates to this benchmark. First, for an experiment to teach us something about voter preferences over candidates, it needs to induce exogenous variation to the set of available candidates. If we observe a voter choosing a local candidate over a non-local candidate when both are available, we can interpret this choice as revealing a preference for local over non-local candidate. Second, to infer whether voters are strategic from the experiment, it needs to induce exogenous variation on whether a voter's vote is pivotal. If a voter's preferred local candidate is highly unlikely to get elected, a strategic voter would instead vote for another local candidate with a legitimate chance of winning a seat from the non-local candidates. Moreover, the experiment should not influence the set of voters or their preference ranking over candidates, or the set of candidates or their behavior. While our natural experiment induces variation both to the voter's choice set and to the political competition, it may at the same time also influence these confounders. In this section, we discuss these issues and provide additional econometric evidence that supports our interpretation.

We start with our claim that the results are due to preferences for local representation and provide more information on the way the voters' choice set changed due to the mergers and how these changes are related to the intensity of treatment that voters receive (*seatshare*). From Table 4, we notice that a merger expands the voters' choice set both in terms of available candidates and parties. The number of candidates a voter can choose from increases on average by 155, an increase of about 160 percent (see Column [1]). A merger also increases the number of available party lists on average by 2, an increase of about 40 percent (see Column [2]). Both of these effects are stronger for higher values of *seatshare* (see Columns [6] and [7]). 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. A more concentrated vote distribution

after the voters are presented with a larger choice set implies strong preferences for local representation.

Table 4. Additional results.

	Number of candidates	Number of parties	Polling district Herfindahl index	Number of total votes
		Panel A: Difference-in-differences		
	[1]	[2]	[3]	[4]
constant	95.08***	5.794***	0.518***	5898***
	[5.357]	[0.117]	[0.018]	[1080]
merger	0.495	-0.386*	0.062*	-1016
	[9.235]	[0.225]	[0.037]	[1273]
after	2.314***	0.425***	0.032***	386.7***
	[0.854]	[0.069]	[0.011]	[89.10]
*merger*after*	154.9***	2.125***	0.006	32.32
	[11.999]	[0.179]	[0.018]	[140.3]
R^2	0.23	0.14	0.01	0.001
N	814	814	814	814
		Panel B: Continuous treatment		
	[5]	[6]	[7]	[8]
constant	197.8***	7.647***	0.162***	13036***
	[18.76]	[0.329]	[0.049]	[2012]
seat share	-157.3***	-3.443***	0.643***	-12542***
	[21.67]	[0.447]	[0.063]	[2319.392]
after	3.708	0.32	0.053**	1446***
	[10.34]	[0.195]	[0.025]	[330.3]
*seat share**	236.1***	3.431***	-0.023	-1580***
after	[21.60]	[0.315]	[0.037]	[380.9]
R^2	0.42	0.47	0.40	0.35
N	240	240	240	240

Notes: The results are from OLS models. Clustered standard errors are reported in brackets.
***, ** and * indicate statistical significance at 1, 5 and 10 percent level, respectively.

A possible issue with our analysis is the nature of our data and the fact that we do not observe the residential location of all candidates, and thus do not know whether the votes are really concentrated to local candidates. An alternative explanation for our findings could be, for example, that due to a merger some prominent national politicians or other "superstars" become available to all voters of the merging municipalities. This could happen especially when a small municipality mergers with a larger city.

We offer two pieces of evidence to alleviate these concerns. First, out of the 120 candidates that received the maximum vote share, 97 were candidates that we can safely assume to be local. These are candidates that ran for a council seat in both the 2004 and 2008 elections and in 2004, ran in the given pre-merger municipality of interest. As long as these candidates did not move between the election years (within a merger), they can be regarded as local. Furthermore, only one out of the 120 stars lived in some other municipality of a given merger in the 2004 elections. 22 out 120 were newcomers for whom we do not know in which municipality they reside in.

In addition, we can analyze more closely from where the candidates receive their votes. We do this by calculating a Herfindhal index using polling district level vote shares for the most popular candidate in each pre-merger municipality. After the merger, these candidates may receive votes from all the polling districts in the merger, not only from their own pre-merger municipality's polling districts. If they receive votes from the new polling districts, we should observe a decrease in the Herfindahl index. From columns [3] and [8] in Table 4, we see that a merger has no effect on the index, which suggests that the most popular candidates receive their votes from the same polling districts as before, that is from their pre-merger municipalities.

The fact that the size of the constituency increases due to a merger, in some cases substantially, may directly influence voters' willingness to vote for various reasons (see e.g. Dahl and Tufte 1973). Since both of our concentration measures are based on candidate vote shares, we need to be sure that changes in the total number of votes are not driving the results. The post-merger vote distributions may be more concentrated, even in the case where the most popular local candidates receive fewer votes. This happens if voters who voted for the less popular candidates in the pre-merger election abstain in the post merger elections. From Column 8, we can see that this is a real concern since the number of votes clearly decreases in the relatively smaller municipalities, even though it does not decrease in mergers on average (see Column [4]).[26] In order to test that changes in the total number of votes do not influence our findings, we estimated all of the vote concentration regressions using the 2004 number

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[26] This result is in line with the findings by Lassen and Serritzlew (2011) who find that after the Danish municipal merger reform, voters in merged municipalities felt less competent to take part in municipal politics. However, Lassen and Serritzlew (2011) do not directly analyze voting behavior.

of total votes when calculating candidates' vote shares. Reassuringly, the results remain the same (not reported here for brevity).

Finally, voters may keep on voting for local candidates for reasons other than local representation. In particular, we could observe vote concentration simply because voters have better information about the quality of local candidates, and thus, continue to vote for local candidates after the merger. In this case, if the number of local candidates decreases, the vote distribution is going to be more concentrated than before the merger. In Table 5, we present evidence against this interpretation. Columns [1] and [4] report the effects on the number of votes for local candidates who ran in both elections as explained above. On average these candidates do not increase their votes after a merger, but they do get more votes after the merger in relatively small municipalities. More importantly, from columns [2], [3], [5] and [6] we see that votes are concentrated also within the set of local candidates. Information advantage cannot drive vote concentration among local candidates because all of these candidates should benefit equally from the local information advantage.

Table 5. Vote concentration among local candidates.

	Number of votes [1]	Maximum vote share [2]	Herfindahl index [3]		Number of votes [4]	Maximum vote share [5]	Herfindahl index [6]
constant	3769.6***	0.0935***	0.0441***	*constant*	8837.3***	0.0355***	-0.0017
	[672.02]	[0.0021]	[0.0012]		[1421.0]	[0.0080]	[0.0064]
merger	-704.45	0.0396***	0.0346***	*seat share*	-8878.1***	0.1500***	0.1236***
	[819.55]	[0.0094]	[0.0081]		[1644.4]	[0.0209]	[0.0190]
after	91.585	0.0056***	0.0025***	*after*	-218.18	-0.0048	-0.0087***
	[69.032]	[0.0016]	[0.0004]		[148.50]	[0.0060]	[0.0032]
*merger*after*	-47.144	0.0436***	0.0234***	*seat share**	403.93**	0.0830***	0.0533***
	[82.141]	[0.0060]	[0.0038]	*after*	[176.01]	[0.0128]	[0.0092]
R^2	0.001	0.15	0.13		0.37	0.35	0.28
N	814	814	814		240	240	240

Notes: The results are from OLS models. Clustered standard errors are reported in brackets. ***, ** and * indicate statistical significance at 1, 5 and 10 percent level, respectively.

4.2 Strategic voting

The second claim we make is that, in addition to valuing local representation, voters are strategic in their efforts to guarantee it. If voters are strategic they should care about the election probabilities of the candidates and vote so that their vote has a chance of affecting the election outcome. The crucial piece of evidence in favor of this interpretation is presented in Table 5. The fact that local candidates receive more votes is what one would expect if voters value local representation. When voters' old candidates no longer run, they vote for other local candidates to guarantee local representation and this could be a purely sincere choice. However, votes are concentrated also within the set of local candidates. This indicates that the voters, whose former preferred candidate no longer runs, vote popular local candidates disproportionally relative to the candidates' popularity in the pre-merger elections. If voters were totally sincere, we would expect their votes to be uniformly (or proportionally) distributed to the available local candidates which would translate into a negative (or zero) effect in our vote concentration regressions using local candidates. Alternatively, some voters abandon their former candidate in order to vote for candidates with a legitimate chance of election. Either way, this is evidence is consistent with strategic voting due to voters' preferences for local representation.[27]

There are two alternative explanations for the results in Table 5. First alternative is campaigning effort by candidates (or parties). 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.[28] However, we can reproduce the heterogeneous treatment effect results also for the subsample of local candidates (Table A3 in Appendix A). The finding that the concentration among local candidates increases with income differences and especially with distance is not consistent with campaigning effort, whereas it is consistent with

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[27] We also estimated these models also using the 2004 total number of votes when calculating vote shares and the results remain the same.

[28] If campaigning is mostly related to conferring information on election probabilities, this does not pose a problem to our interpretation. If that is the case, campaigning can be seen as a coordination device.

voter preferences for local representation. Candidates who care only for political power should not respond to heterogeneity measures unless also the benefits of holding office are correlated with the heterogeneity measures. Moreover, previous empirical evidence suggests that it is quite difficult to influence voter behavior with campaigning (Levitt 1994, Ansolabehere et al. 2003, Gerber et al. 2003 and Krasno and Green 2008).

The second alternative explanation is that a merger may change the voters' (sincerely) preferred candidate. This might happen because different political skills may be valuable in larger post-merger municipalities than in the smaller pre-merger municipalities. If these skills are rare among local candidates, vote concentration could be a result of purely sincere choices. It is important to note that these arguments are completely in line with voters voting for local candidates. Thus, this possibility casts some doubts on whether we can attribute our results to strategic voting, but it does not refute the result that voters value local representation.

Finally, we can also evaluate how successful voters were in securing local representation using the *seatshare* variable and actual 2008 election results. 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 (*seatshare* equal to 1). In reality, these municipalities gained on average over two representatives (maximum being 6) and only one of these municipalities failed to gain a single one. This calculation is based on the subsample of data including only local candidates. Since the calculation excludes any new local candidates, this is a lower bound for the gained local representation. From this analysis, we can conclude that voters were quite successful in their efforts.

5 Conclusions

In this paper, we use voting data and DID methods to analyze how voters in local municipal 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 that voters in municipalities that underwent a merger 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 much larger set of candidates and parties to choose from after a merger. We interpret these results so that voters value local representation and vote strategically (as opposed to sincerely) in order guarantee it, although the latter interpretation remains somewhat uncertain due to potential confounders.

In addition, we analyze whether the observed vote concentration patterns are consistent with voters' preferences in terms of local service-tax bundles and location of local services. Indeed, we find that vote concentration increases both as the geographical distance and income heterogeneity between merging municipalities increases. 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.

Besides providing 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 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 (Alesina and Spolaore 1997). A number of papers have shown that this type of heterogeneity is important (Brasington 2003, Alesina Baqir and Hoxby 2004, Gordon and Knight 2009 and Saarimaa and Tukiainen 2013). 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. 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.

While our placebo, subsample and heterogeneity analyses and simply the sheer size of the effects give us confidence that the result is causal and internally valid (the result applies to the municipalities that actually merged), external validity of the result is an open issue. On the one hand, the mergers involve a significant share of Finnish municipalities, the effects are large and the comparison involves very heterogeneous set

of mergers. Therefore, one could argue that it is safe to generalize the results to Finland. On the other hand, merging is a major decision on part of the municipalities and it could be, for example, that merged municipalities are more homogenous in terms of voter preferences than municipalities that choose not to merge. Furthermore, we cannot generalize the results to other countries, if they have very different political institutions or municipalities are responsible for different tasks. As usual, replication of our analysis in other countries with merger activity and similar data would be useful.

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Appendix A. Additional figures and regression results.

Table A1. Descriptive statistics.

	Mean	Std. Dev.	Min	Max
Share of council seats lost using old votes	0.650	0.353	0	1
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] Median distance of an eligible voter to the centre of the largest municipality in the merger. 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.

Table A2. Placebo tests using 1996, 2000 and 2004 election data.

	1996 to 2000:		2000 to 2004:	
	Maximum vote share	Herfindahl index	Maximum vote share	Herfindahl index
	[1]	[2]	[3]	[4]
constant	0.0593***	0.0228***	0.0596***	0.0244***
	[0.0013]	[0.0005]	[0.0012]	[0.0006]
merger	0.0021	0.0027**	0.0015	0.0024*
	[0.0025]	[0.0013]	[0.0024]	[0.0014]
after	0.0003	0.0015***	0.0014	0.0005
	[0.0013]	[0.0003]	[0.0013]	[0.0003]
*merger*after*	-0.0006	-0.0003	0.0003	0.0004
	[0.0021]	[0.0005]	[0.0020]	[0.0006]
R^2	837	837	825	825
N	0.001	0.016	0.002	0.011

Notes: The results are from OLS models. Clustered standard errors are reported in brackets. ***, ** and * indicate statistical significance at 1, 5 and 10 percent level, respectively.

Table A3. Results for heterogeneous effects using local candidates.

Heterogeneity measure:	Distance	Party	Tax rate	Expenditure	Income
	Panel A: Maximum vote share				
	[1]	[2]	[3]	[4]	[5]
constant	0.0619***	0.0314***	0.0386***	0.0391***	0.0477***
	[0.0077]	[0.0089]	[0.0070]	[0.0074]	[0.0069]
seat share	0.0233	0.1700***	0.1224***	0.1277***	0.0923***
	[0.0294]	[0.0276]	[0.0194]	[0.0238]	[0.0234]
seat share * heterogeneity	0.0053***	-0.0336	0.0656	0.0417	0.0270**
	[0.0014]	[0.0278]	[0.0562]	[0.0437]	[0.0134]
after	0.0059	-0.0019	-0.0026	-0.0032	0.0053
	[0.0059]	[0.0063]	[0.0060]	[0.0061]	[0.0064]
seat share * after	0.0316*	0.0691***	0.0633***	0.0733***	0.0354*
	[0.0190]	[0.0175]	[0.0163]	[0.0172]	[0.0197]
seat share * heterogeneity *	0.0022**	0.0233	0.0468*	0.0181	0.0223***
after	[0.0009]	[0.0170]	[0.0244]	[0.0256]	[0.0063]
R^2	0.54	0.35	0.37	0.36	0.42
N	240	240	240	240	240
	Panel B: Herfindahl index				
	[6]	[7]	[8]	[9]	[10]
constant	0.0224***	-0.0041	0.0017	0.0027	0.0091*
	[0.0060]	[0.0075]	[0.0051]	[0.0058]	[0.0051]
seat share	0.0079	0.1357***	0.0927***	0.0968***	0.0728***
	[0.0276]	[0.0260]	[0.0163]	[0.0217]	[0.0209]
seat share * heterogeneity	0.0049***	-0.0202	0.0735	0.0501	0.0238*
	[0.0014]	[0.0254]	[0.0523]	[0.0405]	[0.0124]
after	0.0014	-0.0086**	-0.0080**	-0.0075***	-0.0021
	[0.0032]	[0.0040]	[0.0031]	[0.0028]	[0.0028]
seat share * after	0.0049	0.0529***	0.0465***	0.0455***	0.0220**
	[0.0160]	[0.0144]	[0.0107]	[0.0092]	[0.0100]
seat share * heterogeneity *	0.0020**	0.0006	0.0163	0.0145	0.0147***
after	[0.0009]	[0.0120]	[0.0198]	[0.0174]	[0.0040]
R^2	0.51	0.28	0.31	0.30	0.34
N	240	240	240	240	240

Notes: The results are from OLS models. Clustered standard errors are reported in brackets.
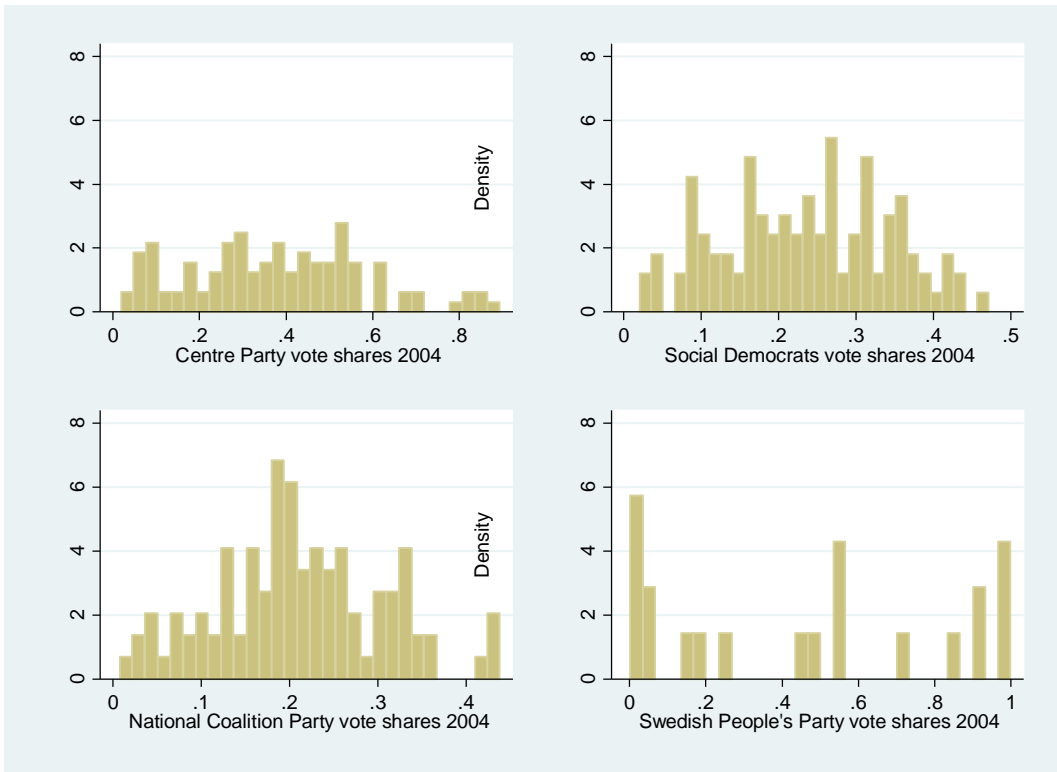***, ** and * indicate statistical significance at 1, 5 and 10 percent level, respectively.
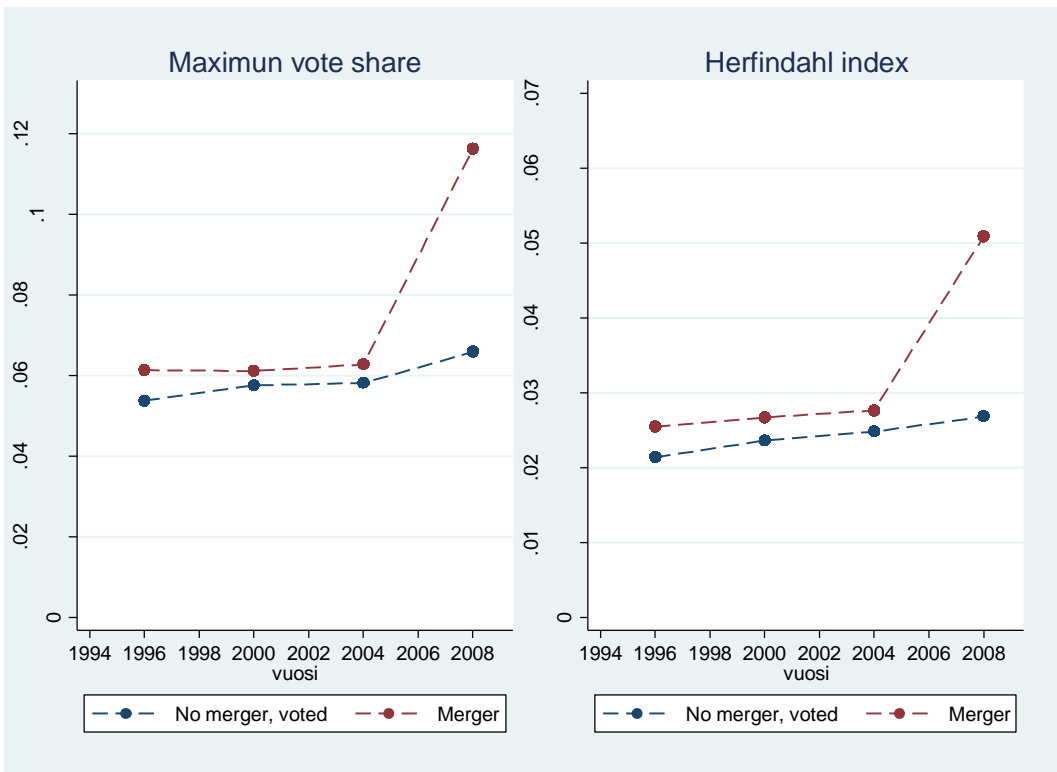
Figure A1. Party vote shares in 2004.

Figure A2. Trends in vote distributions using the alternative control group, 1996–2008.

Appendix B. Additional party and candidate level analysis

In this appendix, we present more detailed analysis of vote concentration within parties and also examples using individual municipalities and candidates. We start by examining more closely the concentration patterns within parties. In Table B1, in each cell, we report the main coefficient of interest (*seatshare*after*) from regression models based on Eq. (3). In these regressions the cross-sectional unit is municipality party and the response variables measure the vote shares of the 1st to the 5th most successful candidate within a party, not municipality.

The results are quite interesting. Vote concentration takes place only within four parties: The three largest parties and the Swedish People's Party. While the latter is a small party at a national level, it is typically a very large party in those municipalities that it is present at all (see Figure A1 in Appendix A). Moreover, for the Social Democrats and the National Coalition Party, votes are concentrated only to the most popular candidate, while already the third most popular candidate is losing market share. For these parties, voters seem to abandon their old favorites to support the most popular candidate. For the small parties, who are often unlikely to benefit from vote concentration, we do not observe a change in voter behavior. For the Centre Party, votes are concentrated to the four best candidates. Centre Party is large especially in small rural municipalities, and thus, stands to lose most seats due to the mergers. In the context of strategic voting, it is more effective to concentrate votes to more than one candidate if there are enough voters to get many local candidates past the post. Alternatively, coordination may be more difficult if there are many local candidates to choose from.

Table B1. Vote concentration within municipality-parties.

	Centre Party [1]	Social Democrats [2]	National Coalition Party [3]	Left Alliance [4]
1st	0.2838***	0.1445***	0.1778***	0.0357
	[0.0353]	[0.0448]	[0.0455]	[0.0657]
2nd	0.0641***	0.013	0.0205	-0.0590**
	[0.0150]	[0.0162]	[0.0183]	[0.0233]
3rd	0.0333***	-0.0335***	-0.0143	-0.0590***
	[0.0116]	[0.0113]	[0.0108]	[0.0162]
4th	0.0197**	-0.0313***	-0.0365***	-0.0181
	[0.0079]	[0.0089]	[0.0086]	[0.0136]
5th	0.0036	-0.0371***	-0.0327***	-0.009
	[0.0061]	[0.0063]	[0.0068]	[0.0108]
	Greens of Finland [5]	Christian Democrats [6]	Swedish People´s Party [7]	Finns Party [8]
1st	-0.0261	0.028	0.5062**	0.1756
	[0.1258]	[0.1154]	[0.1916]	[0.1614]
2nd	-0.0710**	-0.0452	0.1323**	-0.025
	[0.0349]	[0.0287]	[0.0549]	[0.0417]
3rd	-0.0744***	-0.0342	0.0573	-0.002
	[0.0256]	[0.0234]	[0.0398]	[0.0350]
4th	-0.0141	-0.0419***	0.0226	-0.0343*
	[0.0184]	[0.0124]	[0.0267]	[0.0194]
5th	-0.0158	-0.0232**	-0.0405	-0.0594***
	[0.0144]	[0.0105]	[0.0251]	[0.0113]

Notes: The results are from OLS models where the dependent variables are the vote shares of the most, the 2nd most, the 3rd most the 4th most and the 5th most popular candidate in a given party. Each cell in the table represents a coefficient from a separate regression model. Clustered standard errors are reported in brackets. ***, ** and * indicate statistical significance at 1, 5 and 10 percent level, respectively.

Next we look at concentration patterns for individual candidates within a single merger. As an example, we analyze at the merger between a small municipality of Savonranta and the much larger city of Savonlinna. The populations of these municipalities in 2004 are 1,238 and 27,463, respectively. The pre-merger council size was 15 in Savonranta and 43 in Savonlinna, whereas the post-merger council size is 43.

Figure B1 shows histograms for the vote distribution in Savonranta and Savonlinna before (in 2004) and after the merger (in 2008). The graphs report votes coming from the pre-merger municipalities. The first thing to note from Figure B1 is

that the most popular candidate in Savonranta received 80 votes making her/him the only candidate that would make it into the new post-merger council if a merger took place and voters behaved exactly as they did in the pre-merger elections.

The distributions of votes in both municipalities look roughly similar in terms of dispersion before the merger. Moreover, the distributions of votes in Savonlinna before and after are very similar. However, in Savonranta, the vote distribution changes dramatically after the merger. Before the merger, votes were spread out quite evenly, whereas after the merger two clear "superstars" gather a lot of votes and also the number of candidates receiving only one vote increases dramatically. Importantly, these two candidates also made it into the new council, instead of just one that would have been the case with the old vote distribution. Moreover, the overall number of votes in these two municipalities did not change substantially between the two elections. The total number of candidates to choose from is larger in 2008 than in 2004 for both municipalities, even though the number of local candidates is smaller.
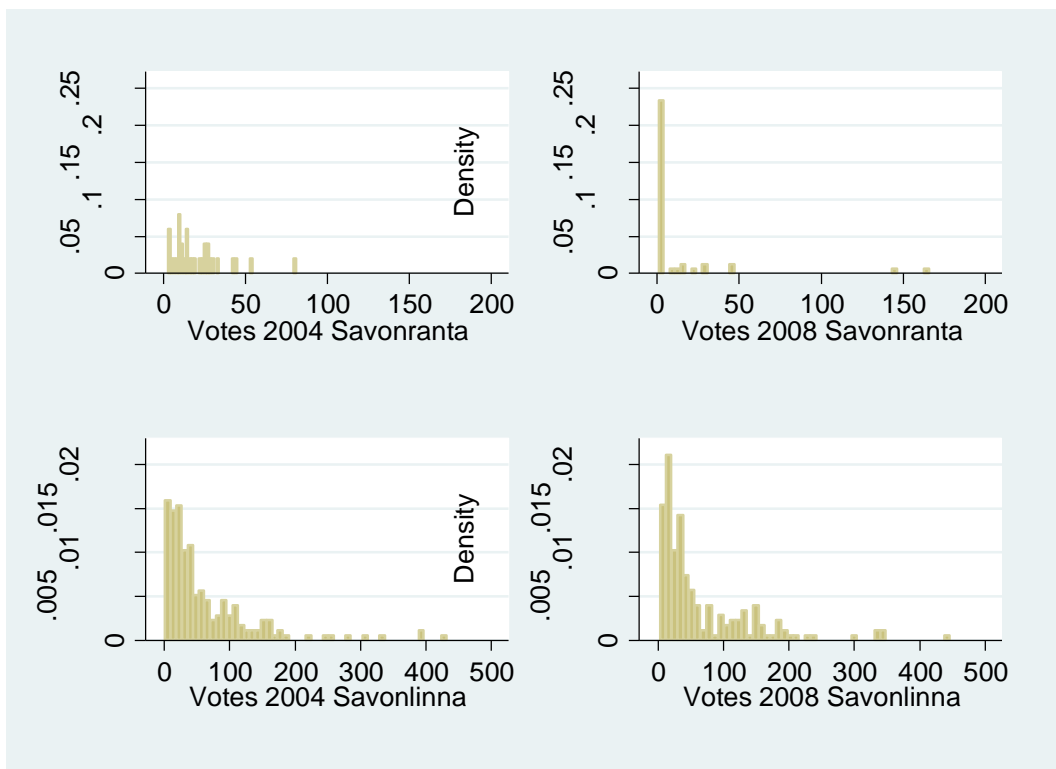

Figure B1. Vote distributions in Savonranta and Savonlinna in 2004 and 2008.

Figure B2 illustrates another example where two roughly equal sized municipalities, Toijala and Viiala, merged. The population of Toijala was 5,372 and 8,299 for Viiala. As can be seen from Figure B2, there is some evidence of vote concentration in both these municipalities, slightly more so in Toijala (again note the change in the scale of the axis of Viiala), but clearly less so than in Savonranta in Figure B1.
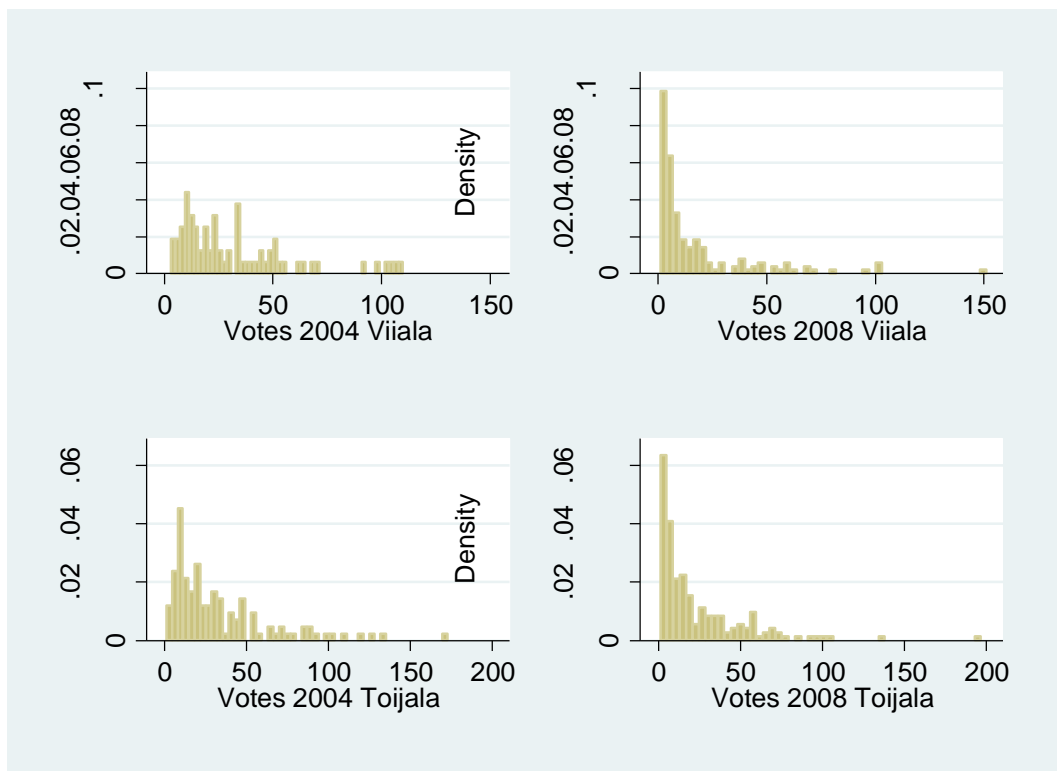

Figure B2. Vote distributions in Viiala and Toijala in 2004 and 2008.

2011

2011/1, Oppedisano, V; Turati, G.: "What are the causes of educational inequalities and of their evolution over time in Europe? Evidence from PISA"

2011/2, Dahlberg, M; Edmark, K; Lundqvist, H.: "Ethnic diversity and preferences for redistribution "

2011/3, Canova, L.; Vaglio, A.: "Why do educated mothers matter? A model of parental help"

2011/4, Delgado, F.J.; Lago-Peñas, S.; Mayor, M.: "On the determinants of local tax rates: new evidence from Spain"

2011/5, Piolatto, A.; Schuett, F.: "A model of music piracy with popularity-dependent copying costs"

2011/6, Duch, N.; García-Estévez, J.; Parellada, M.: "Universities and regional economic growth in Spanish regions"

2011/7, Duch, N.; García-Estévez, J.: "Do universities affect firms' location decisions? Evidence from Spain"

2011/8, Dahlberg, M.; Mörk, E.: "Is there an election cycle in public employment? Separating time effects from election year effects"

2011/9, Costas-Pérez, E.; Solé-Ollé, A.; Sorribas-Navarro, P.: "Corruption scandals, press reporting, and accountability. Evidence from Spanish mayors"

2011/10, Choi, A.; Calero, J.; Escardíbul, J.O.: "Hell to touch the sky? private tutoring and academic achievement in Korea"

2011/11, Mira Godinho, M.; Cartaxo, R.: "University patenting, licensing and technology transfer: how organizational context and available resources determine performance"

2011/12, Duch-Brown, N.; García-Quevedo, J.; Montolio, D.: "The link between public support and private R&D effort: What is the optimal subsidy?"

2011/13, Breuillé, M.L.; Duran-Vigneron, P.; Samson, A.L.: "To assemble to resemble? A study of tax disparities among French municipalities"

2011/14, McCann, P.; Ortega-Argilés, R.: "Smart specialisation, regional growth and applications to EU cohesion policy"

2011/15, Montolio, D.; Trillas, F.: "Regulatory federalism and industrial policy in broadband telecommunications"

2011/16, Pelegrín, A.; Bolancé, C.: "Offshoring and company characteristics: some evidence from the analysis of Spanish firm data"

2011/17, Lin, C.: "Give me your wired and your highly skilled: measuring the impact of immigration policy on employers and shareholders"

2011/18, Bianchini, L.; Revelli, F.: "Green polities: urban environmental performance and government popularity"

2011/19, López Real, J.: "Family reunification or point-based immigration system? The case of the U.S. and Mexico"

2011/20, Bogliacino, F.; Piva, M.; Vivarelli, M.: "The impact of R&D on employment in Europe: a firm-level analysis"

2011/21, Tonello, M.: "Mechanisms of peer interactions between native and non-native students: rejection or integration?"

2011/22, García-Quevedo, J.; Mas-Verdú, F.; Montolio, D.: "What type of innovative firms acquire knowledge intensive services and from which suppliers?"

2011/23, Banal-Estañol, A.; Macho-Stadler, I.; Pérez-Castrillo, D.: "Research output from university-industry collaborative projects"

2011/24, Ligthart, J.E.; Van Oudheusden, P.: "In government we trust: the role of fiscal decentralization"

2011/25, Mongrain, S.; Wilson, J.D.: "Tax competition with heterogeneous capital mobility"

2011/26, Caruso, R.; Costa, J.; Ricciuti, R.: "The probability of military rule in Africa, 1970-2007"

2011/27, Solé-Ollé, A.; Viladecans-Marsal, E.: "Local spending and the housing boom"

2011/28, Simón, H.; Ramos, R.; Sanromá, E.: "Occupational mobility of immigrants in a low skilled economy. The Spanish case"

2011/29, Piolatto, A.; Trotin, G.: "Optimal tax enforcement under prospect theory"

2011/30, Montolio, D; Piolatto, A.: "Financing public education when altruistic agents have retirement concerns"

2011/31, García-Quevedo, J.; Pellegrino, G.; Vivarelli, M.: "The determinants of YICs' R&D activity"

2011/32, Goodspeed, T.J.: "Corruption, accountability, and decentralization: theory and evidence from Mexico"

2011/33, Pedraja, F.; Cordero, J.M.: "Analysis of alternative proposals to reform the Spanish intergovernmental transfer system for municipalities"

2011/34, Jofre-Monseny, J.; Sorribas-Navarro, P.; Vázquez-Grenno, J.: "Welfare spending and ethnic heterogeneity: evidence from a massive immigration wave"

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2011/36, Brülhart, M.; Schmidheiny, K.: "Estimating the Rivalness of State-Level Inward FDI"

2011/37, García-Pérez, J.I.; Hidalgo-Hidalgo, M.; Robles-Zurita, J.A.: "Does grade retention affect achievement? Some evidence from Pisa"

2011/38, Boffa, f.; Panzar. J.: "Bottleneck co-ownership as a regulatory alternative"

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2012/1, Montolio, D.; Trujillo, E.: "What drives investment in telecommunications? The role of regulation, firms' internationalization and market knowledge"
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2013/1, Sánchez-Vidal, M.; González-Val, R.; Viladecans-Marsal, E.: "Sequential city growth in the US: does age matter?"

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2013/20, Hellerstein, J.K.; Kutzbach, M.J.; Neumark, D.: "Do labor market networks have an important spatial dimension?"

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2013/24, Huisman, R.; Stradnic, V.; Westgaard, S.: "Renewable energy and electricity prices: indirect empirical evidence from hydro power"

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2013/26, Lambertini, L.; Mantovani, A.: "Feedback equilibria in a dynamic renewable resource oligopoly: pre-emption, voracity and exhaustion"

2013/27, Feld, L.P.; Kalb, A.; Moessinger, M.D.; Osterloh, S.: "Sovereign bond market reactions to fiscal rules and no-bailout clauses – the Swiss experience"

2013/28, Hilber, C.A.L.; Vermeulen, W.: "The impact of supply constraints on house prices in England"

2013/29, Revelli, F.: "Tax limits and local democracy"

2013/30, Wang, R.; Wang, W.: "Dress-up contest: a dark side of fiscal decentralization"

2013/31, Dargaud, E.; Mantovani, A.; Reggiani, C.: "The fight against cartels: a transatlantic perspective"

Fiscal Federalism