Popular, but not powerful: Local candidates under closed-list proportional representation*

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Abstract

Geographic representation is considered to be an important factor in candidate nominations, even under closed-list proportional representation (PR), and may also matter for distributive policy outcomes. However, since nominations are determined strategically, the causal effects of representation for local areas are difficult to identify. We study candidate nominations, voter behavior, and distributive policies in the closed-list PR setting of Norway (1953-2013). Exploiting as-good-as-random election outcomes for candidates who are marginally close to winning a seat in parliament, we find that parties obtain higher support in subsequent elections in the hometowns of narrowly-elected candidates. This effect appears to be driven by an increase in the probability of having the local candidate at the top of the party list in the next election. However, we find no effect of local representation on geographically targeted policy benefits for the hometown. Our results suggest that local candidates under closed-list PR are able to attract and mobilize local voters, but either do not have the power to obtain distributive benefits for their localities, or are not interested in seeking them.

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1 Introduction

Parties seeking to win elections must take into account how voters will evaluate the observable characteristics of the candidates they nominate. One important characteristic is the geographic background of the candidate (Latner and McGann, 2005; Shugart et al., 2005; Put et al., 2015). Voters may value candidates with local ties (through birth or residence) to their communities, even if those candidates do not come from their preferred parties (e.g., Blais et al., 2003; Arzheimer and Evans, 2012; Campbell and Cowley, 2014). This may be because voters expect a local candidate to do a better job serving their interests or delivering public goods to the locality (e.g., Carozzi and Repetto, 2016; Fiva and Halse, 2016). Indeed, multiple existing studies have found a positive correlation between a candidate's local ties and electoral support in a district or subregion within a district. However, the strategic nature of candidate selection decisions within parties makes it difficult to determine whether there is any causal effect of local representation on party support. Moreover, it is often unclear whether voters actually derive any tangible distributive policy benefits as a direct effect of having a local candidate elected to parliament, particularly in closed-list proportional representation (PR) settings.

Most of the existing studies on local ties and voter support concern electoral systems where votes are cast for an individual candidate, either in single-member district (SMD) systems (e.g., Lewis-Beck and Rice, 1983; Rice and Macht, 1987; Arzheimer and Evans, 2012; Meredith, 2013; Arzheimer and Evans, 2014), or systems like the single-transferable vote (STV) system or open-list PR that allow for intraparty preference voting (e.g. Tavits, 2010; Górecki and Marsh, 2012, 2014; Jankowski, 2016). Here, we consider the effect of local representation in the previously unexplored setting of closed-list PR.[1] Because votes are cast for parties, rather than candidates, closed-list PR should theoretically decrease the salience of the personal characteristics of individual candidates (Shugart, 2001; Shugart et al., 2005). Moreover, personal-vote seeking behavior through the provision of

[1]Fiva and Halse (2016) find evidence of local favoritism in public spending within election districts in the closed list proportional system of Norwegian regional governments, where the entire region is one electoral district.

public goods is assumed to be less prevalent under PR systems, where voters tend to evaluate parties based on programmatic platforms, and there are several legislators representing each electoral district, making it more difficult to attribute credit for providing such benefits to any one of them (Carey and Shugart, 1995).

There is some evidence supporting the claim that PR systems result in lower levels of geographically-targeted distributive policies relative to widely-dispersed programmatic policies. However, this evidence is based either on aggregate spending data that require assumptions about the relative costs of distributive policies (Milesi-Ferretti et al., 2002; Persson and Tabellini, 2003; Funk and Gathmann, 2013), or on politicians' observed legislative behavior (i.e., bill submissions or committee membership), without directly measuring the final policy outcomes (e.g. Stratmann and Baur, 2002; Gagliarducci et al., 2011).

We investigate whether and how local representation matters in the closed-list PR setting of Norway. Our empirical analysis is based on an original data set of all candidates in Norwegian parliamentary elections from 1953-2013, biographical information on the candidates' home municipalities within the larger districts, and vote returns measured at the municipality-level in these elections. We first investigate how local representation affects turnout, party support, and candidate nominations in the next election. We then examine at the effect of local representation on distributive policy decisions. The Norwegian government has a tradition of promoting distributive policies to support settlement and economic activity in all parts of the country, which makes it an ideal case for studying the effects of geographic representation on distributive politics. To study the impact of local representation on distributive politics, we use three different policy outcomes: (1) nationals road constructions, (2) central government jobs, and (3) direct fiscal transfers from the central government.

The mechanics of the Norwegian electoral system provide opportunities to plausibly identify causal effects of political representation under weak assumptions. We identify two quasi-experimental events which result in a municipality gaining representation in

parliament: (1) a local candidate narrowly wins a district ("first-tier") seat in a *close election*; (2) a local candidate wins a national ("second-tier") adjustment seat. We exploit both these events using a regression discontinuity (RD) framework. The first event captures the part of the seat allocation outcome in closed-list PR systems that can be considered as good as random when parties' vote shares are sufficiently close to allocation thresholds (Folke, 2014). The second event captures the fact that it is almost impossible to predict ex ante which candidates will be awarded national adjustment seats, which are allocated based on parties' "excess votes" after first-tier seats have been allocated.[2]

Our results show that parties enjoy higher support in the next election in the hometowns of narrowly elected candidates. This effect is driven by voters changing party support, rather than an increase in turnout. We also find that when a local candidate wins a seat by a narrow margin, the top candidate of the same party is more likely to come from the same locality in the next election. This suggests that a local top candidate attracts local voters. Considering larger geographic units, we find no evidence that the party enjoys a local advantage beyond the hometown of the candidate. It seems like voters in other municipalities close to the hometown would prefer having their own local top candidate, something which becomes less likely when the candidate wins and runs again.

We find no evidence that the hometown of a narrowly elected candidate benefits in terms of distributive policies. Considering all three policy outcomes in our data, the effects are either close to zero or negative. This indicates that legislators elected in this electoral setting either do not have the power to obtain benefits to their hometown, or are not interested in doing so.

[2]Similar designs have recently been applied to PR systems to evaluate the policy impact of shifting partisan control in local assemblies (Folke, 2014; Fiva et al., 2016), the causal effect of incumbency on the formation of dynasties (Fiva and Smith, 2016c), and the financial benefits of holding office in closed-list PR settings (Willumsen, 2011).

2 Institutional setting and data

Our interest is in whether geographic representation matters for voter participation and distributive policy outcomes within election districts. In this section, we explain the Norwegian electoral system and describe our data.

2.1 The electoral system

Proportional representation for electing members of parliament (MPs) to the Norwegian *Storting* was introduced in 1921.[3] Originally, the seat allocation was determined through the D'Hondt method; however, from the 1953 election onwards, seats have been allocated by the Modified Sainte-Laguë method, which is more favorable to small parties.[4] The 1953 electoral reform also abolished a previous distinction between urban and rural electoral districts, such that districts since 1953 correspond to the borders of Norway's 19 regions (*fylker*).[5] District magnitude ranges from 4 to 16 seats, with an average of about 9.

A two-tier system was introduced in 1989. In the first tier, seats are allocated proportionally to parties within each of the 19 districts based on party vote shares in the district. In the second tier, adjustment seats are given to parties that are under-represented on the national level once the first-tier seats have been allocated, provided that those parties reach an electoral threshold of four percent of the national vote count. From 1989 to 2001, there were eight second-tier seats, which could be allocated to any district. Since 2005, there is one second-tier seat per district (hence 19 adjustment seats in total).

Party lists are closed—each party puts forward a rank-ordered list of candidates in each of the districts, and votes are cast for the party list as a whole.[6] Candidate nom-

[3]Prior to 1921, the electoral system was a two-round runoff system using single-member districts (see Cox et al. (2016)).

[4]The Modified Sainte-Laguë method uses larger divisors (1.4, 3, 5, 7, ...), rather than the D'Hondt method's (1, 2, 3, 4, ...), which mechanically produces a more proportional outcome (Fiva and Folke, 2016).

[5]Bergen was a separate district until 1973.

[6]Voters may cross names off of the list when they cast their ballots, but the rank order will only be changed if at least half of all of the party's voters make exactly the same change. In practice this has never happened, so the system is effectively closed-list.

inations and rank positions are determined within each district by dues-paying party delegates at nominating conventions (Valen et al., 2002). This implies that the local party organization is responsible for determining the composition of each list with respect to geography, age, gender and other background characteristics. Candidates are almost always residents of the districts where they run; however, in a few cases parties have allowed candidates to run in a district other than their home district in order to increase those candidates' chances of election. In some cases, this is done strategically in order to increase the electoral chances of members of the party elite.[7]

The party system has been relatively stable (Strøm and Leipart, 1993; Narud and Strøm, 2011). The main party cleavage runs between the left-leaning social democratic camp, consisting of the Labor party (DNA) and the Socialist Peoples' party/Socialist Left party (SV; founded in 1961), and the right-leaning conservative camp, consisting of the Center party (SP; formerly the Farmer's party), the Christian Peoples' party (KrF), the Liberal party (V), the Conservative party (H), and the Progress party (FrP; founded in 1973). A few other parties have succeeded in winning seats in some elections.[8] Partisan identification among voters was remarkably and consistently high, at roughly 70 percent, until the 1980s, when it began to decline to around 50 percent today (Bengtsson et al., 2013, p. 71).

2.2 Candidates and municipality-level vote data

Our data set covers all candidates on all party lists for Storting elections from 1906-2013 (Fiva and Smith, 2016b). This data set also includes information on those candidates' gender, occupation, and hometown (municipality within election district). Because the data set includes background information on all candidates *running* for office, not just

[7]In 1989, Erik Solheim, leader of the Socialist Left party, was elected from Sør-Trøndelag instead of his home district, Oslo. In 2005, Dagfinn Høybråten, leader of the Christian Democratic party, was elected from Rogaland instead of his home district, Akershus. In 2005, Progress party MP and later deputy party leader Per Sandberg switched from Nord-Trøndelag to Sør-Trøndelag district.

[8]The left-right cleavage has shifted somewhat in recent elections, after the Center party joined the center-left coalition in 2005.

winners, it is well suited for analyzing the consequences of political representation.[9] Our research design is closely related to the one pursued by Fiva and Smith (2016c). While their RD analysis is applied to the 1953-1981 period, do we use data for the entire 1953-2013 period.[10]

Like Fiva and Smith (2016c), we start by identifying candidates, for each of the seven main parties, who are either next in line to win a seat, or first in line to lose a seat.[11] We then use party vote counts at the district level to measure how far individual candidates are from winning (losing) a seat using the distance measure proposed by Folke (2014). In short, this measure generates a *win margin* for each candidate, which is defined as the minimum total vote change across all parties, scaled by the total number of votes cast, that would be required for candidate i in party j to experience a seat change.

Our main measure of geographic affiliation is the home municipality of the candidate. In the vast majority of cases, this is reported on the election ballot. In a few cases, we have used home municipality reported in the previous or next election, or in elections at the regional level. Candidates who report a hometown outside the election district are not included.[12] To investigate the impact of local representation on voter behavior, we supplement the candidate-level observations with municipality-level vote returns.[13]

Since Norwegian municipalities are quite small geographic units, it rarely happens that a party nominates several high-ranked candidates from the same municipality. To get an idea about the extent to which parties geographically balance their tickets, it

[9]Fiva and Smith (2016a) use this data set to evaluate the effect of local candidates on voter mobilization in the two-round runoff system used prior to the adoption of PR. Fiva and Smith (2016c) use the data set to investigate the relationship between the incumbency advantage and the formation of political dynasties in Norway, finding that once a candidate is elected, he or she tends to get re-nominated to list positions that are high enough to secure a seat again in the next election. They find, however, no evidence that the incumbency advantage is *inherited* by their family members.

[10]Fiva and Smith (2016c) end their analysis in 1981 primarily because they need a sufficiently large period *after* candidates have run in order for family members to potentially appear in the data.

[11]We also include the Norwegian Communist party in the 1953 and 1957 elections, and the New People's party in the 1973 and 1977 elections.

[12]The exception is candidates who apparently change hometown when going into national politics. If a candidate changes hometown status to the capital Oslo or a neighboring municipality (and runs in another election district), we include the candidate with his or her original hometown.

[13]This data is missing in the districts Telemark and Nord-Trøndelag in the 1981 elections, when votes had to be recounted in these two districts due to error.

can be useful to look at larger subregions within the districts. For this, we use the 89 economic regions defined in official statistics[14] and look at the allocation of Parliament seats between these *subregions*. We consider the Labor party as a special case, since this party has traditionally won several seats in most election district, which makes geographic balance particularly relevant.

The left panel of Figure 1 shows that if a party wins two seats, they are won by candidates from two different subregions in about 3/4 of the cases, and by two candidates from the same subregion in the remaining 1/4. Hence, it is not uncommon that one subregion gets both seats. If a party wins three seats, the Labor party is more likely than the other parties to have MPs from three different subregions. It is very rare that one subregion gets all three seats, both in the Labor party and the other parties.

An alternative illustration is shown in the right panel, which compares the *share* of subregions with a seat against the expected share if seats were allocated randomly across subregions (not taking differences in population size into account). We see that for high expected shares, the actual share with a seat is somewhat higher in the Labor party[15], and slightly lower in the other parties. This could reflect that the interests groups which support the other parties are more geographically concentrated within each district, or that the fact that the Labor party often wins several seats makes the party organization pay more attention to geographic balance among candidates.[16]

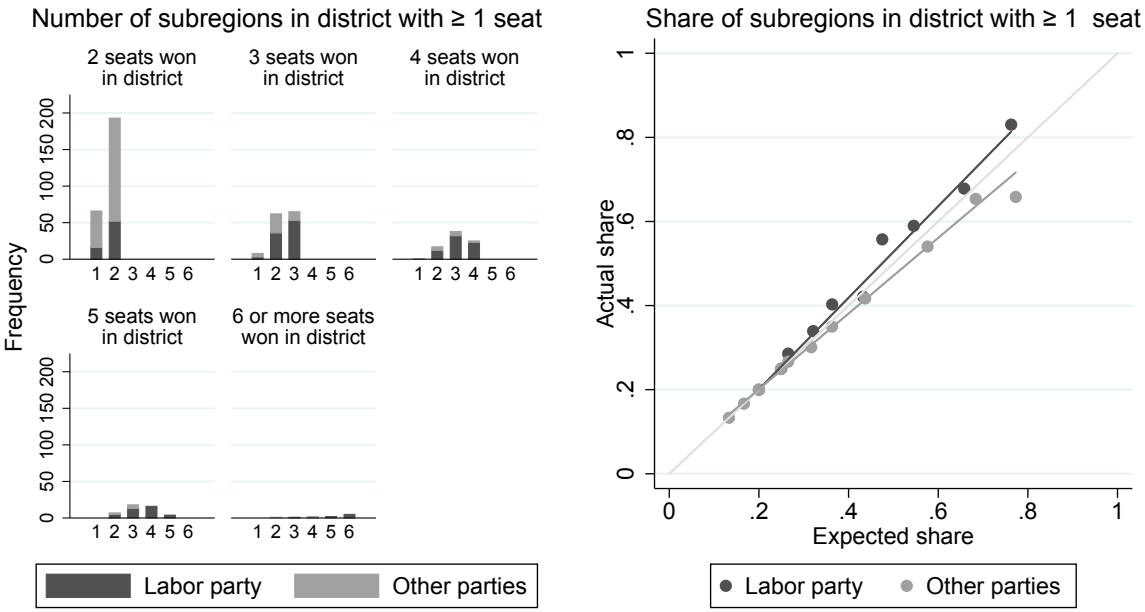
Appendix Figure A.2 plots representation on the municipality level vs. municipality population for each party. On average, municipalities seem to be represented roughly proportionally to their share of the population in the election district. Municipalities with small populations are over-represented among MPs from the Center party and Liberal

[14]The advantage of using these units is that they do not cross the election district borders, and that most election districts are divided into about the same number of subregions (between four and eight). A disadvantage could be that they do not perfectly capture the geography of local labor markets. An alternative set of subregions have been proposed by Gundersen and Jukvam (2013).

[15]The linear regression line has a constant term of -0.03 and a slope of 1.12. For example, with four subregions and four seats, about three of four subregions (0.73) typically gets a seat, while the expected share is 0.68.

[16]Appendix Figure A.1 shows a similar difference when also including candidates who are next in line to being elected.

Figure 1: Allocation of party seats between subregions within the election district



Note: 'Expected' share is the share of each party's seats in the Parliament which the subregion would expect to get if seats were allocated randomly across subregions within the election district. There are four to eight subregions per district. Seats won include all seats won by candidates with a reported hometown within the district. The subregion within Hordaland district which includes the city of Bergen is excluded in years before 1973, when Bergen was a separate election district. Each binned scatter point in the right panel contain roughly the same number of observations. The linear regression line is based on the underlying data, not the binned scatterpoints.

party, which both have their historical roots in rural interests. They are somewhat under-represented among MPs from the Conservative party, the right-wing Progress party and the Socialist left party.

2.3 Distributive policies

As mentioned in the introduction, we rely on three different policy outcomes, all measured at the municipality-level, to study the impact of local representation on distributive politics: (1) constructions on nationals roads, (2) central government jobs, and (3) direct fiscal transfers from the central government.

Constructions on national roads

Due to its large geographical area and relatively scattered settlement pattern, Norway has a wide and diverse network of public roads—overall totaling 94,000 kilometers. The network consists of national, regional, and local roads. The national government is responsible for the national roads, which amounted to 28,000 kilometers before 2010, or roughly five meters per capita.[17] In 2010, a large share of this network was transferred to the regional road network. Public funding of investments in national roads is allocated in the national budget, which is approved by parliament at the end of each calendar year.

The time at which a road project is first proposed and discussed in parliament varies across projects. Since 1970, the government is required to prepare a long-term plan of road projects to be discussed in parliament. In 2002, this plan was replaced by a national transport plan covering all modes of transport. The national plan is not a binding legal document, but a document of policy intentions. Before receiving funding, a road project has typically been included at least once in the national plan. Parliament is involved earlier in the decision-making process in the case of public toll roads, which must be approved by a vote in parliament. The share of national road investments financed by toll revenues has increased from 5 percent in 1982 to 45 percent in 2010 (Lauridsen, 2011).

To identify the local effect of national road policies, we use detailed data on constructions on national roads.[18] More specifically, our data set includes information on all bridges built on national roads over the 1953-2013 period, and is collected from the BRUTUS database of the National Public Roads Administration (Statens vegvesen, 2014).[19] The database is used for planning and conducting inspections of bridges, and includes the location and physical characteristics of each bridge. Given the topology of Norway, with

[17] Road investments made by one level of government are sometimes co-financed by other levels of government.

[18] An alternative would be to use map data to identify expansions of the road network. This is less relevant for the period we study, in which the network was more or less already established.

[19] We only include constructions on national roads, although the central government sometimes grants support to projects on the sub-national level. There are also some cases in the database where the bridge is part of a national road, but listed as part of the local or regional road which it crosses. Data on other types of constructions (e.g., tunnels) is incomplete and is therefore not used in our analysis. Seven municipalities have no national roads, and are excluded from our analysis.

its many fjords and mountains, bridges are a major component of infrastructure investments. In 2001, for example, there were more than 17,000 bridges across Norway, with an estimated value of approximately EUR 6 billion (Stensvold and Rønnestad, 2001).

Whether road investments involve building large bridges depends both on the standard of road demanded and local conditions. Bridges are more likely to be built as part of a modern highway and, naturally, in order to cross bodies of water or un-level terrain. Appendix Figure A.3 illustrates that there is a positive correlation between the total length of the national road network and meters of bridge built in a given municipality over the sample period. The relationship is stronger in coastal areas, but positive also in inland municipalities.

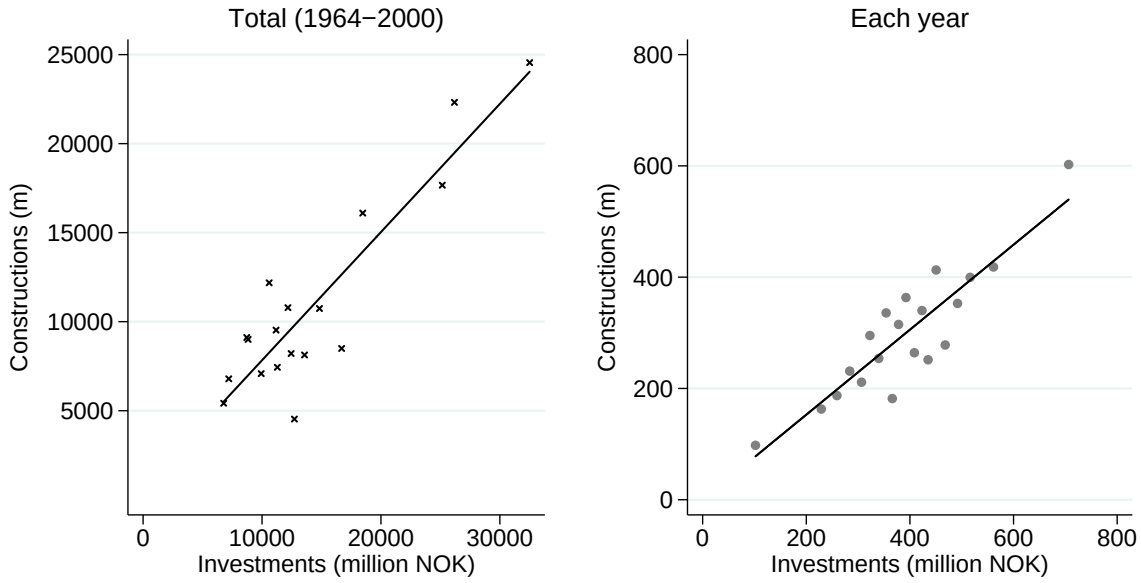
Data on the *investment costs* of road projects is not available on the municipality level. Helland and Sørensen (2009) analyze aggregate road investments at the *election district level*. In Figure 2, we compare their data on investments with our data on constructions at the district level, both cross-sectionally (left-hand panel) and over time within each district (right-hand panel). The relationship is positive and close to proportional, indicating that bridge constructions are a reasonable proxy for local road investments.

Central government jobs

The core government ministries and many of the central government agencies are located in the capital Oslo. However, other central government agencies are located, or have local offices, in other parts of the country. In some cases, the location of a central government agency in a peripheral region is intended to ameliorate lower economic activity in the local private sector due to, for example, structural changes in specific industries. A prominent example is the *National Library of Norway*, which established a division in the northern steel industry city of Mo i Rana in 1989 that today accounts for about half of the library's employees.[20] Mo i Rana, with a population of about 18,000, is also home to the fee collecting office of the public broadcaster *NRK*, and the central government agency that

[20]Mo i Rana was home to the *Norsk Jernverk* public steel company until 1988, when it was divided and privatized.

Figure 2: Bridges on national roads and total road investments in the election district



Note: The vertical axis reports the total meters of new or rebuilt bridges on national roads within the election district. The horizontal axis reports national road investments in the district. The left-hand panel compares total constructions and investments over all years 1964-2000. Each marker (x) in this panel represents one district. The right-hand panel compares constructions and investments per year, controlling for district fixed effects. Each marker (dot) in this panel is a binned scatter point containing roughly the same number of observations. The linear regression line is based on the underlying data, not the binned scatterpoints.

collects fines and debts to the central government (*Statens innkrevingssentral*).[21]

Information on the localization of central government jobs is attached to the national budget documents, and is provided by the *NSD - Norwegian Centre for Research Data* (NSD). The data cover all years from 1974 to 2012, which allows us to measure the growth in central government employment during ten of the election periods in our sample.[22]

[21] Another example is *Statistics Norway*, which employs over a third of its workers in the city of Kongsvinger, 93 kilometers away from the main office in Oslo. In 2015, Kongsvinger hosted 334 of 877 total employees of Statistics Norway. Kongsvinger also has a population of about 18,000.

[22] Up until 1996, government positions were registered in October. From 1998 onwards, they have been registered in March. Due to data availability issues, our first period of analysis runs from October 1974 to October 1977; the 1993-1997 period runs from October 1993 to March 1998; the 1997-2001 period runs from March 1998 to March 2001; and the last period runs from March 2009 to March 2012. The left-hand panel of Figure A.4 shows that most municipalities have at least one central government position per 100 inhabitants, and some have many more. The right-hand panel shows that the change during an election period is small in most municipalities, but that there are some municipalities that have experienced large decreases or increases. The distribution is highly symmetric.

Fiscal transfers from the central government

Finally, we explore the impact of local representation on general fiscal transfers from the central government. The financing of the local governments is highly centralized, and more than 80% of the revenues are generated from central government grants and regulated income taxes. The grants are distributed as block grants and are primarily based on objective criteria, partly as tax equalization and partly as spending equalization. We focus on a type of grant where the central government have quite a bit of discretion, namely central government funding for local public investments. Based on all local government accounting sheets for each year from 1973-2013, we calculate investment funding per capita during each four-year election period starting with 1974-1977 and ending with 2010-2013.

In sum, all our three measures capture policies which are likely to matter for local welfare in an area. Table 1 gives descriptive statistics on all the three distributive policies. We see that road constructions have a very skewed distribution. In most municipalities, there are no new constructions during an election period, but a few have some constructions which are large relative to the population. Investment funding is also skewed, but not as dramatically as road constructions.

Table 1: Descriptive statistics, policy outcomes

	Median	90th pctile.	99th pctile.	N
Road constructions (meter/100 inhab.)	0.00	1.71	13.30	5992
Government jobs (change/100 inhab.)	0.00	0.52	2.17	4375
Investment funding (NOK 2015/inhab.)	1696.9	5482.2	13939.7	4227

Note: The variables are road constructions on national roads, central government jobs and investment funding from the central to the local government, measured at the municipality level. Road constructions are measured at the municipality structure of 2014.

3 Impact on voter behavior

To assess the importance of within-district variation in political representation, we first investigate whether party support and voter turnout is higher in the hometown of elected representatives from the parties in our sample (cf. section 2.1).

As our main outcome variable, we consider the local support for the party *relative to its support in the whole district*, measured by

$$LocalSupport_{pmdt} = LocalVoteShare_{pmdt} - DistrictVoteShare_{pdt} \tag{1}$$

where p denote party, m municipality, d election district, and t time. A positive value on $LocalSupport$ at time t for municipality m indicates that the party receives above district-average support, i.e. the municipality is a "party stronghold".

We are interested in how $LocalSupport_{pmd,t+4}$ depends on whether municipality m has a local candidate who is elected to parliament at time t.[23] Even though parties assemble their tickets strategically, anticipating the reactions of voters, they cannot control *exactly* which candidates ultimately get elected. We identify the effect of local representation using quasi-experimental variation stemming from the electoral rules. More specifically, we use two exogenous sources of variation: (1) candidates who win first-tier seats in close races and (2) candidates who win second-tier seats.[24] Without (2), our approach would constitute a standard regression discontinuity (RD) design. Taking also second-tier seats into account, our model is:

$$\begin{aligned} LocalSupport_{pmd,t+4} = \alpha_p + \theta_t + \delta_d + \beta(Win1st_{pmdt} + Win2nd_{pmdt}) \\ + \lambda_1 WinMargin_{pmdt} + \lambda_2 WinMargin_{pmdt} \cdot Win1st_{pmdt} + \varepsilon_{pmd,t+4} \end{aligned} \tag{2}$$

[23] Norwegian elections take place every four years. Because the distributive politics analyses rely on yearly observations, we here use $t + 4$ to denote variables referring to the next election.

[24] We do not take into account that in some cases, an MP might be promoted to cabinet member, and a losing parliament candidate might serve as deputy MPs if an MP from the same party and election district is promoted or resigns.

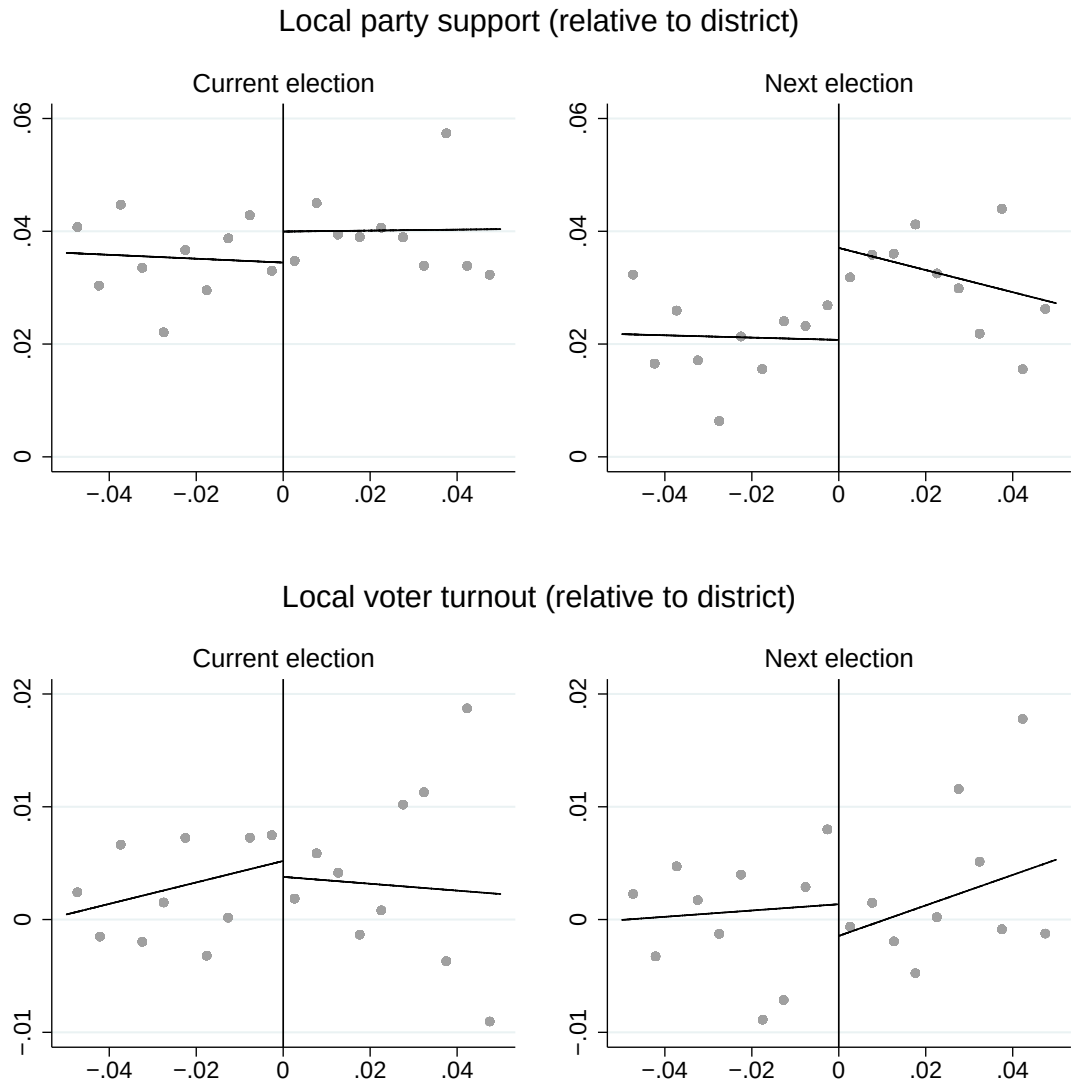
where $Win1st_{pmdt}$ and $Win2nd_{pmdt}$ are dummy variables for whether the candidate wins a first- and second-tier seat, respectively. $WinMargin_{pmdt}$ measures how far the local candidate is from winning a first-tier seat, using Folke's (2014) distance measure which Fiva and Smith (2016c) adapt to the case of Norway. In our baseline results, we limit the sample to candidates who are at most 5 percentage points away from winning or losing a first-tier seat.[25] In later robustness checks, we verify that the results hold for other choices of bandwidths around the seat threshold.

Figure 3 shows how local electoral support changes when crossing the threshold for winning a first-tier seat, without taking second-tier seats into account. The upper left-hand panel shows that the effect in the current election is close to zero, indicating that there is no selection around the threshold with respect to local support. The upper right-hand panel, however, shows that parties appear to do better in the *next* national election in municipalities where a local candidate from those parties narrowly wins election. The estimates indicate that local party support increases by one to two percentage points at the cutoff. This may signify that voters reward parties with local MPs, or alternatively, that local incumbents are better able to mobilize voters than local newcomers. There is, however, no indication that overall voter turnout is affected by having a local MP (see the bottom right panel of Figure 3). This suggests that the presence of a local incumbent serves to mobilize the erstwhile supporters of other parties, rather than to mobilize previous abstainers.

Panel A of Table 2 shows the results from the estimation of equation (2), which also takes into account that, since 1989, marginal candidates can also win a seat through the second-tier. As in the graphical evidence, column (1) shows that neither of the two ways of winning a seat has a significant relationship with local support in the *current* national election, supporting the claim that our research design is isolating quasi-experimental variation in local representation. Column (2) shows that both a marginal first and a second-tier seat increases local party support by about a percentage point.

[25] In this sample, there are six observations where one party list has two marginal candidates from the same municipality. Our results are robust to excluding these observations.

Figure 3: RD plots showing the effect of local representation in parliament on party support and turnout



Note: The vertical axis in the upper panels shows the party's vote share in the municipality minus its vote share at the electoral district level. The vertical axis in the bottom panels shows electoral turnout minus turnout at the electoral district level. The horizontal axis shows by which margin the candidate wins a first-tier seat in the current national election. The dependent variable is voter turnout in the municipality minus turnout at the district level. The sample is limited to marginal candidates, defined as being within 5 percentage points from winning a first-tier seat (N=1469). Losing candidates who win second-tier seats are excluded. In the lower panels, the sample is limited to municipalities with exactly one marginal candidate (N=951). Each bin represents an interval of half a percentage point. Separate linear regression lines are estimated to the left and right of the discontinuity using the underlying data, not the binned scatterpoints.

Table 2: The effects of local representation in parliament on party support and turnout

Panel A: Local party support

	(1) t	(2) $t+4$	(3) $t+4$	(4) $t+4$	(5) $t+4$	(6) $t+4$
1st tier seat	0.001	0.013*				
	(0.005)	(0.007)				
2nd tier seat	0.004	0.012*				
	(0.005)	(0.006)				
1st or 2nd tier seat			0.012**	0.012**	0.011*	0.013**
			(0.006)	(0.005)	(0.006)	(0.005)
Mean of outcome var.	0.038	0.027	0.027	0.027	0.027	0.027
R-squared	0.10	0.10	0.10	0.13	0.16	0.14
Observations	1492	1292	1292	1292	1292	1292

Panel B: Local voter turnout

	(1) t	(2) $t+4$	(3) $t+4$	(4) $t+4$	(5) $t+4$	(6) $t+4$
1st tier seat	-0.001	-0.002				
	(0.004)	(0.004)				
2nd tier seat	0.001	0.007				
	(0.003)	(0.004)				
1st or 2nd tier seat			0.001	0.001	0.001	0.002
			(0.004)	(0.004)	(0.004)	(0.003)
Mean of outcome var.	0.003	0.001	0.001	0.001	0.001	0.001
R-squared	0.02	0.04	0.04	0.05	0.07	0.07
Observations	996	850	850	850	850	850
Party fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	No	No	No	Yes	Yes	Yes
District fixed effects	No	No	No	No	Yes	No
Rank fixed effects	No	No	No	No	No	Yes

Note: In panel A, the dependent variable is the party's vote share in the municipality minus its vote share at the district level. In panel B, the dependent variable is turnout in the municipality minus turnout at the district level. The sample is limited to marginal candidates, defined as being within 5 percentage point distance from winning a first-tier seat. In Panel B, the sample is limited to municipalities with exactly one marginal candidate. All specifications include a linear control function on both sides of the electoral threshold and dummies for the periods 1989-2001 and 2005-2009, during which two different systems for allocating second-tier seats are in place. Standard errors and corresponding significance stars are based on a cluster-robust covariance matrix, with clustering on the district level. * $p < 0.10$,** $p < 0.05$, *** $p < 0.01$.

When combining first-tier and second-tier seats (column 3), we find that local party support increases by about 1.2 percentage point when a local candidate from that party wins a seat in parliament. This effect is statistically significant and robust to the inclusion of various fixed effects (columns 4-6).[26] Panel B of Table 2 shows the corresponding results when using local turnout (relative to turnout at the district level) as the outcome variable. There are no indications that turnout is affected positively or negatively.

3.1 Mechanisms

In this section, we investigate whether the effect of a local incumbent on local party support is driven by party-list nominations in the next election. Using the same data set as we do, Fiva and Smith (2016c) document a strong incumbency advantage for Norwegian MPs. Once a candidate is elected, he or she appears to get re-nominated to list positions that are high enough (lower numerically) to secure a seat again in the next election. While Fiva and Smith (2016c) emphasize outcomes at *the candidate level*, we investigate below how winning a seat affects nomination outcomes *at the municipality level*. In particular, we look at the probability of having a local *top candidate*.

We have already seen that local party support is higher for marginal candidates at both sides of the cut-off for a first-tier seat (cf. Figure 3). This may either indicate that parties nominate candidates from municipalities that are *ex ante* party strongholds, or that support increases when the party has a local candidate with a chance of winning a seat. Interestingly, Figure 3 indicates that local party support falls for candidates that just miss out on a seat, in comparison to candidates that barely wins a seat.

The top left panel of Figure 4 shows that in about half of the cases, having a local

[26] In Appendix Figure A.6, we show that the results also hold for other choices of bandwidths around the electoral threshold. For bandwidths of +/- 2.5 percentage points or less, the point estimates change somewhat and precision goes down when using the specification reported in column (3). When only comparing the means on both sides of the threshold, the effect is similar also for narrower bandwidths. Inference in Figure A.6 is based on a t-distribution with $N - K$ degrees of freedom (Hansen, 2007), where K is the number of covariates. We also show that results are similar when using log vote shares to construct the dependent variable, indicating that outliers are not driving the results.

marginal candidate implies having a local top candidate.[27] The top right panel shows that, even if the local candidate wins, the probability of having a top-ranked local candidate is slightly lower in the next election. However, if a local candidate loses, the probability falls much more. This suggests that re-nomination of local candidates at the top of the ballot are important drivers of voter mobilization and local party support, and that this contributes to the pattern documented in Figure 3. The lower panels of Figure 4 show no effects on the probabilities of a local candidate ranked second.[28]

The small jump at the discontinuity in the top left-hand panel of Figure 4 is caused by a slight imbalance in the sample with respect to party: At the left of the discontinuity, there are more Labor party candidates, who tend not to be top candidates. When estimating the relationship with party fixed effects, the jump disappears, as shown in Appendix Table A.1. These results also show that the effect at time $t + 4$ is statistically significant and robust to including time, district and rank fixed effects.[29]

3.2 How local is the effect?

All the results in this section so far concern party support in the hometown (municipality) of the candidate, but representation in larger geographic units could also be relevant. For instance, a candidate might be expected to work for the interests of all those areas which have close economic and social ties with his or her hometown.

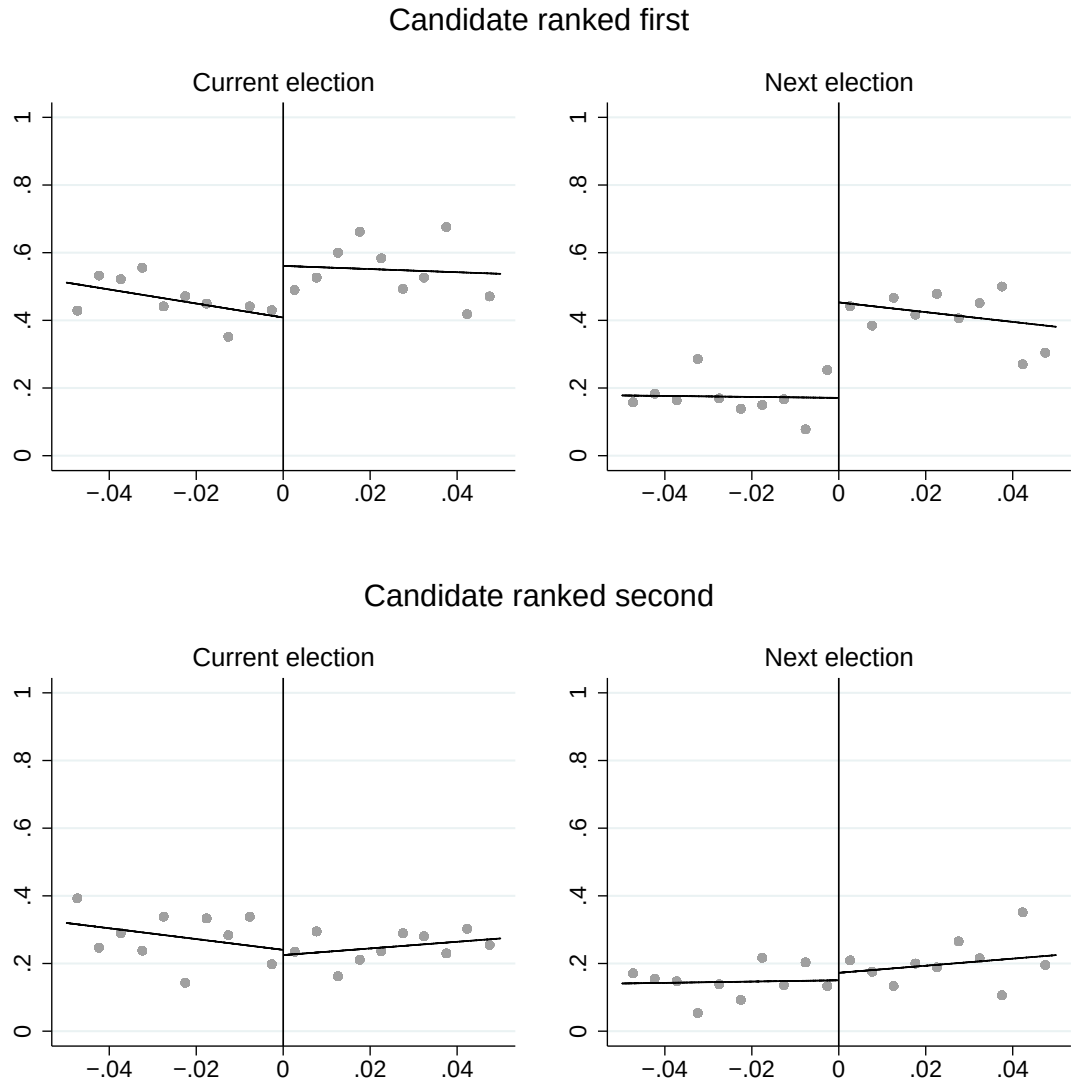
To investigate this, we look at the effect on winning a seat on outcomes for the the subregion to which the hometown of the candidate belongs. Figure 5 shows the effect of a local candidate elected on support in the subregion (including the hometown) relative to district-level support. We see that the party has a much smaller advantage in support

[27] In 93 percent of the cases, the top candidate is the marginal candidate. This reflects that parties seldom nominate several high-ranked candidates from the same municipality.

[28] Appendix Figure A.7 show that outcomes on the individual level are similar.

[29] The results in Table A.1 indicate that candidates who win second-tier seats are more likely to be top candidates also in the *current* election (column 1). This is most likely because second-tier seats are often won by smaller parties in election districts where they are close to winning a first-tier seat. In any case, column (6), which includes rank-fixed effects, shows that this imbalance is not driving the effect in the next election.

Figure 4: RD plots showing the effect of local representation in parliament on nominations for the next election

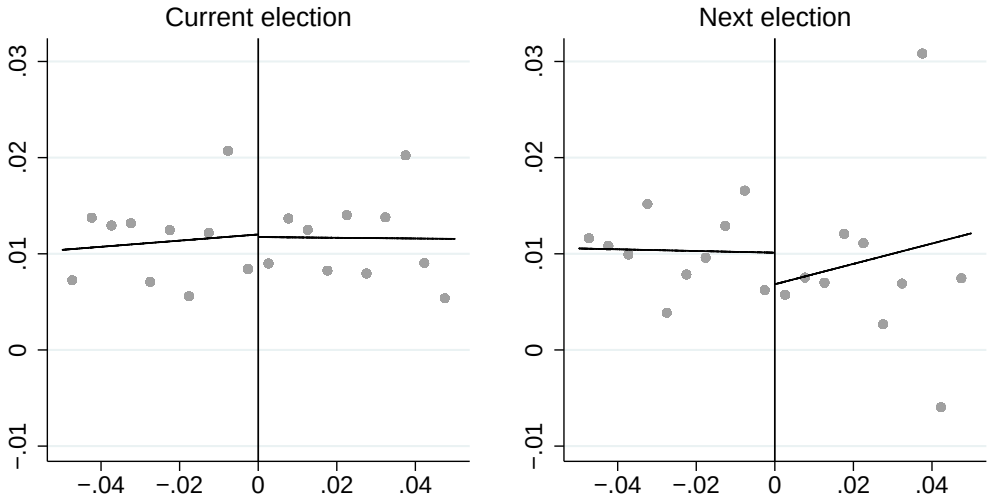


Note: The vertical axis indicates the probability that the candidate, or any other candidate from the same party and municipality, is ranked in the position indicated in the panel heading. The horizontal axis shows by which margin the candidate wins a first-tier seat in the current national election. The sample is limited to marginal candidates, defined as being within 5 percentage points from winning a first-tier seat. Losing candidates who win second-tier seats are excluded. Each bin represents an interval of half a percentage point. Separate linear regression lines are estimated to the left and right of the discontinuity using the underlying data (N=1,396), not the binned scatterpoints.

to begin with (about +1.1 percentage point), and there is no evidence that support in the next election depends on whether the local candidate is elected. In this respect, the effect seems to be very local.

Next, we look at the effect of a local candidate elected on nomination outcomes for the *rest* of the subregion. Obviously, if the probability of a local top candidate increases, the probability that the next top candidate is from somewhere else in the district decreases. However, it is interesting to see to which extent a hometown competes with other hometowns within the same subregion.

Figure 5: RD plots showing the effect of local representation in parliament on party support in the whole subregion



Note: The vertical axis shows the party's vote share in the subregion minus its vote share at the electoral district level. The horizontal axis shows by which margin the candidate wins a first-tier seat in the current national election. The dependent variable is voter turnout in the municipality minus turnout at the district level. The sample is limited to marginal candidates, defined as being within 5 percentage points from winning a first-tier seat (N=1469). Losing candidates who win second-tier seats are excluded. In the lower panels, the sample is limited to municipalities with exactly one marginal candidate (N=951). Each bin represents an interval of half a percentage point. Separate linear regression lines are estimated to the left and right of the discontinuity using the underlying data, not the binned scatterpoints.

Table 3 shows the results. In our sample of marginal candidates, the top candidates come from elsewhere in the sub-region in about 9 percent of the cases (column 1). When a local candidate is (marginally) elected this probability is more than cut in half (column

2-5). Hence, it appears as if there is competition within the subregion for getting the top candidate, which may explain why party support elsewhere in the sub-region level appears not to increase when a local candidate is elected (Figure 5).

Table 3: The effects of local representation in parliament on the probability of a first candidate from elsewhere in the same subregion

	(1) t	(2) $t+4$	(3) $t+4$	(4) $t+4$	(5) $t+4$	(6) $t+4$
1st tier seat	0.011	-0.055**				
	(0.032)	(0.020)				
2nd tier seat	-0.013	-0.036				
	(0.040)	(0.028)				
1st or 2nd tier seat			-0.049**	-0.050**	-0.053**	-0.043**
			(0.019)	(0.019)	(0.020)	(0.019)
Mean of outcome var.	0.095	0.092	0.092	0.092	0.092	0.092
R-squared	0.05	0.03	0.03	0.04	0.07	0.07
Observations	1481	1342	1342	1342	1342	1342
Party fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	No	No	No	Yes	Yes	Yes
District fixed effects	No	No	No	No	Yes	No
Rank fixed effects	No	No	No	No	No	Yes

Note: The sample is limited to marginal candidates, defined as being within 5 percentage point distance from winning a first-tier seat. All specifications include a linear control function on both sides of the electoral threshold and dummies for the periods 1989-2001 and 2005-2009, during which two different systems for allocating second-tier seats are in place. Standard errors and corresponding significance stars are based on a cluster-robust covariance matrix, with clustering on the district level. * $p < 0.10$,** $p < 0.05$, *** $p < 0.01$.

4 Impact on distributive policy

One possible explanation for why voters support parties with a local first-ranked candidate is that they expect this candidate to be able to secure pork for the hometown. Geographical representation is found to be important for the distribution of 'pork' in countries using plurality rule (e.g., Ferejohn, 1974; Mayhew, 1974; Ansolabehere et al., 2002; Knight, 2008). It is not obvious that the pork barrel logic applies similarly to closed-list PR settings where voters cast their ballots for parties, rather than individ-

ual politicians. In this section, we investigate this using the data on policy outcomes described in section 2.3.

A challenge with the outcome variables that we have available is that there is likely to be a time lag between the stage at which the MP influences the decision-making process and the observed outcome. We therefore analyze the effect of representation in parliament on policy outcomes both during the current and the next election period. In the case of road constructions, we add another two-year lag to account for the fact that the data is on the opening year of the construction, not the year when construction starts.

Another potential pitfall is that the policies are observed for one particular municipality, but could give benefits to the neighboring municipalities. This particularly concerns the road constructions, which could be part of an investment project which spans over several municipalities. In Appendix B, we look at the effect on investments of a more continuous spatial measure of representation. In this section, we show the results from estimating the following regression model:

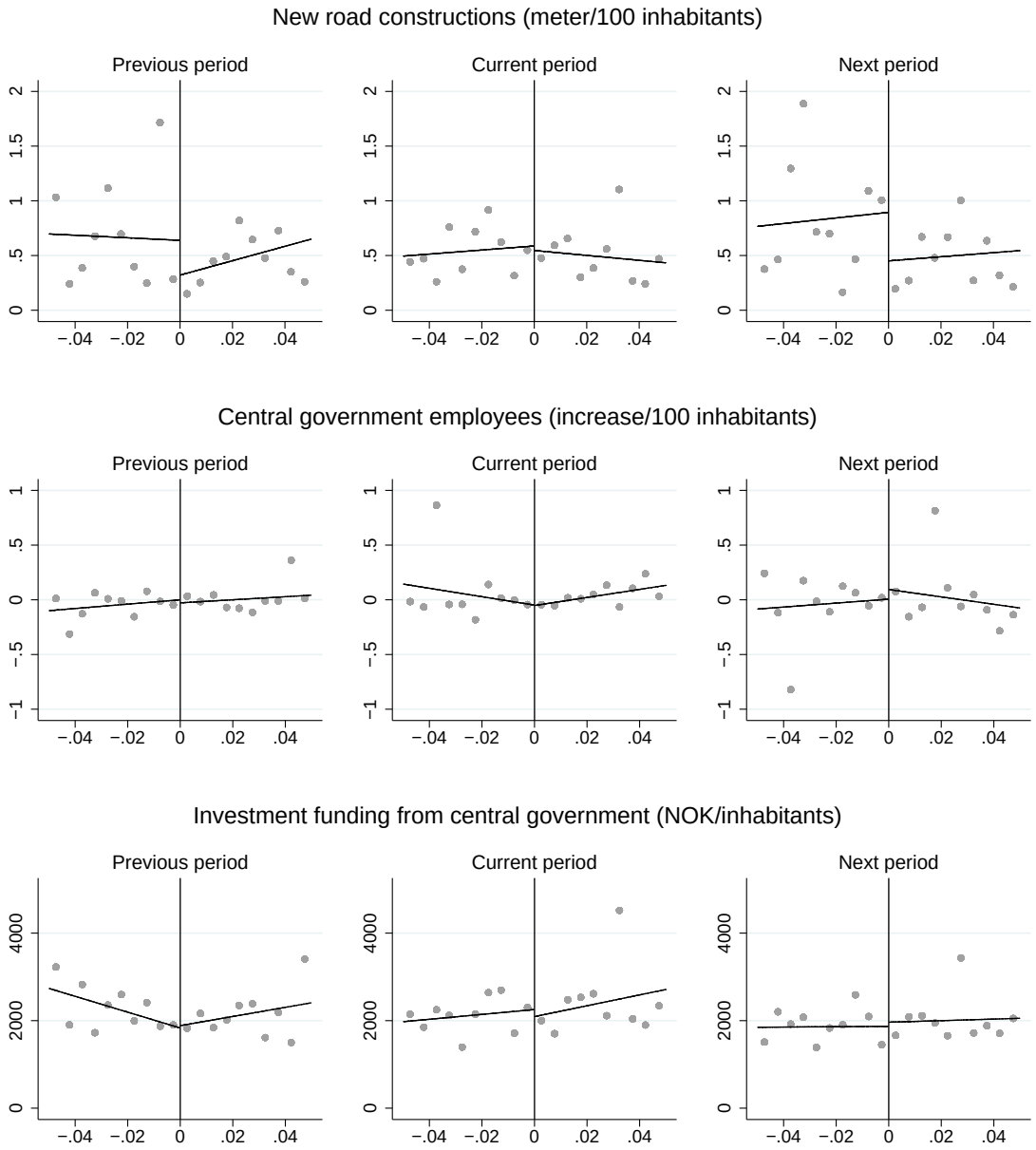
$$Y_{md,t+l} = \alpha_p + \theta_t + \delta_d + \beta(\mathit{Win1st}_{pmdt} + \mathit{Win2nd}_{pmdt}) + \lambda_1 \mathit{WinMargin}_{pmdt} + \lambda_2 \mathit{WinMargin}_{pmdt} \cdot \mathit{Win1st}_{pmdt} + \varepsilon_{pmd,t+l} \quad (3)$$

where $Y_{md,t+l}$ is the policy outcome[30] and l is either -4, 0 or 4. We exclude from the estimation sample municipalities which have local marginal candidates from more than one party.

Figure 6 shows graphically how winning a first tier seat affects the various policy outcomes, based on a five percentage point bandwidth around the electoral threshold. There is no evidence of a positive effect on any of these policies during the current election period, and also not during the next period. The effects on road constructions are not precisely estimated, but are close to zero in the current period (top middle panel)

[30]Since the road construction data is on the current municipality structure, we map historic hometowns to this structure. In some cases, if new borders have been drawn splitting the old municipalities, this could imply that the actual home municipality is the neighbor municipality.

Figure 6: RD plots showing the effect of local representation in parliament on policy outcomes



Note: Policy outcomes are measured at the hometown (municipality) level. In the top panels, the hometowns of candidates are mapped to the municipality structure of 2014. The horizontal axis shows by which margin the candidate wins a first-tier seat in the current national election. The sample in the top panel consists of all elections 1953-2009. The sample in the two bottom panels consists of elections 1973-2009. Road constructions are regarded as built in an election period if they are completed two years after the years included in the period (e.g. between 2008 and 2011 for the 2006-2009 period). The sample is limited to municipalities with exactly one candidate who is within 5 percentage points from winning a first-tier seat, and no candidate who wins a second-tier seat. Each bin represents an interval of half a percentage point. Separate linear regression lines are estimated to the left and right of the discontinuity using the underlying data, not the binned scatterpoints.

Table 4: The effects of local representation in parliament on policy outcomes

Panel A: New road constructions (meter/100 inhabitants)

	(1) Prev.	(2) Curr.	(3) Curr.	(4) Curr.	(5) Curr.	(6) Curr.	(7) Next
1st tier seat	-0.37	-0.08					-0.45*
	(0.28)	(0.15)					(0.24)
2nd tier seat	0.31	-0.13					-0.51**
	(0.39)	(0.17)					(0.21)
1st or 2nd tier seat			-0.09	-0.10	-0.09	-0.07	
			(0.14)	(0.15)	(0.16)	(0.14)	
Mean (meter/100 inhabitants)	0.58	0.51	0.51	0.51	0.51	0.51	0.65
R-squared	0.03	0.04	0.04	0.05	0.07	0.06	0.01
Observations	960	897	897	897	897	897	837

Panel B: Central government jobs (increase/100 inhabitants)

	(1) Prev.	(2) Curr.	(3) Curr.	(4) Curr.	(5) Curr.	(6) Curr.	(7) Next
1st tier seat	-0.02	-0.04					0.10
	(0.09)	(0.08)					(0.10)
2nd tier seat	-0.05	-0.02					-0.02
	(0.16)	(0.07)					(0.07)
1st or 2nd tier seat			-0.03	-0.02	-0.03	-0.03	
			(0.07)	(0.06)	(0.07)	(0.07)	
Mean (jobs/100 inhabitants)	1.82	1.75	1.75	1.75	1.75	1.75	1.78
R-squared	0.11	0.05	0.05	0.13	0.18	0.13	0.02
Observations	541	607	607	607	607	607	539

Panel C: Investment funding (NOK 2015/inhabitant)

	(1) Prev.	(2) Curr.	(3) Curr.	(4) Curr.	(5) Curr.	(6) Curr.	(7) Next
1st tier seat	45.9	-45.5					159.6
	(437.5)	(405.2)					(365.2)
2nd tier seat	325.5	-46.8					119.6
	(398.2)	(294.1)					(302.0)
1st or 2nd tier seat			-46.0	-13.0	-37.4	29.1	
			(313.0)	(330.7)	(375.5)	(347.6)	
Mean (NOK/inhabitant)	2214.7	2212.6	2212.6	2212.6	2212.6	2212.6	1928.4
R-squared	0.02	0.02	0.02	0.05	0.13	0.07	0.03
Observations	520	582	582	582	582	582	517
Party fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	No	No	No	Yes	Yes	Yes	No
District fixed effects	No	No	No	No	Yes	No	No
Rank fixed effects	No	No	No	No	No	Yes	No

Note: "Prev.", "Curr." and "Next" refer to the previous, current and next election period, respectively. Policy outcomes are measured at the hometown (municipality) level. In the top panel, the hometowns of candidates are mapped to the municipality structure of 2014. The sample is limited to municipalities with exactly one candidate who is within 5 percentage points from winning a first-tier seat, and no candidate who wins a second-tier seat. All specifications include a linear control function on both sides of the electoral threshold and dummies for the periods 1989-2001 and 2005-2009. Standard errors and corresponding significance stars are based on a cluster-robust covariance matrix, with clustering on the district level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

and negative in the next period (top right panel). For the two other policies, we have quite precisely estimated zeros. As seen in the left panels, there is also no evidence that the sample is unbalanced in terms of policy outcomes during the previous period. Table 4 shows the regression results, which confirm the findings from the graphical analysis.

Our results suggest that marginally elected MPs do not influence policies in a direction which benefits his or her hometown during the eight years following the election. We cannot rule out that there could be some MPs who are more influential, or that it takes even longer time before the effect of representation materializes.[31] However, if there is a long-run effect, it would be more difficult to observe also for voters. It is therefore unlikely that this explains the fairly big effect on local party support which we document in section 3.

5 Discussion

In single-member district contexts, there is a clear link between geography and representation. In multi-member districts, and especially under closed-list PR, the electoral and policy impacts of local representation in the national legislature are less understood. In this study, we have made a first attempt at assessing the impact of local representation on voter behavior and distributive policy outcomes in the closed-list PR context of Norway.

Our results on voting behavior provide credible evidence that local representation *within* election districts matters. Voters reward parties with an MP from their hometown, even though individual MPs appear *not* to use their time in office to provide benefits to their hometown. This could imply that voters give their local MPs credit for benefits which they would have received anyway, or that they prefer local politicians for other reasons.

If the effect of representation on party support in the next election is driven solely by the (re)nomination of a local top candidate, our results imply that a local top candidate

[31] In the election period 2001-2005, the parliament approved moving eight central government agencies out of Oslo. According to various sources, this process was completed within the next election period.

increases a local party's vote share by about 4-5 percentage points. This is comparable to the home county advantage documented by Rice and Macht (1987) in gubernatorial races, and also to the results of Fiva and Smith (2016a) on the SMD system which was in place in Norway between 1906 and 1918. Given that closed-list PR systems are regarded as less candidate-centered, this is somewhat striking. A feature which might explain our finding is that each party often wins only one seat per election district, which gives the top candidate a prominent position.

In contrast to these studies, we do not find that the hometown advantage is driven by higher voter turnout. This suggests that the hometowns of candidates affect the party choice of voters who have decided to vote, but who have weak preferences over parties. Since the hometowns are reported on the ballot, some voters might use this information to make their decision inside the voting booth. However, we cannot rule out that local mobilization effort during the electoral campaign also matters (Crisp and Desposato, 2004).

According to our results, representation *within* the election district does not matter for the allocation of public resources in this electoral setting. An open question is whether representation affects the allocation *between* districts under closed-list PR. For example, Helland and Sørensen (2009) find that Norwegian election districts which have more parliamentary seats relative to population receive more national road investments. This question cannot be addressed within the research design used in this paper, but is an interesting topic for future research.

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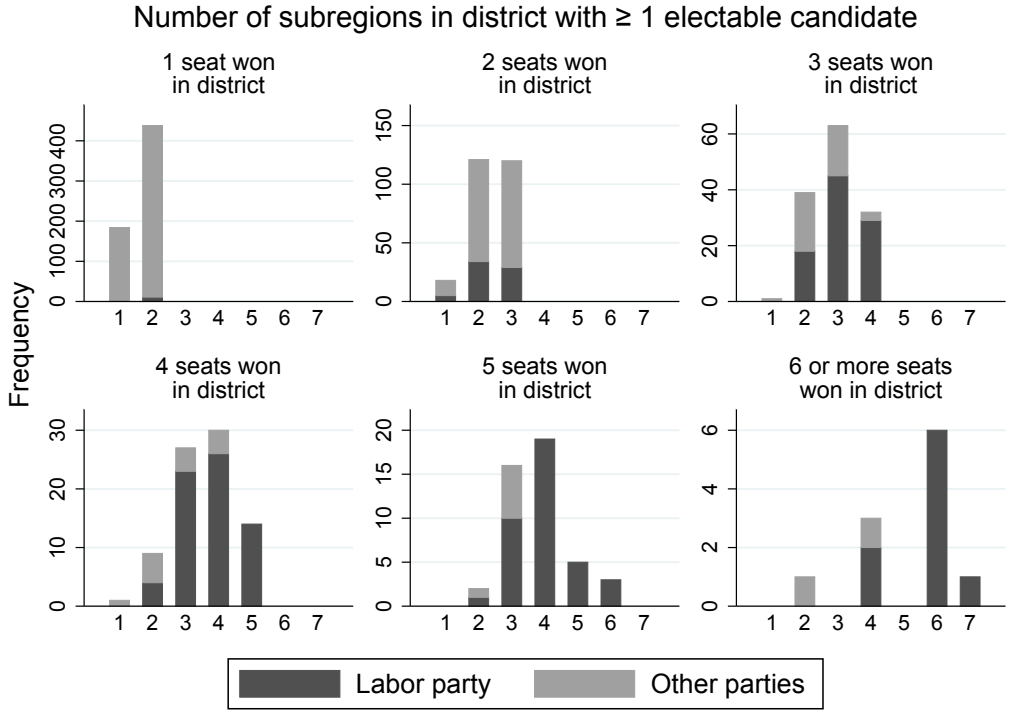
Appendix A: Supplementary figures and tables

Table A.1: The effects of local representation in parliament on the probability of a local first candidate

	(1)	(2)	(3)	(4)	(5)	(6)
	t	$t+4$	$t+4$	$t+4$	$t+4$	$t+4$
1st tier seat	0.042	0.231***				
	(0.038)	(0.052)				
2nd tier seat	0.122*	0.354***				
	(0.069)	(0.062)				
1st or 2nd tier seat			0.264***	0.268***	0.272***	0.255***
			(0.050)	(0.050)	(0.047)	(0.054)
Mean of outcome var.	0.514	0.309	0.309	0.309	0.309	0.309
R-squared	0.33	0.16	0.16	0.16	0.18	0.21
Observations	1499	1354	1354	1354	1354	1354
Party fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	No	No	No	Yes	Yes	Yes
District fixed effects	No	No	No	No	Yes	No
Rank fixed effects	No	No	No	No	No	Yes

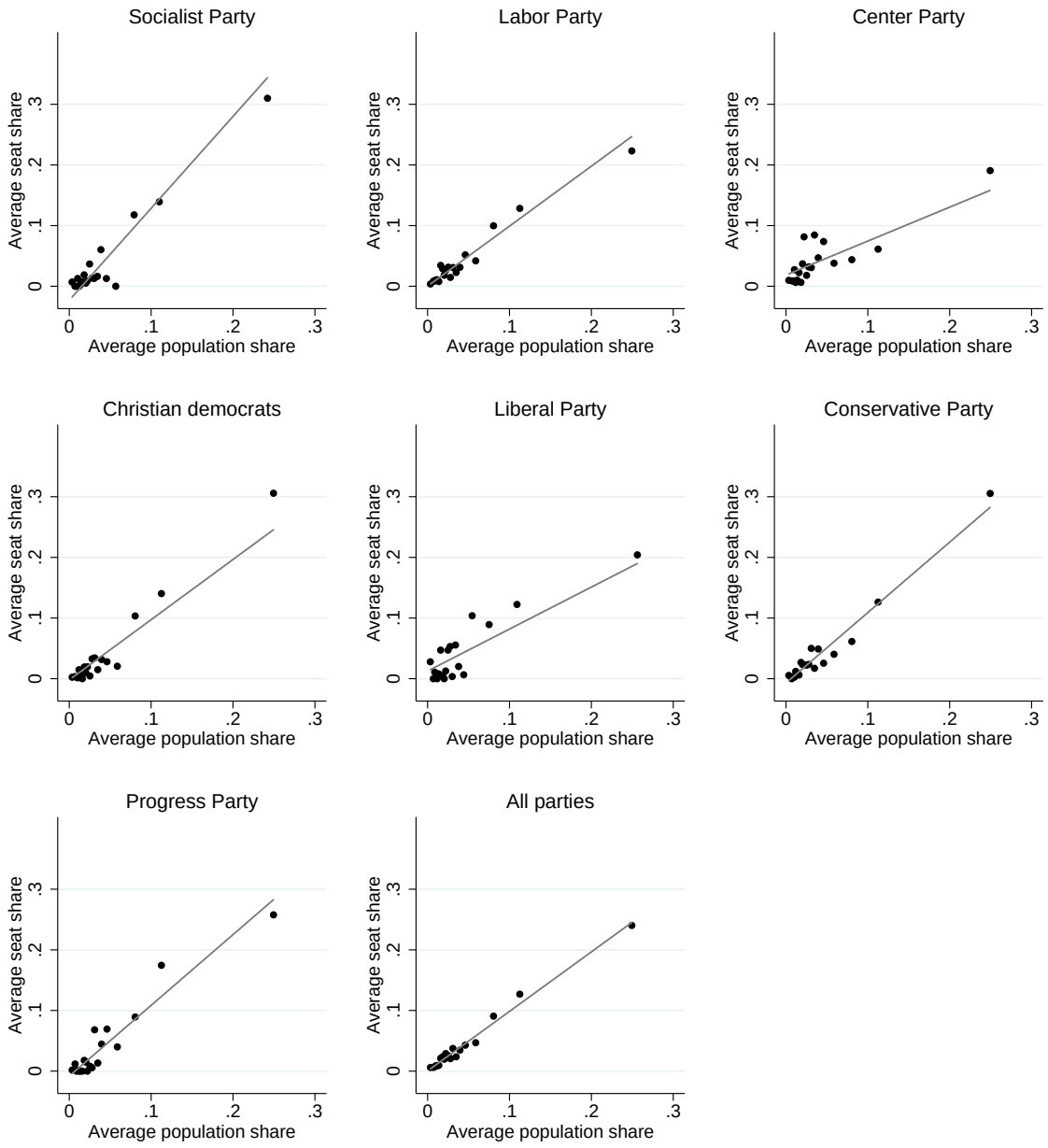
Note: The sample is limited to marginal candidates, defined as being within 5 percentage point distance from winning a first-tier seat. All specifications include a linear control function on both sides of the electoral threshold and dummies for the periods 1989-2001 and 2005-2009, during which two different systems for allocating second-tier seats are in place. Standard errors and corresponding significance stars are based on a cluster-robust covariance matrix, with clustering on the district level. * $p < 0.10$,** $p < 0.05$, *** $p < 0.01$.

Figure A.1: Allocation of candidates in an electable rank position between subregions within the election district



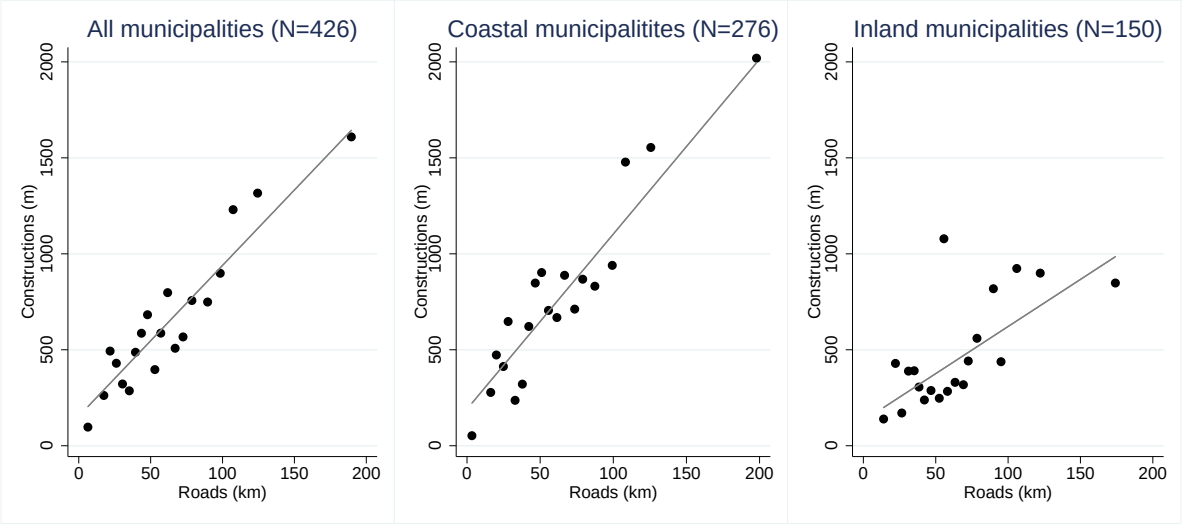
Note: Electable candidates are candidates who are either elected or ranked one position below the last candidate from the party who wins a seat. There are four to eight subregions per district. Seats won include all seats won by candidates with a reported hometown within the district. The subregion within Hordaland district which includes the city of Bergen is excluded in years before 1973, when Bergen was a separate election district.

Figure A.2: Municipality' share of parliament seats vs. share of population



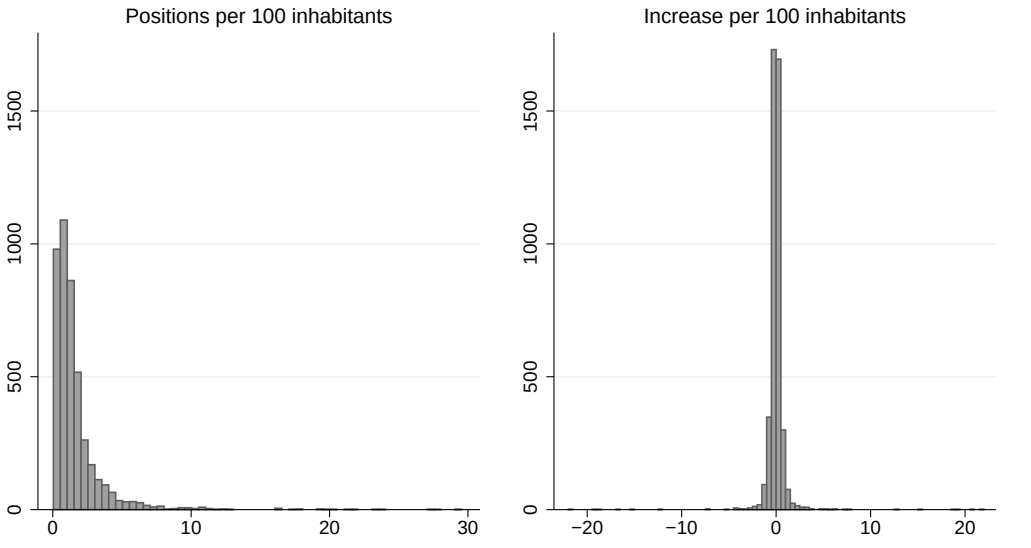
Note: The vertical axis plots the average share of the seats won by the party in the election district which are occupied by MPs from the municipality. The horizontal axis plots the municipality's share of the population in the election district. Both are averaged over all elections 1953-2013. The vertical axis in the plot with all parties (bottom middle panel) reports the average share of seats won by any party with a local candidate. Hometowns are matched to the municipalities existing in 2014. Hordaland district is not included in elections prior to 1973, when the city of Bergen was a separate election district. Vestfold district is not included in the 2013 election due to missing hometown data. Three municipalities are excluded due to changes in election district borders. The binned scatter points represent contains approximately the same number of observations. The linear regression lines are based on the underlying data, not the binned scatterpoints.

Figure A.3: Road bridges on national roads and length of the national road network



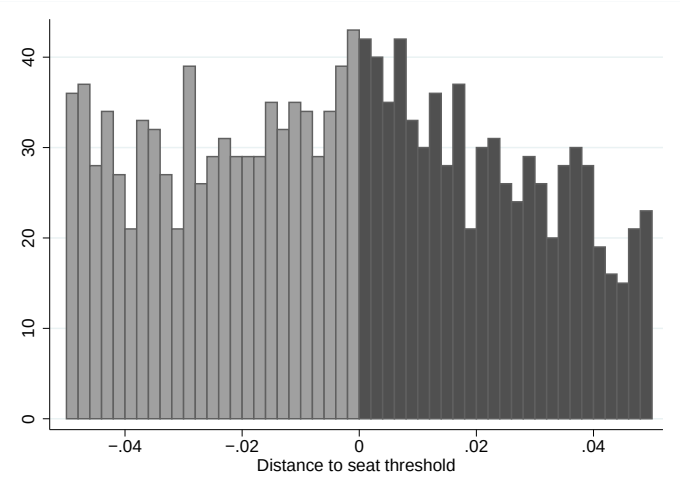
Note: The vertical axis reports total meters of new or rebuilt bridges on national roads within the municipality during the period 1952-2012. The horizontal axis reports the total length of the national road network in the municipality (measured in 2002), including national roads which were re-classified as regional roads in 2010. Each of the binned scatter points contains roughly the same number of observations.

Figure A.4: Central government jobs in the municipality



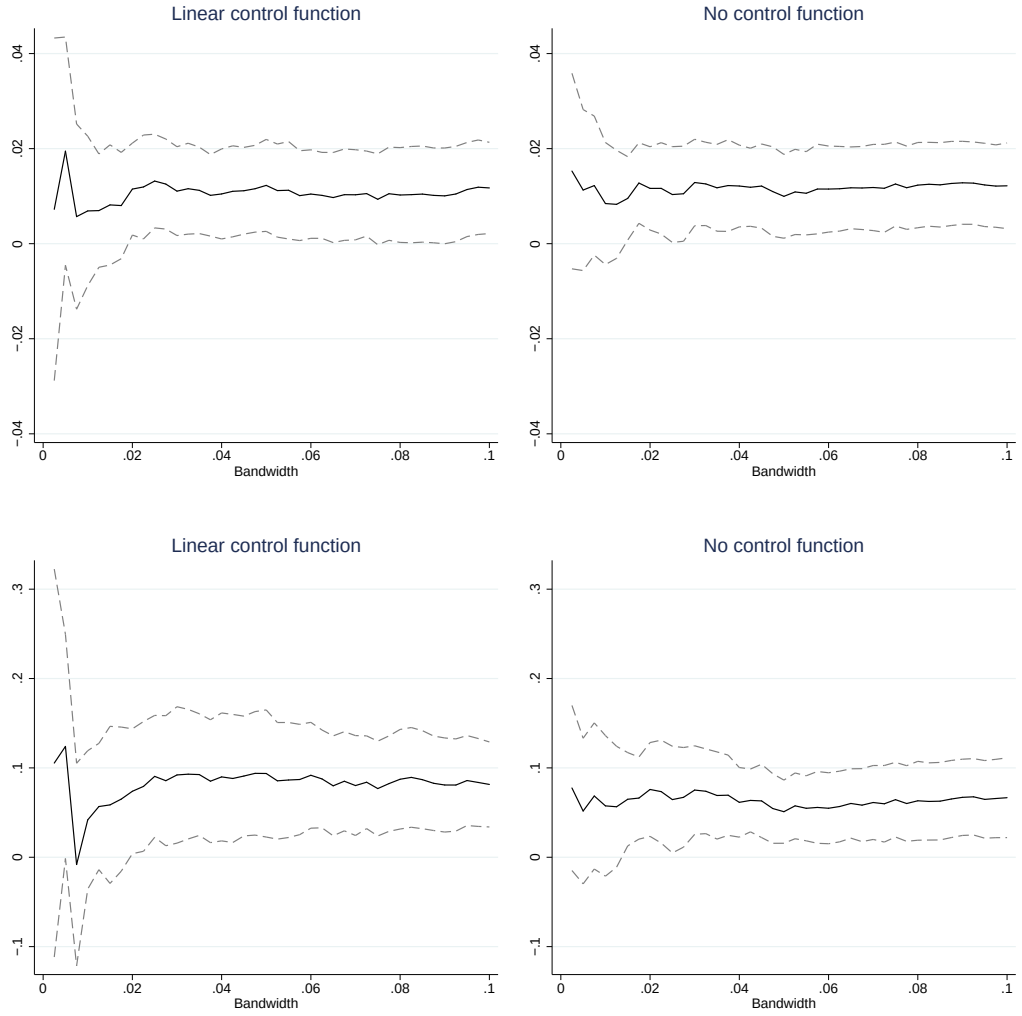
Note: The left panel shows the frequencies by the number of jobs per 100 inhabitants by the beginning of the election period. The right panel shows the change in the same measure from the beginning of the election period to the beginning of the next election period. Each bar has a width of 0.5. The sample consists of election periods from 1973-1977 to 2009-2013.

Figure A.5: Density of observations, marginal candidates



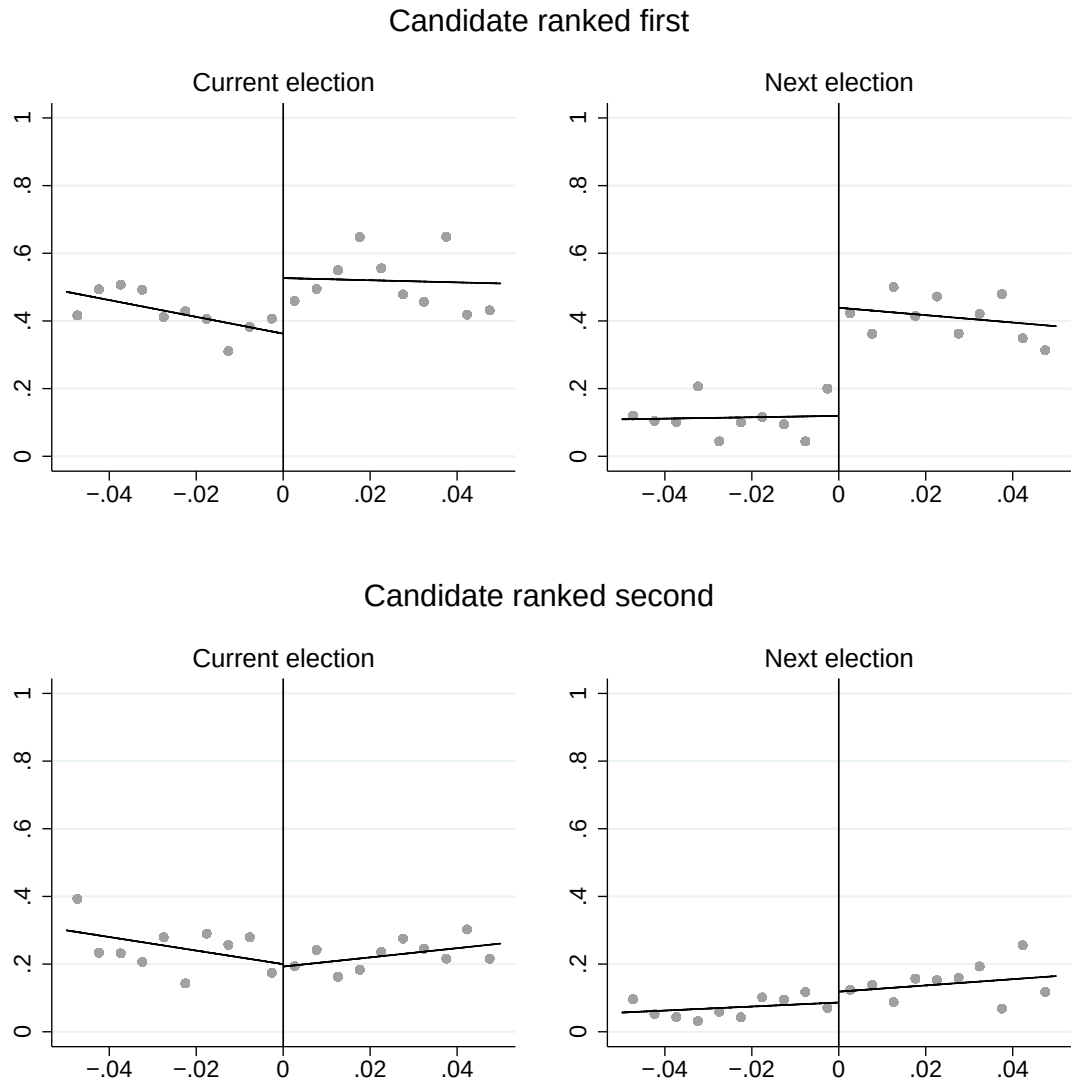
Note: The horizontal axis shows by which margin the candidate wins a first-tier seat in the current national election. The sample is limited to marginal candidates, defined as being within 5 percentage points from winning a first-tier seat.

Figure A.6: Effect of a local MP on local party support in nominal (top) and log (bottom) terms: Sensitivity to bandwidth choice



Note: In the upper panel, the dependent variable is the vote share of the party in the national election at the municipality level minus its vote share at the election district level. In the lower panel, it is the corresponding difference in log vote shares. The horizontal axis indicates the percentage point bandwidth on both sides of the electoral threshold. The solid line represent the point estimates. The dashed lines represent 90 percent confidence intervals based on a t-distribution with 16 degrees of freedom, as advocated by Hansen (2007). All specifications include party fixed effects and dummies for the periods 1989-2001 and 2005-2009. Standard errors are clustered on the election district level.

Figure A.7: RD plots showing the effect of local representation in parliament on nominations for the next election of the same candidate



Note: The vertical axis in indicates the probability that the candidate is ranked in the position indicated in the panel heading. The horizontal axis shows by which margin the candidate wins a first-tier seat in the current national election. The sample is limited to marginal candidates, defined as being within 5 percentage points from winning a first-tier seat. Losing candidates who win second-tier seats are excluded. Each bin represents an interval of half a percentage point. Separate linear regression lines are estimated to the left and right of the discontinuity using the underlying data (N=1,396), not the binned scatterpoints.

Appendix B: Effect on road investments: Panel data approach

A challenge with the road constructions used as an outcome variable in section 4 is that the observed construction could be part of a project which benefits also other municipalities near the municipality in which the construction is located.[32] In addition, this variable is very skewed, implying that a small number of observations could be driving the results. To address both these issues, we conduct an additional analyisis of the relationship between representation and new constructions where we (1) use the full sample of municipalities for identification and (2) compare discrete and continuous spatial measures of representation.

We also take into account that it could take many years for the effect of representation to fully materialize by using a cumulative outcome variable defined as

$$Y_{md,t+L} = \frac{CumMeter_{md,t+L}}{Pop_{mdt}} = \frac{\sum_{l=2}^{L} Meter_{md,t+l}}{Pop_{mdt}} \tag{4}$$

where $L = 0, 1, ..., 15$. We estimate the association between representation and completed road constructions in municipality m of election district d at time t based on the following specification:

$$Y_{md,t+L} = \alpha_{md} + \theta_t + \beta Rep_{mdt} + \gamma Cand_{mdt} + \varepsilon_{mdt} \tag{5}$$

In the discrete specification, Rep_{mdt} is a dummy for whether the municipality has at least one local MP, and $Cand_{mdt}$ is a dummy for whether the municipality has at least one local *candidate* who is either elected or is next in line to being elected. Controlling for $Cand_{mdt}$ implies that β only captures the effect of having a local candidate who actually wins a seat. However, unlike the RDD in section 4, identification does not only come from close elections. Hence, there could be selection with respect to the electoral success

[32] A special case is bridges over water which connect to municipalities. In the data, these are recorded as located in one of the two municipalities.

of candidates.[33]

In the continuous specification Rep_{mdt} and $Cand_{mdt}$ is the the *distance to the closest* representative and candidate, respectively. Since intra-district distances vary substantially between districts, we measure this by ranking all municipalities in each district by how close they are to an elected MP or candidate (Rank 1 = MP/candidate from the municipality). We also normalize the variable to have a zero mean and standard deviation equal to one. A negative effect of distance implies that there is a positive effect of local representation.

Table B.1 shows the association between both measures of representation and road constructions completed in years 3-6 years after the election ($L = 3$). There is a positive effect of local representation both when using the discrete measure (columns 2-4) and the continuous measure (columns 6-8), but it is very close to zero. Considering that the dummy measure of representation has lower variance, the effects are similar in magnitude, but precision is somewhat better when using the continuous measure.

Figure B.1 shows the effect for all cumulative time lags L. There is no evidence that the effects in later years are stronger than the immediate effects. When the maximum lag is between $L = 6$ and $L = 10$, the effects are as good as zero. For longer lags, the number of observations drop and precision becomes lower. As shown in the lower panel, the results are similar when we include MPs who are close geographically but elected in another election district. The results are consistent with those in section 4, which show that there are no substantial positive effects of local representation in Parliament on road investments or other distributive policies.

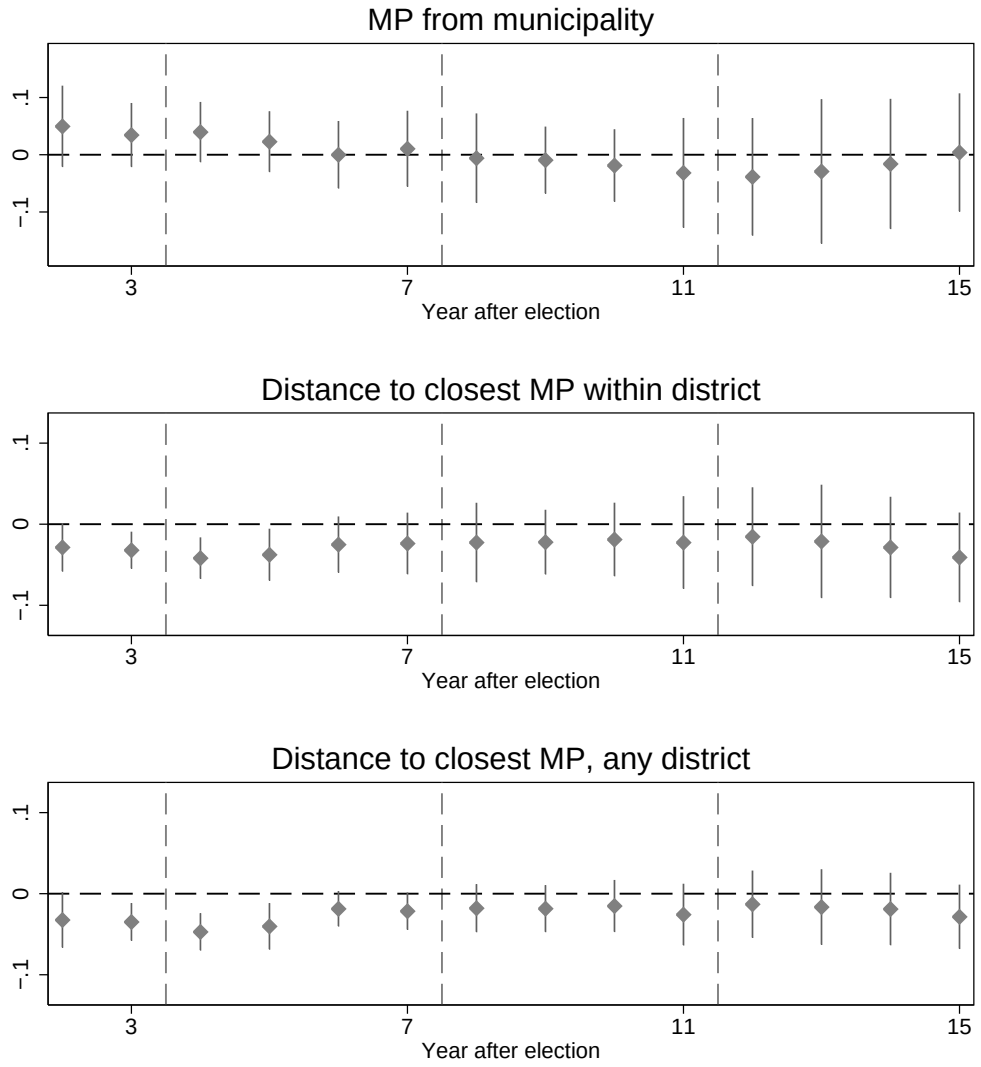
[33]The bias is most likely positive—i.e., parties might rank candidates higher in areas where they intend to invest in new projects, or representation could be correlated with lobbying and other channels of influence. However, we cannot rule out that the bias could also be negative.

Table B.1: Association between a local MP and new road constructions completed in years 3-6 after the election. OLS estimates with municipality fixed effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Local MP	-0.01	0.02	0.02	0.02				
	(0.03)	(0.03)	(0.03)	(0.03)				
Local candidate		-0.05*	-0.04	-0.06*				
		(0.03)	(0.02)	(0.03)				
Distance to MP					-0.00	-0.04**	-0.04**	-0.04**
					(0.02)	(0.02)	(0.02)	(0.02)
Distance to cand.						0.05*	0.05*	0.06*
						(0.03)	(0.03)	(0.03)
R-squared	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.03
Observations	5859	5859	5859	5859	5859	5859	5859	5859
Municipality fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	No	No	Yes	No	No	No	Yes	No
District-time fixed effects	No	No	No	Yes	No	No	No	Yes

Note: 'Local MP' and 'Local candidate' are dummies for whether the municipality has at least one elected MP, or a candidate within one rank position from being elected, respectively. The dependent variable is meters of new constructions per capita in the municipality, normalized to have mean zero and standard deviation equal to one. 'Distance to MP' and 'Distance to candidate' are normalized accordingly. Standard errors and corresponding significance stars are based on a cluster-robust covariance matrix, with clustering on the region level. * $p < 0.10$,** $p < 0.05$, *** $p < 0.01$.

Figure B.1: Association between a local MP and road constructions in the municipality (OLS estimates with municipality fixed effects)



Note: The dependent variable is total meters of new road bridges on national roads in the municipality completed between year 2 and the year indicated on the horizontal axis, divided by population and normalized to have mean zero and standard deviation equal to one. Year 0 is the first year after the election. 90 percent confidence intervals are based on a t-distribution with 18 degrees of freedom. Standard errors are clustered on the region level.