Online Appendix
Local Representation and Voter Mobilization in Closed-list Proportional Representation Systems[*]

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Abstract

We investigate whether geographic representation affects local voting behavior in closed-list proportional representation (PR) systems, where conventional theoretical wisdom suggests a limited role of localism in voter preferences. Using detailed data on Norwegian parliamentary candidates' hometowns, we show that parties engage in geographic balancing when constructing candidate lists. However, because most districts contain more municipalities than seats, not all municipalities will ultimately see a local candidate elected. A regression discontinuity design applied to marginal candidates reveals that parties obtain higher within-district support in subsequent elections in incumbents' hometowns—novel evidence of "friends-and-neighbors" voting in an otherwise party-centered environment. Exploring the mechanisms, we find that represented municipalities often continue to have locally-connected candidates in top positions, in contrast to municipalities with losing candidates, and are more frequently referenced in legislative speeches. There is no evidence that unequal representation creates inequalities in distributive policies.

# Appendix A: Supplementary figures and tables
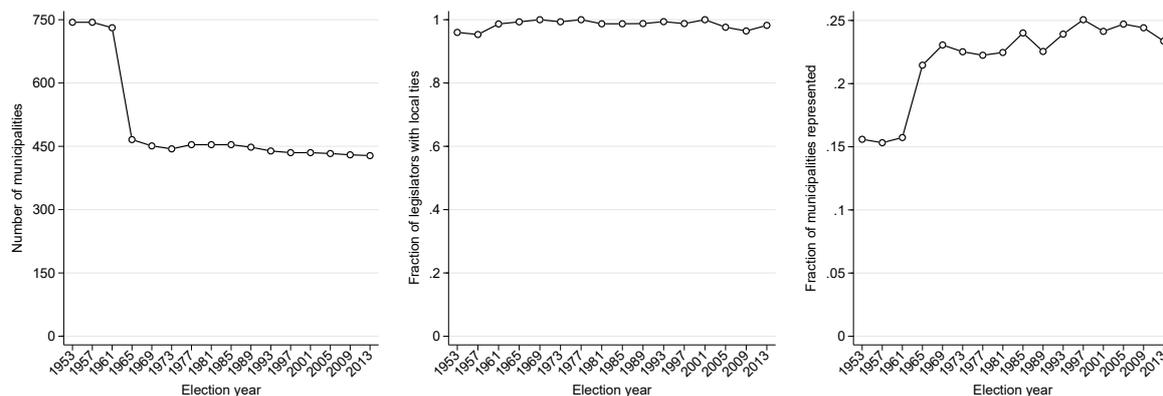
Figure A.1: Norwegian municipalities and local ties

Note: The left panel shows the number of municipalities by election year. The middle panel shows the fraction of legislators residing in the electoral district where they were elected. The right panel shows the fraction of municipalities where at least one inhabitant is elected to parliament by election year.
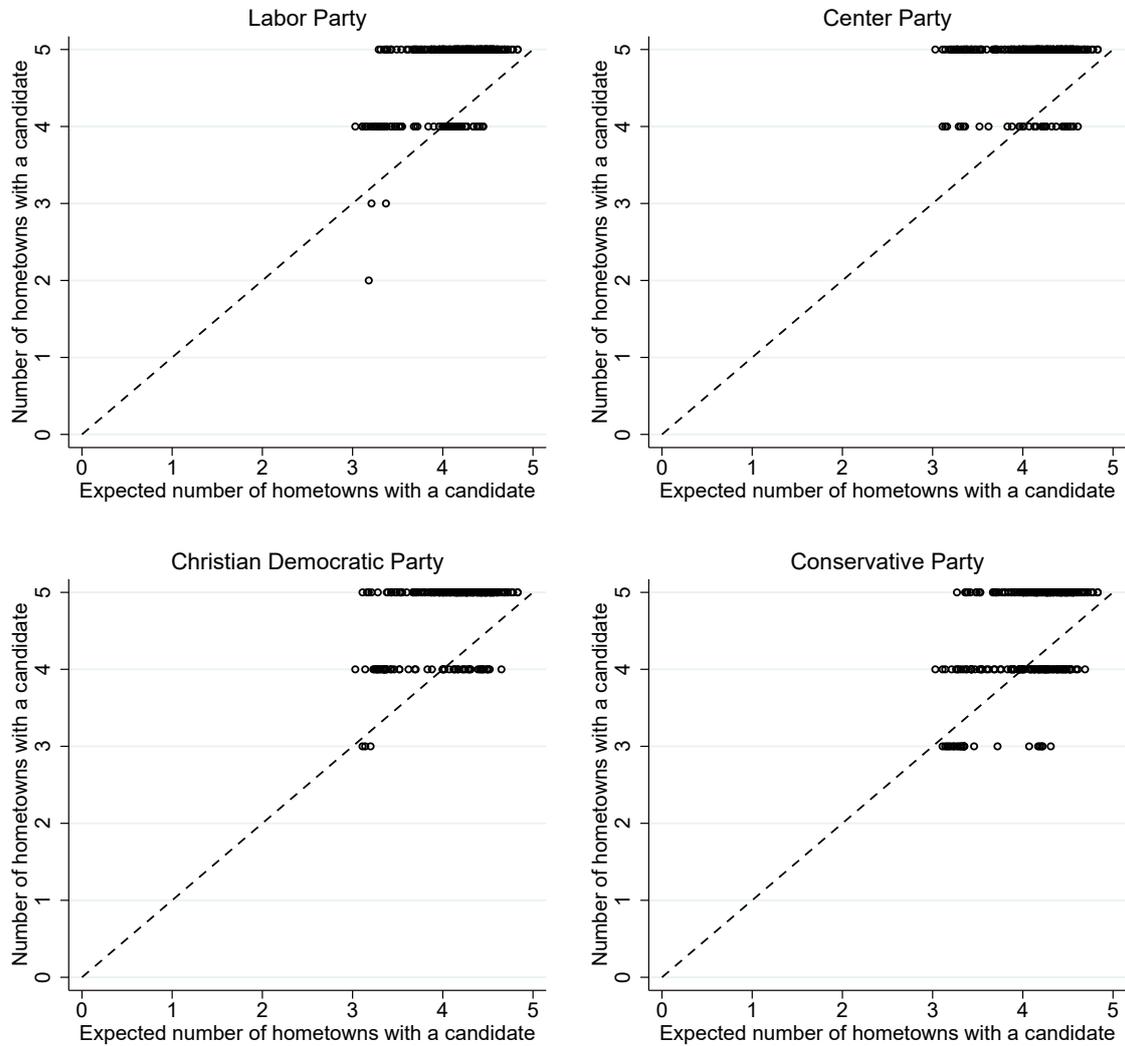
Figure A.2: Geographic balancing in candidate nominations for the top five list positions in the four largest parties

Note: The figure plots, for each of the four largest parties, the number of municipalities represented by candidates in the top five positions on the lists against the expected number from a random draw based on populations. The unit of observation is the party-district-year level (N=1,085). At the dashed 45-degree line, municipalities are, on average, represented on the list in proportion to their share of the district population.
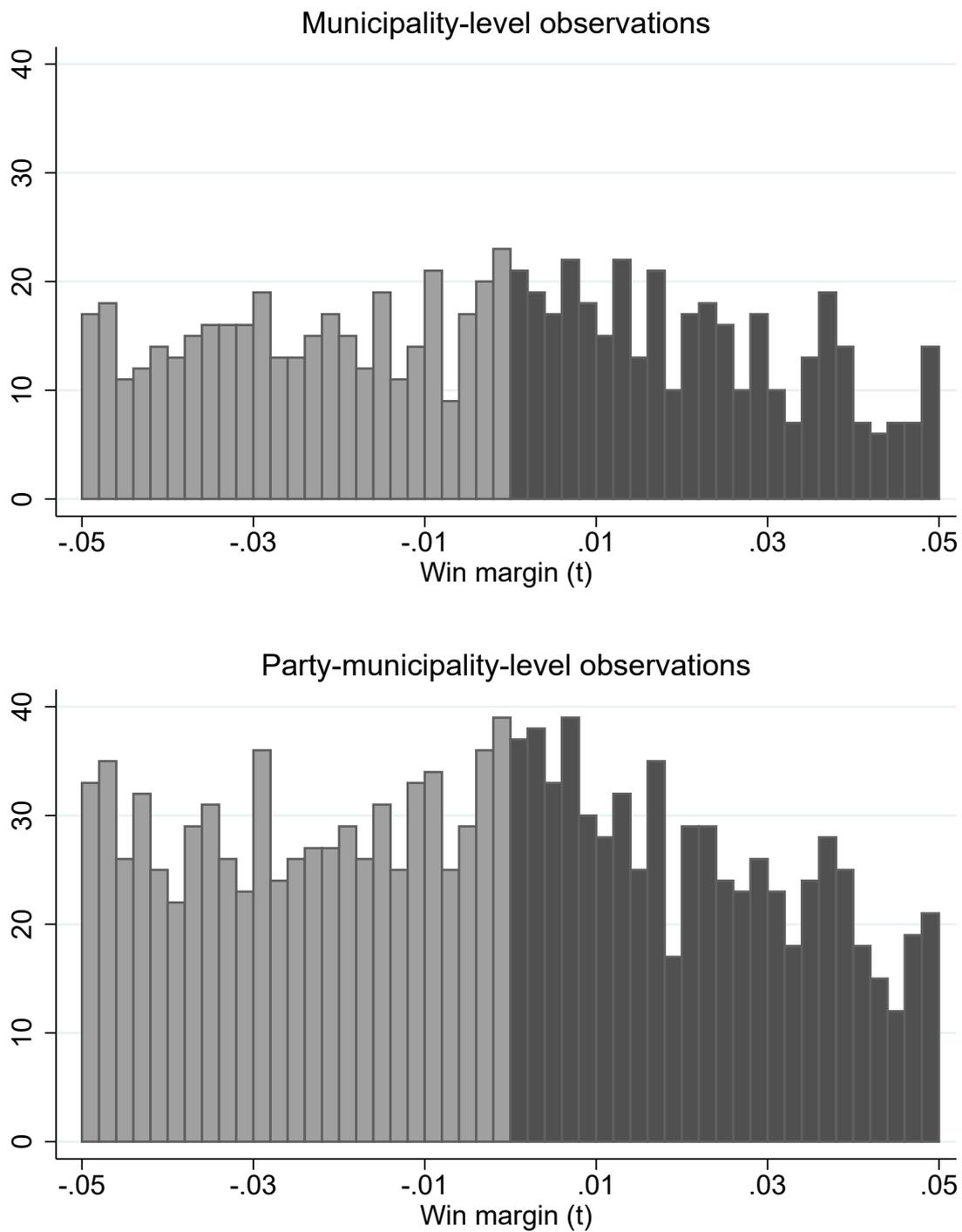
Figure A.3: Frequency of observations

*Note: In the top panel, the sample is limited to municipalities with exactly one marginal candidate (from any party), defined as those within 5 percentage points from winning a first-tier seat, and no candidate winning a first-tier seat by a larger margin. In the bottom panel, the sample is limited to combinations of party and municipality that satisfy the same restriction.*
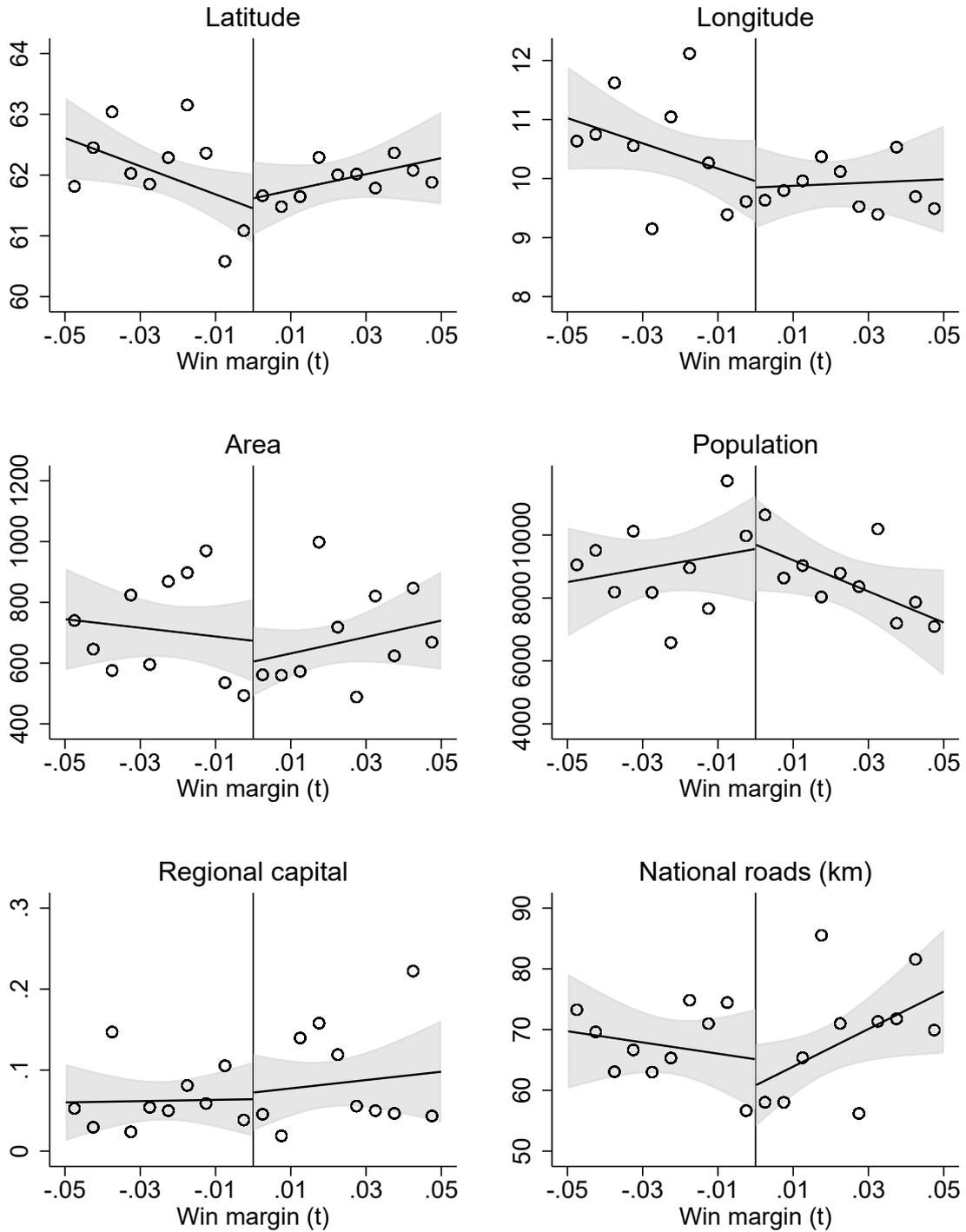
Figure A.4: Balance of hometown characteristics around the electoral threshold for winning a first-tier seat

Note: The horizontal axis shows the margin by which the candidate wins a first-tier seat in the current national election. The sample is limited to municipalities with exactly one marginal candidate, defined as those within 5 percentage points from winning a first-tier seat, and no candidate winning a first-tier seat by a larger margin. 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.

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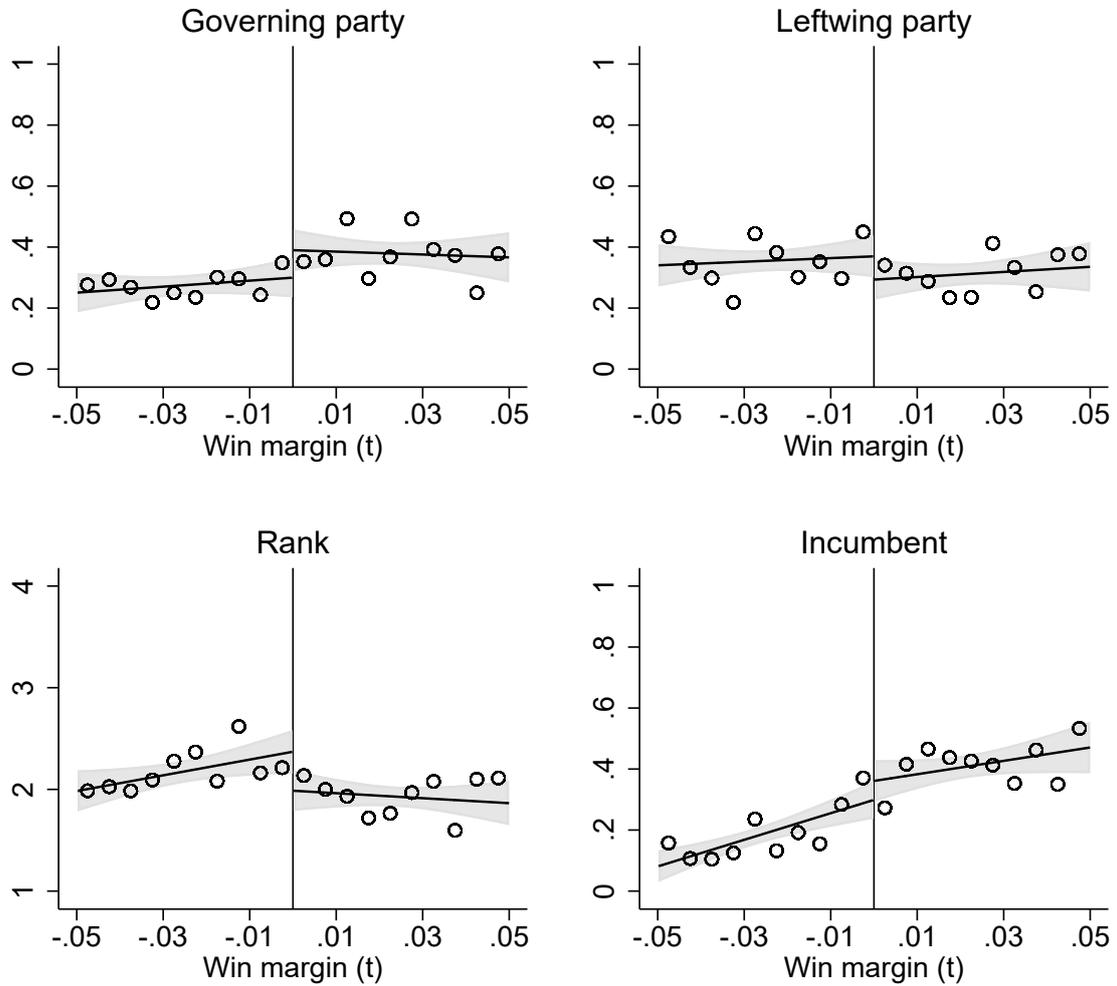
Figure A.5: Balance of candidate characteristics around the electoral threshold for winning a first-tier seat

Note: The horizontal axis shows the margin by which the candidate wins a first-tier seat in the current national election. The sample is limited to municipalities with exactly one marginal candidate, defined as those within 5 percentage points from winning a first-tier seat, and no candidate winning a first-tier seat by a larger margin. 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.
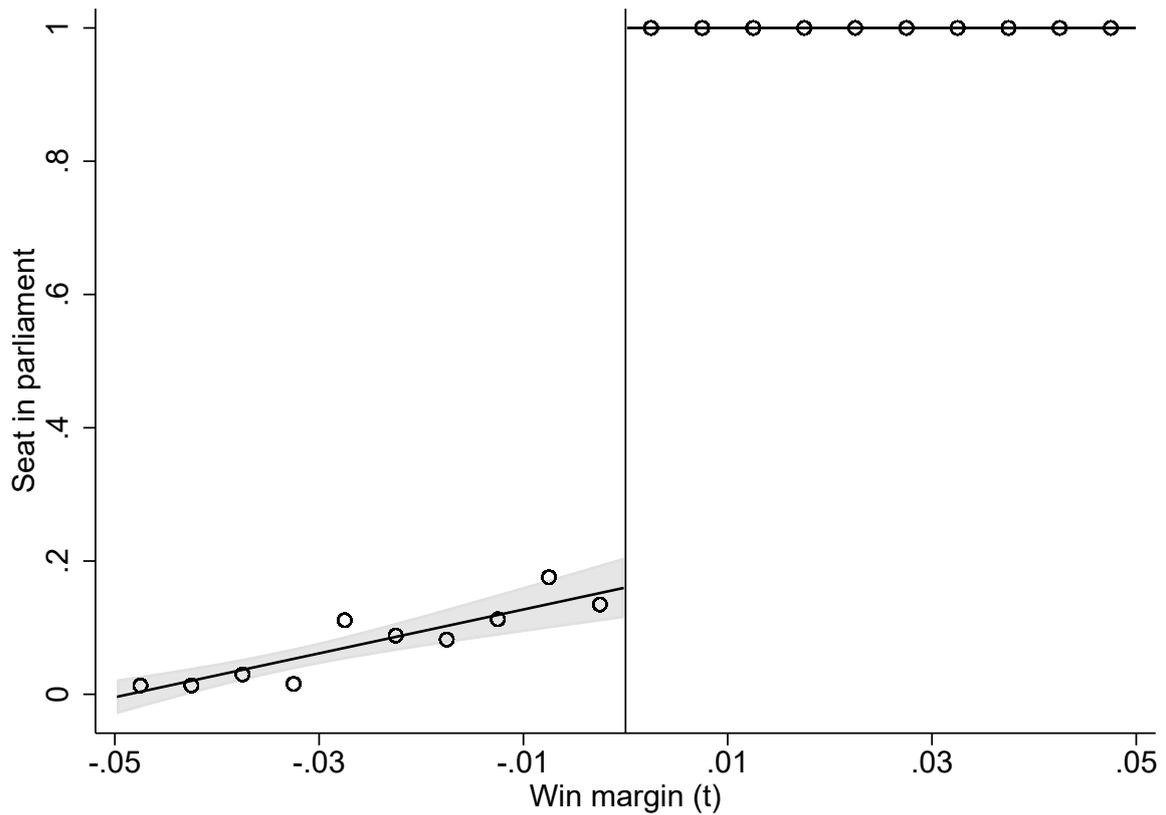
Figure A.6: RD plot showing how local representation changes at the cutoff for winning a first-tier seat

Note: The sample is limited to municipalities in which the party has exactly one marginal candidate, defined as those within 5 percentage points from winning a first-tier seat, and no candidate winning a first-tier seat by a larger margin. 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.
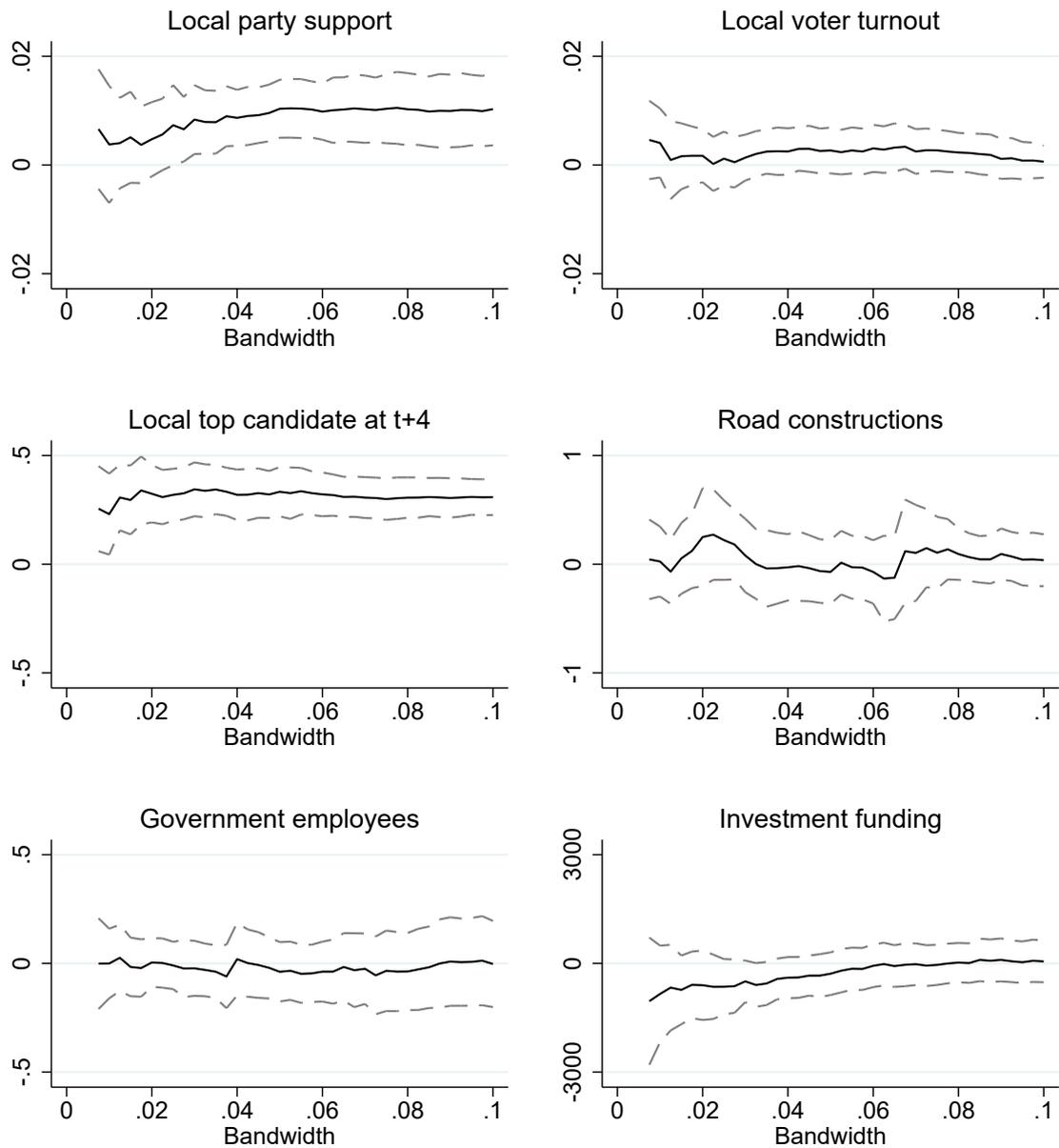
Figure A.7: Sensitivity to bandwidth choice of the effect of local representation on main outcome variables

Note: The graphs shows the results from the models reported in column column (2) of Table 2, column (2) of Table A.5 and column (3) of Table A.7 for different bandwidths on both sides of the electoral threshold. The bandwidth is indicated on the horizontal axis. The solid line represents the point estimates. The dashed lines represent 95 percent confidence intervals based on a t-distribution with 18–5 degrees of freedom in order to take into account within-district correlation.
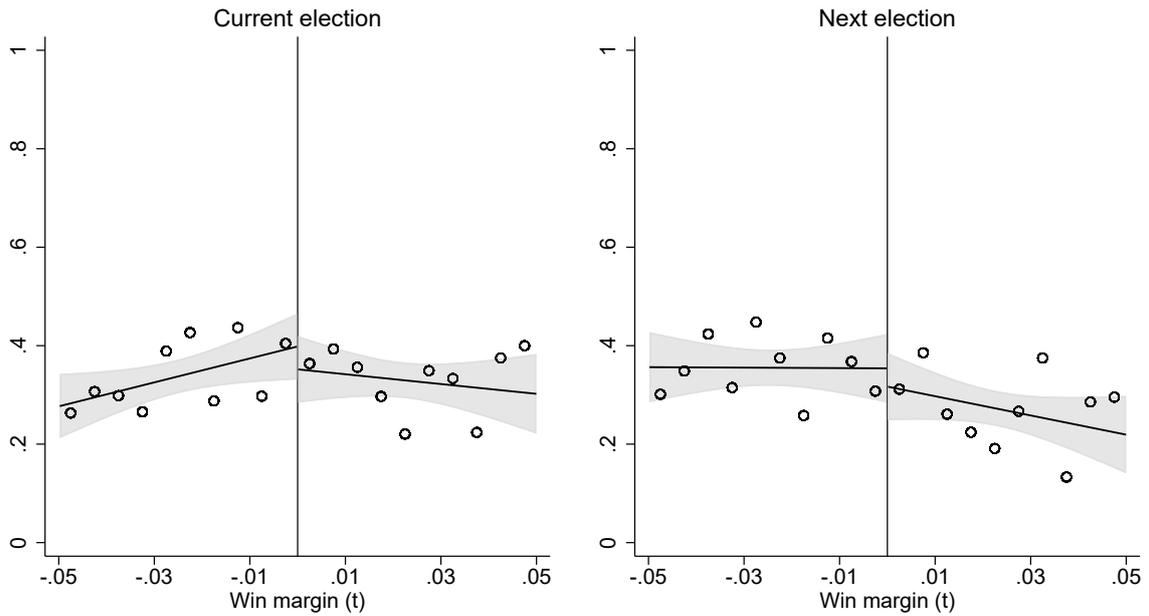
Figure A.8: RD plots showing the effect of local representation on the probability of having a local candidate ranked third, fourth, or fifth

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 the margin by which the candidate wins a first-tier seat in the current national election. The sample is limited to municipalities in which the party has exactly one marginal candidate, defined as those within 5 percentage points from winning a first-tier seat, and no candidate winning a first-tier seat by a larger margin. 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.

Hometown mentioned by any legislator
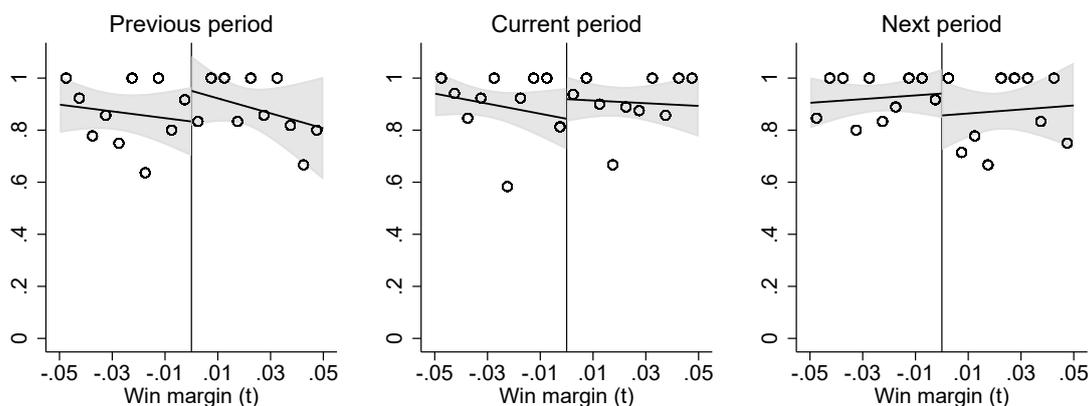
Hometown mentioned by any legislator from the same party
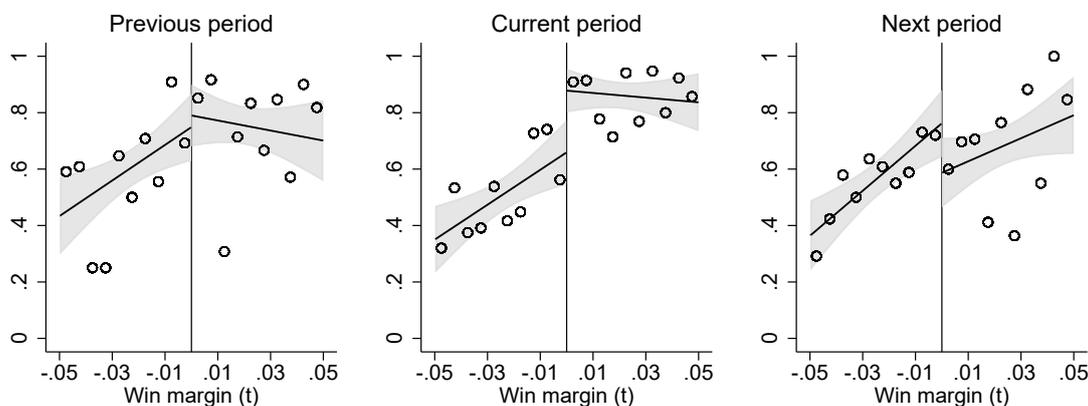
Figure A.9: RD plots showing the effect of local representation on parliamentary speech mentions

Note: The horizontal axis shows the margin by which the candidate wins a first-tier seat in the current national election. The sample consists of all elections from 1997 to 2013. Speech data is from the Talk of Norway project (Lapponi et al., 2018) which covers the 1998-2016 period and includes 250,000 unique speeches. We exclude speeches by the president and vice-president (73,000 observations), speeches by candidates of non-main parties (2,000 observations), and speeches lacking electoral district information (18,000 observations, typically speeches by cabinet members promoted from outside the Storting). In the top panel, the dependent variable is a dummy variable for if the hometown of a candidate is mentioned by any legislator in the relevant election period. The sample is limited to municipalities with exactly one marginal candidate (from any party), defined as those within 5 percentage points distance from winning a first-tier seat, and no candidate winning a first-tier seat by a larger margin. In the bottom panel, the dependent variable is a dummy variable for if the hometown of a candidate is mentioned by any legislator from the party of the candidate in the relevant election period. The sample is limited to municipalities in which the party has exactly one marginal candidate, defined as those within 5 percentage points distance from winning a first-tier seat, and no candidate winning a first-tier seat by a larger margin. 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 A.1: Descriptive statistics by parliamentary representation, all hometowns

Panel A: Municipality-level outcomes

	No seat	Seat	Difference	N
Local voter turnout (rel. to rest of district, current election)	-0.007	0.004	0.011***	7,889
	(0.044)	(0.034)	(0.001)	
Δ Local voter turnout (rel. to rest of district, next election)	0.001	-0.001	-0.003***	7,031
	(0.026)	(0.019)	(0.001)	
Hometown mentioned in parliament	0.808	0.949	0.141***	2,083
	(0.394)	(0.220)	(0.018)	
New road constructions (meter/100 inhabitants)	0.823	0.562	-0.261**	7,001
	(3.321)	(1.753)	(0.090)	
Central gov. employees (increase/100 inhab.)	-0.006	0.001	0.007	4,357
	(1.263)	(0.633)	(0.041)	
Inv. funding from central gov. (1000 NOK/inhab.)	2.540	1.893	-0.646***	4,217
	(3.249)	(2.161)	(0.110)	
Latitude	62.356	61.888	-0.467***	7,955
	(3.503)	(3.338)	(0.096)	
Longitude	10.521	10.412	-0.109	7,955
	(4.759)	(4.427)	(0.130)	
Area	762.607	721.375	-41.232	7,955
	(877.973)	(835.182)	(24.010)	
Population (1000)	4.599	17.176	12.577***	7,955
	(4.812)	(26.558)	(0.355)	
Regional capital	0.037	0.146	0.109***	7,955
	(0.188)	(0.353)	(0.006)	
National roads (km)	63.986	75.995	12.009***	7,955
	(41.835)	(47.432)	(1.189)	

Panel B: Party-municipality-level outcomes

	No seat	Seat	Difference	N
Local party support (rel. to rest of district, current election)	-0.001	0.031	0.033***	48,048
	(0.071)	(0.079)	(0.002)	
Δ Local party support (rel. to rest of district, next election)	0.000	-0.005	-0.005***	41,415
	(0.026)	(0.029)	(0.001)	
Local candidate ranked first (next election)	0.060	0.473	0.413***	12,332
	(0.238)	(0.499)	(0.008)	
Local candidate ranked second (next election)	0.091	0.230	0.139***	12,332
	(0.288)	(0.421)	(0.008)	
Hometown mentioned in parliament by legislator from same party	0.325	0.865	0.539***	14,581
	(0.469)	(0.342)	(0.018)	

Note: In panel A, the unit of observation is at the municipality-year level. In panel B, the unit of observation is at the party-municipality-year level.

Table A.2: The effects of local representation on party support and turnout, measured in levels instead of changes

Panel A: Change in local party support (relative to rest of district)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1st tier seat	0.016						
	(0.008)						
2nd tier seat	0.017						
	(0.007)						
1st or 2nd tier seat		0.016	0.016	0.011	0.010	0.010	0.012
		(0.006)	(0.006)	(0.006)	(0.007)	(0.006)	(0.007)
Mean of outcome var.	0.029	0.029	0.029	0.029	0.029	0.029	0.030
R-squared	0.03	0.03	0.06	0.12	0.15	0.16	0.03
Observations	1250	1250	1250	1250	1250	1250	1250

Panel B: Change in local voter turnout (relative to rest of district)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1st tier seat	-0.004						
	(0.005)						
2nd tier seat	0.003						
	(0.005)						
1st or 2nd tier seat		-0.002	-0.002	-0.001	-0.002	-0.001	-0.005
		(0.005)	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)
Mean of outcome var.	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R-squared	0.00	0.00	0.01	0.03	0.06	0.09	0.00
Observations	671	671	671	671	671	671	671
Time fixed effects	No	No	Yes	Yes	Yes	Yes	No
Party fixed effects	No	No	No	Yes	Yes	Yes	No
District fixed effects	No	No	No	No	Yes	Yes	No
Rank fixed effects	No	No	No	No	No	Yes	No
Kernel	Unif.	Unif.	Unif.	Unif.	Unif.	Unif.	Tria.

Note: In panel A, the dependent variable is the party's vote share in the municipality minus its vote share at the district level (excluding the focal municipality) in the next election. The sample is limited to municipalities in which the party has exactly one marginal candidate, defined as those within 5 percentage points from winning a first-tier seat, and no candidate winning a first-tier seat by a larger margin. In panel B, the dependent variable is turnout in the municipality minus turnout at the district level (excluding the focal municipality) in the next election. The sample is limited to municipalities with exactly one marginal candidate (from any party) and no candidate winning a first-tier seat by a larger margin. 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 were in place. Standard errors are based on a cluster-robust covariance matrix, with clustering on the district level.

Table A.3: The effects of local representation on party support and turnout, including municipalities with multiple marginal and/or safe candidates

Panel A: Change in local party support (relative to rest of district)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1st tier seat	0.010						
	(0.003)						
2nd tier seat	0.010						
	(0.003)						
1st or 2nd tier seat		0.010	0.011	0.011	0.011	0.011	0.008
		(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Mean of outcome var.	-0.009	-0.009	-0.009	-0.009	-0.009	-0.009	-0.008
R-squared	0.02	0.02	0.03	0.05	0.09	0.10	0.02
Observations	1311	1311	1311	1311	1311	1311	1311

Panel B: Change in local voter turnout (relative to rest of district)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1st tier seat	-0.001						
	(0.001)						
2nd tier seat	0.002						
	(0.001)						
1st or 2nd tier seat		0.000	0.000	-0.000	-0.000	0.000	0.000
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Mean of outcome var.	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.002
R-squared	0.00	0.00	0.01	0.01	0.03	0.04	0.00
Observations	1311	1311	1311	1311	1311	1311	1311
Time fixed effects	No	No	Yes	Yes	Yes	Yes	No
Party fixed effects	No	No	No	Yes	Yes	Yes	No
District fixed effects	No	No	No	No	Yes	Yes	No
Rank fixed effects	No	No	No	No	No	Yes	No
Kernel	Unif.	Unif.	Unif.	Unif.	Unif.	Unif.	Tria.

Note: In panel A, the dependent variable is the increase from the current to the next election in the party's vote share in the municipality minus its vote share at the district level (excluding the focal municipality). In panel B, the dependent variable is the increase in turnout in the municipality minus turnout at the district level (excluding the focal municipality). In both panels, the sample is restricted to hometowns of a marginal candidate, defined as those within 5 percentage points 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 were in place. Standard errors are based on a cluster-robust covariance matrix, with clustering on the district level.

Table A.4: The effects of local representation on party support and turnout, excluding elections before municipality mergers (1953-1961)

Panel A: Change in local party support (relative to rest of district)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1st tier seat	0.011						
	(0.004)						
2nd tier seat	0.011						
	(0.003)						
1st or 2nd tier seat		0.011	0.011	0.012	0.012	0.012	0.009
		(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Mean of outcome var.	-0.009	-0.009	-0.009	-0.009	-0.009	-0.009	-0.008
R-squared	0.02	0.02	0.02	0.05	0.12	0.12	0.02
Observations	1045	1045	1045	1045	1045	1045	1045

Panel B: Change in local voter turnout (relative to rest of district)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1st tier seat	-0.001						
	(0.003)						
2nd tier seat	0.007						
	(0.002)						
1st or 2nd tier seat		0.002	0.001	0.001	0.001	0.001	0.001
		(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Mean of outcome var.	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
R-squared	0.02	0.01	0.04	0.05	0.09	0.10	0.01
Observations	522	522	522	522	522	522	522
Time fixed effects	No	No	Yes	Yes	Yes	Yes	No
Party fixed effects	No	No	No	Yes	Yes	Yes	No
District fixed effects	No	No	No	No	Yes	Yes	No
Rank fixed effects	No	No	No	No	No	Yes	No
Kernel	Unif.	Unif.	Unif.	Unif.	Unif.	Unif.	Tria.

Note: These specifications exclude observations prior to a number of municipality mergers that occurred during the time period of our main sample (see Figure A.1). In panel A, the dependent variable is the increase from the current to the next election in the party's vote share in the municipality minus its vote share at the district level (excluding the focal municipality). The sample is limited to municipalities in which the party has exactly one marginal candidate, defined as those within 5 percentage points from winning a first-tier seat, and no candidate winning a first-tier seat by a larger margin. In panel B, the dependent variable is the increase in turnout in the municipality minus turnout at the district level (excluding the focal municipality). The sample is limited to municipalities with exactly one marginal candidate (from any party) and no candidate winning a first-tier seat by a larger margin. 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 were in place. Standard errors are based on a cluster-robust covariance matrix, with clustering on the district level.

Table A.5: The effects of local representation on the probability of having a local top candidate in the next election

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1st tier seat	0.297						
	(0.055)						
2nd tier seat	0.467						
	(0.056)						
1st or 2nd tier seat		0.344	0.348	0.289	0.296	0.268	0.318
		(0.054)	(0.055)	(0.052)	(0.051)	(0.055)	(0.054)
Mean of outcome var.	0.307	0.307	0.307	0.307	0.307	0.307	0.324
R-squared	0.10	0.09	0.11	0.20	0.22	0.28	0.10
Observations	1258	1258	1258	1258	1258	1258	1258
Time fixed effects	No	No	Yes	Yes	Yes	Yes	No
Party fixed effects	No	No	No	Yes	Yes	Yes	No
District fixed effects	No	No	No	No	Yes	Yes	No
Rank fixed effects	No	No	No	No	No	Yes	No
Kernel	Unif.	Unif.	Unif.	Unif.	Unif.	Unif.	Tria.

Note: The sample is limited to municipalities in which the party has exactly one marginal candidate, defined as those within 5 percentage points from winning a first-tier seat, and no candidate winning a first-tier seat by a larger margin. 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 are based on a cluster-robust covariance matrix, with clustering on the district level.

Table A.6: The effects of local representation on parliamentary speech mentions

Panel A: Hometown mentioned by any legislator

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1st tier seat	0.140						
	(0.096)						
2nd tier seat	0.132						
	(0.040)						
1st or 2nd tier seat		0.136	0.138	0.149	0.177	0.176	0.140
		(0.064)	(0.064)	(0.071)	(0.073)	(0.076)	(0.072)
Mean of outcome var.	0.900	0.900	0.900	0.900	0.900	0.900	0.894
R-squared	0.05	0.05	0.05	0.07	0.16	0.17	0.07
Observations	221	221	221	221	221	221	221

Panel B: Hometown mentioned by any legislator from the same party

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1st tier seat	0.388						
	(0.041)						
2nd tier seat	0.509						
	(0.040)						
1st or 2nd tier seat		0.453	0.451	0.527	0.522	0.557	0.420
		(0.032)	(0.032)	(0.030)	(0.030)	(0.037)	(0.040)
Mean of outcome var.	0.664	0.664	0.664	0.664	0.664	0.664	0.706
R-squared	0.25	0.24	0.25	0.35	0.40	0.45	0.23
Observations	470	470	470	470	470	470	470
Time fixed effects	No	No	Yes	Yes	Yes	Yes	No
Party fixed effects	No	No	No	Yes	Yes	Yes	No
District fixed effects	No	No	No	No	Yes	Yes	No
Rank fixed effects	No	No	No	No	No	Yes	No
Kernel	Unif.	Unif.	Unif.	Unif.	Unif.	Unif.	Tria.

Note: In the top panel, the dependent variable is a dummy variable for if the hometown of a candidate is mentioned by any legislator in the relevant election period. The sample is limited to municipalities with exactly one marginal candidate (from any party), defined as those within 5 percentage points distance from winning a first-tier seat, and no candidate winning a first-tier seat by a larger margin. In the bottom panel, the dependent variable is a dummy variable for if the hometown of a candidate is mentioned by any legislator from the party of the candidate in the relevant election period. The sample is limited to municipalities in which the party has exactly one marginal candidate, defined as those within 5 percentage points distance from winning a first-tier seat, and no candidate winning a first-tier seat by a larger margin. 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 were in place. Standard errors are based on a cluster-robust covariance matrix, with clustering on the district level.

Table A.7: The effects of local representation on redistributive policy outcomes

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

	(1)	(2)	(3)	(4)	(5)	(6)
	Prev.	Prev.	Curr.	Curr.	Next	Next
1st or 2nd tier seat	0.123	0.032	-0.027	0.077	-0.607	-0.723
	(0.212)	(0.195)	(0.188)	(0.164)	(0.272)	(0.357)
Mean of outcome var.	0.540	0.497	0.544	0.585	0.627	0.615
S.D. of outcome var.	1.89	1.71	1.50	1.56	2.61	2.42
R-squared	0.01	0.07	0.01	0.08	0.01	0.09
Observations	709	709	662	662	622	622

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

	(1)	(2)	(3)	(4)	(5)	(6)
	Prev.	Prev.	Curr.	Curr.	Next	Next
1st or 2nd tier seat	-0.109	-0.129	-0.053	-0.054	0.068	-0.059
	(0.113)	(0.109)	(0.065)	(0.059)	(0.111)	(0.100)
Mean of outcome var.	-0.046	-0.031	0.039	0.008	0.001	0.033
S.D. of outcome var.	0.57	0.54	1.04	0.76	1.47	1.31
R-squared	0.10	0.32	0.03	0.20	0.02	0.09
Observations	417	417	467	467	416	416

Panel C: Investment funding (NOK 2015/inhabitant)

	(1)	(2)	(3)	(4)	(5)	(6)
	Prev.	Prev.	Curr.	Curr.	Next	Next
1st or 2nd tier seat	77.718	462.375	-172.730	-231.389	66.120	187.144
	(337.907)	(407.182)	(356.541)	(561.056)	(330.357)	(284.308)
Mean of outcome var.	2221.073	2102.874	2168.183	2170.322	1860.082	1861.549
S.D. of outcome var.	2575.61	2287.86	2774.08	2698.49	1899.15	1823.18
R-squared	0.01	0.28	0.02	0.16	0.01	0.19
Observations	395	395	440	440	390	390
YearFE	No	Yes	No	Yes	No	Yes
PartyFE	No	Yes	No	Yes	No	Yes
DistrictFE	No	Yes	No	Yes	No	Yes
RankFE	No	Yes	No	Yes	No	Yes
Kernel	Unif.	Tria.	Unif.	Tria.	Unif.	Tria.

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 winning a first-tier seat by a larger margin. 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 are based on a cluster-robust covariance matrix, with clustering on the district level.

Table A.8: The effects of local representation on party support, by government alignment status

Panel A: Candidates from party/parties in government

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1st tier seat	0.008						
	(0.005)						
2nd tier seat	0.010						
	(0.007)						
1st or 2nd tier seat		0.008	0.010	0.011	0.011	0.011	0.006
		(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)
Mean of outcome var.	-0.008	-0.008	-0.008	-0.008	-0.008	-0.008	-0.005
R-squared	0.02	0.02	0.08	0.09	0.12	0.13	0.04
Observations	405	405	405	405	405	405	405

Panel B: Candidates from parties not in government

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1st tier seat	0.012						
	(0.004)						
2nd tier seat	0.012						
	(0.004)						
1st or 2nd tier seat		0.012	0.013	0.013	0.012	0.012	0.010
		(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Mean of outcome var.	-0.009	-0.009	-0.009	-0.009	-0.009	-0.009	-0.009
R-squared	0.02	0.02	0.04	0.06	0.13	0.13	0.03
Observations	845	845	845	845	845	845	845
Time fixed effects	No	No	Yes	Yes	Yes	Yes	No
Party fixed effects	No	No	No	Yes	Yes	Yes	No
District fixed effects	No	No	No	No	Yes	Yes	No
Rank fixed effects	No	No	No	No	No	Yes	No
Kernel	Unif.	Unif.	Unif.	Unif.	Unif.	Unif.	Tria.

Note: The dependent variable is the increase from the current to the next election in the party's vote share in the municipality minus its vote share at the district level (excluding the focal municipality). In panel A, the sample consists of candidates from a party that is in government at the end of the election period (i.e., four years later). In panel B, the sample consists of candidates from a party that is not in government at the end of the period. The sample is further limited to municipalities in which the party has exactly one marginal candidate, defined as those within 5 percentage points from winning a first-tier seat, and no candidate winning a first-tier seat by a larger margin. 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 were in place. Standard errors are based on a cluster-robust covariance matrix, with clustering on the district level.

Appendix B: Distributive policy outcomes

Our first outcome variable related to distributive politics is construction work 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.[36] 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 rather simply 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.

To identify the local effect of national road policies, we use detailed data on constructions on national roads.[37] 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.[38] Given the topology of Norway, with its many fjords and mountains, bridges are a major component of infrastructure investments.

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

[37]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.

[38]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.

Data on the *investment costs* of road projects is not available at the municipality level. Helland and Sørensen (2009) analyze aggregate road investments at the *election district level.* In Figure B.1, we compare their data on investments with our data on constructions at the district level, both cross-sectionally (left panel) and over time within each district (right panel). The relationship is positive and close to proportional, indicating that bridge constructions are a reasonable proxy for local road investments.
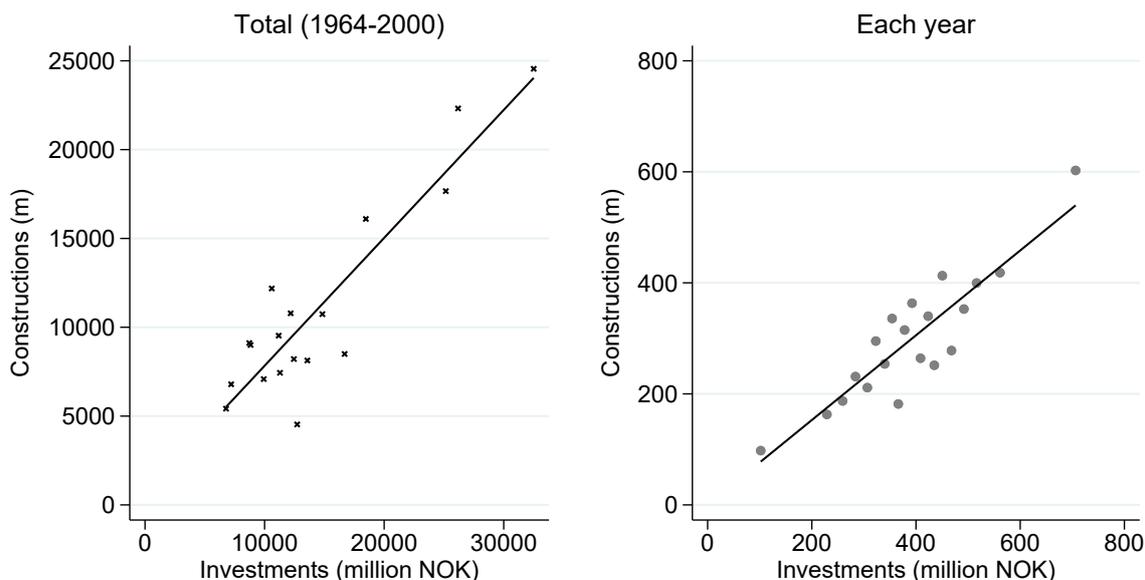
Figure B.1: Bridges on national roads and total road investments in the election district

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 panel compares total constructions and investments over all years 1964-2000. Each marker (x) in this panel represents one district. The right panel compares constructions and investments per year, controlling for district fixed effects. Each marker (dot) in this panel is a binned scatterpoint containing roughly the same number of observations. The linear regression line is based on the underlying data, not the binned scatterpoints.

Our second outcome variable for redistribution is the number of jobs connected to the central government located within a local municipality. The core government ministries and many of the central government agencies are located in 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.[39] Information on the localization of central government jobs is attached to the national budget documents, and is provided by the 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 candidate sample.[40] The left panel of Figure B.2 shows that most municipalities have at least one central government position per 100 inhabitants, and some have many more. The right 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.

Finally, for our third outcome measure, we explore the impact of local representation on fiscal transfers from the central government. While most of the grant allocations from the central government follow objective criteria, we focus on a type of grant where the central government has quite a bit of discretion: 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 legislative period between elections starting with 1974-1977 and ending with 2010-2013. In sum, all three measures capture distributive policies which are likely to matter for local welfare.

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[39]Mo i Rana was home to the *Norsk Jernverk* public steel company until 1988, when it was divided and privatized. 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 collects fines and debts to the central government (Statens Innkrevingssentral). 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.

[40]Until 1998, government positions were registered in October, but have subsequently 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.
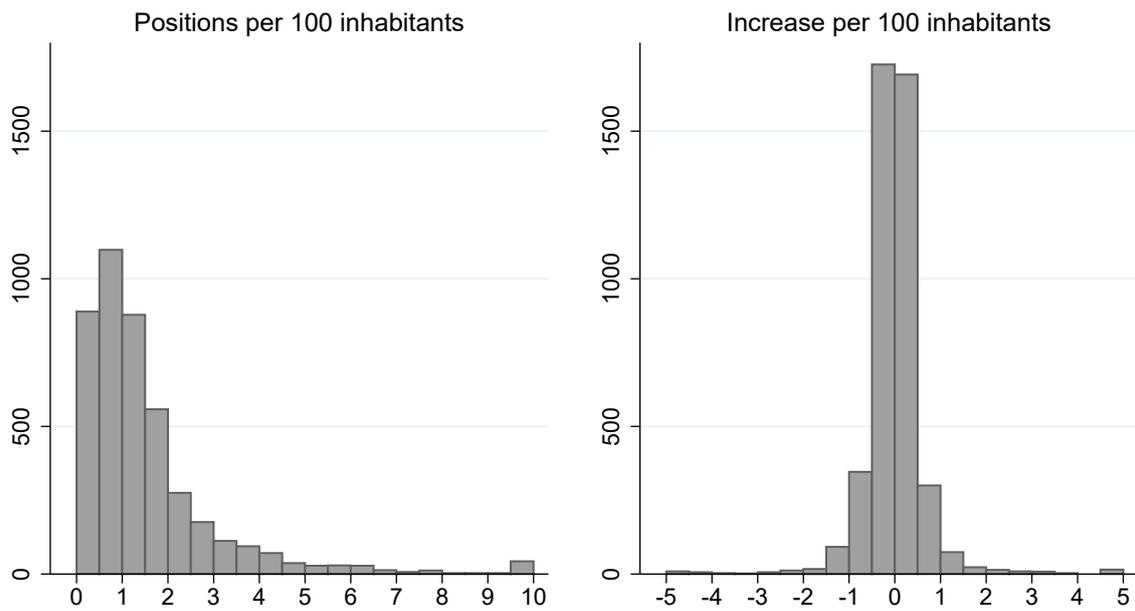
Figure B.2: Central government jobs in the municipality

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, censored at −5 and +5 employees per 100 inhabitants. Each bar has a width of 0.5. The sample consists of election periods from 1973-1977 to 2009-2013.