

Larger Legislatures and the Cost of Political Brokerage: Evidence from Brazil

Appendix for Online Publication

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A TABLES

Table A.1: Maximum number of council members, by population

Population Above... (in thousand)	Council Increase at the discontinuity	Maximum Council Size	Municipalities just below	Municipalities just above
15	22.2%	11	1269	702
30	18.2%	13	381	231
50	15.4%	15	105	85
80	13.3%	17	52	34
120	11.8%	19	20	10
160	10.5%	21	9	7
300	9.5%	23	6	1
450	8.7%	25	0	0
600	8.0%	27	1	0
750	7.4%	29	0	0
900	6.9%	31	0	0
1050	6.5%	33	0	0
1200	6.1%	35	0	0
1350	5.7%	37	0	0
1500	5.4%	39	0	0
1800	5.1%	41	0	0
2400	4.9%	43	0	0
3000	4.7%	45	0	0
4000	4.4%	47	0	0
5000	4.3%	49	0	0
6000	4.1%	51	0	0
7000	3.9%	53	0	0
8000	3.8%	55	0	0

For a population below 15,000 the council size is capped at 9 members. This is also the minimum for all municipalities. The Table includes all municipalities in the sample that have a population within 7,500 of one of the thresholds.

Table A.2: RD effects in the first stage

	(1)	(2)	(3)	(4)	(5)
RD Effect	1.169*	1.135*	0.919*	0.923*	0.799*
	(0.138)	(0.136)	(0.201)	(0.198)	(0.232)
Pre-Treatment Mean	9.920	9.920	10.221	10.149	10.266
Bandwidth	3.52	3.52	1.76	3.90	5.11
Observations	1308	1308	622	1453	2008
Bandwidth rule	optimal	optimal	optimal/2	optimal	optimal
Demographic covariates	N	Y	N	N	N
Polynomial	linear	linear	linear	quadratic	cubic

†p<0.1, *p<0.05. The dependent variable is the number of council seats in the municipality. Standard errors are heteroskedasticity robust and presented in parenthesis. Pre-treatment mean is the control average at the discontinuity.

Table A.3: Balance of covariates

Dependent variable	(1)	(2)	(3)
Gender share	-0.148	-0.212	-0.193
(2010 IBGE census)	(0.156)	(0.136)	(0.126)
Urban share	-0.133	1.014	0.212
(2010 IBGE census)	(2.307)	(1.861)	(1.134)
Past pc budget	-0.033	-0.015	-0.022
(log)	(0.027)	(0.022)	(0.017)
Health and Education spending	-0.002	-0.002	-0.002
(past share of budget)	(0.009)	(0.008)	(0.007)
Garbage collection	-0.938	0.519	-0.354
(2010 IBGE census)	(2.409)	(1.584)	(0.944)
Piped Water	-0.018	1.172	0.460
(2010 IBGE census)	(2.077)	(1.796)	(1.385)
Semi-arid location	0.018	0.011	0.010
(binary, 1=semi-arid)	(0.047)	(0.033)	(0.030)
2012 pc GDP	-0.019	-0.017	-0.020
(log)	(0.015)	(0.013)	(0.013)
Number of voters	0.005	0.028	0.057
(log)	(0.081)	(0.055)	(0.037)
Metropolitan area	0.053	0.032	0.034
(binary, 1=metropolitan)	(0.048)	(0.040)	(0.040)
Literacy rate	-0.005	-0.003	-0.005
(2010 census)	(0.010)	(0.005)	(0.004)
State fixed effects	N	Y	Y
Other covariates	N	N	Y

†p<0.1, *p<0.05. Standard errors are heteroskedasticity robust and presented in parenthesis. All regressions include fixed-effects for the assignment window. The bandwidth is 3,520 for all regressions, in line with the first stage shown in Figure 3. The specification in column (3) also every other covariate shown in this Table as a control, with the exception of the variable used as the outcome.

Gender share: share of male in the population (IBGE Census 2010); **Urban share:** share of urban population (IBGE Census 2010); **Past pc budget:** Local budget expenses per inhabitant (Finbra, average of 2009-2012). It only includes municipalities that report at least two years of data within the 4-year mayoral tenure (Finbra); **Health and Education spending:** Share of the above budget allocated to health and education (Finbra); **Garbage collection:** share of households with garbage collection (IBGE Census 2010); **Piped Water:** share of households with access to piped water (IBGE Census 2010); **Semi-arid location:** indicates whether the municipality belongs in the semi-arid region (IBGE); **2012 pc GDP:** per capita GDP in 2012 (IBGE); **Number of voters:** Number of registered voters in 2012 (TSE); **Metropolitan area:** Indicates whether municipality is part of a metro area (IBGE); **Literacy rate:** Share of adults that are literate (IBGE Census 2010).

Table A.4: Correlation between council size and mayors' partisanship at the discontinuity

Dependent variable	(1)	(2)	(3)
PT's federal coalition	0.032 (0.052)	0.001 (0.052)	0.019 (0.026)
PT mayor	0.014 (0.038)	0.014 (0.041)	-0.007 (0.025)
PMDB mayor	0.012 (0.042)	0.005 (0.043)	-0.011 (0.025)
PSDB mayor	0.013 (0.036)	0.022 (0.037)	0.022 (0.032)
PSD mayor	-0.015 (0.029)	-0.014 (0.029)	-0.017 (0.022)
PSB mayor	-0.003 (0.025)	0.001 (0.026)	0.007 (0.023)
PP mayor	-0.011 (0.031)	-0.019 (0.030)	-0.019 (0.021)
PDT mayor	0.007 (0.026)	-0.003 (0.027)	-0.010 (0.021)
State effects and demographic covariates	N	Y	Y
Other covariates	N	N	Y

†p<0.1, *p<0.05. The dependent variable is always a dummy that indicates whether the mayor elected in 2012 belongs to the party in question (or to PT's federal coalition, in the case of the first line). All regressions include fixed-effects for the assignment window. The bandwidth is 3,520 for all regressions, in line with the first stage shown in Figure 3. Standard errors are heteroskedasticity robust and presented in parenthesis. The demographic covariates are described in Table A.3. The specification in column (3) also every other variable shown in this Table as a control, with the exception of the variable used as the outcome. All data comes from TSE.

Table A.5: Loss of electoral strength by the local incumbent party (excludes: 50, 300 pop)

Dependent variable: vote percentage	(1)	(2)	(3)
Vote Share Index (aggregates the elections below)	-4.479* (1.473)	-4.393* (1.529)	-3.843* (1.480)
Observations	1032	1032	1032
<i>INDIVIDUAL ELECTION OUTCOMES</i>			
Gubernatorial (2014)	-4.769* (2.248)	-4.511† (2.302)	-4.143† (2.248)
Observations	1207	1207	1207
Presidential (2014)	-4.928* (1.999)	-3.785 (2.439)	-3.649 (2.416)
Observations	1209	1209	1209
Mayoral (2016)	-3.367† (1.761)	-3.297† (1.789)	-2.700 (1.750)
Observations	1034	1034	1034
Demographic covariates	Y	Y	N
Political Party covariates	Y	N	N

†p<0.1, *p<0.05. The dependent variable is the percentage of total votes in the municipality obtained by the candidate supported by the mayor's party in each election. The index aggregates the three election in the Table. Standard errors are heteroskedasticity robust and presented in parenthesis. The number of observations is shown right below. The regressions include fixed-effects for the assignment window, state dummies, and the covariates listed Table A.3 and Table A.4. The bandwidth is 3,520, in line with the first stage shown in Figure 3. Excludes the assignment windows with population thresholds of 50,000 and 300,000.

Table A.6: Loss of electoral strength by the local incumbent party (includes: 15 pop)

Dependent variable: vote percentage	(1)	(2)	(3)
Vote Share Index (aggregates the elections below)	-5.624* (1.836)	-5.715* (1.945)	-5.184* (1.939)
Observations	735	735	735
<i>INDIVIDUAL ELECTION OUTCOMES</i>			
Gubernatorial (2014)	-5.471† (2.982)	-5.415† (3.105)	-5.281† (3.085)
Observations	873	873	873
Presidential (2014)	-5.297* (2.610)	-3.817 (3.249)	-3.703 (3.299)
Observations	875	875	875
Mayoral (2016)	-4.327* (2.194)	-4.562* (2.255)	-3.700† (2.242)
Observations	737	737	737
Demographic covariates	Y	Y	N
Political Party covariates	Y	N	N

†p<0.1, *p<0.05. The dependent variable is the percentage of total votes in the municipality obtained by the candidate supported by the mayor's party in each election. The index aggregates the three election in the Table. Standard errors are heteroskedasticity robust and presented in parenthesis. The number of observations is shown right below. The regressions include fixed-effects for the assignment window, state dummies, and the covariates listed Table A.3 and Table A.4. The bandwidth is 3,520, in line with the first stage shown in Figure 3. Includes only the assignment window with population threshold of 15,000.

Table A.7: Loss of electoral strength by the local incumbent party (placebo)

Dependent variable: vote pct.	(1)	(2)	(3)
Vote Share Index (aggregates the elections below)	-0.072 (1.561)	-0.155 (1.664)	-0.101 (1.676)
Observations	883	883	883
<i>INDIVIDUAL ELECTION OUTCOMES</i>			
Gubernatorial (2010)	0.645 (2.465)	0.688 (2.488)	0.808 (2.431)
Observations	1102	1102	1102
Presidential (2010)	0.310 (2.512)	0.396 (2.874)	0.300 (2.906)
Observations	1146	1146	1146
Mayoral (2012)	-0.294 (1.806)	-0.319 (1.842)	0.042 (1.823)
Observations	1144	1144	1144
Demographic covariates	Y	Y	N
Political Party covariates	Y	N	N

†p<0.1, *p<0.05. The dependent variable is the percentage of total votes in the municipality obtained by the candidate supported by the mayor's party in each election. Standard errors are heteroskedasticity robust and presented in parenthesis. The regressions include fixed-effects for the assignment window, state dummies, and the covariates listed Table A.3 and Table A.4, with the exception of the dummy for PP mayors, given that the party did not elect a single mayor in 2008 in the municipalities within the bandwidth. Accordingly, the value of these covariates is measured in the following periods: 2010 IBGE Census (Gender share, Urban share, Piped Water, Garbage collection, Literacy rate); 2008 by TSE (Number of voters, all variables in Table A.4); 2008 by IBGE (GDP); and 2005-2008 by FINBRA (Past pc budget and Health and Education spending). The bandwidth is 3,520, in line with the first stage shown in Figure 3.

Table A.8: Other political outcomes

Dependent variable	(1)	(2)	(3)
2012 ELECTION			
Mayoral candidates (number)	0.014 (0.104)	0.048 (0.107)	0.073 (0.087)
Mayor's vote (pct)	-0.009 (0.014)	-0.010 (0.014)	-0.008 (0.012)
Parties in the winning coalition (log)	0.218 (0.318)	0.376 (0.326)	0.266 (0.295)
Share of elected coalition councilors aligned (with mayor's 2014 gubernatorial coalition)	-0.061* (0.031)	-0.062† (0.032)	-0.045 (0.028)
Share of elected coalition councilors aligned (with mayor's 2014 presidential coalition)	-0.040 (0.031)	-0.049 (0.032)	-0.018 (0.028)
2016 ELECTION			
Mayoral candidates (number)	-0.054 (0.117)	-0.012 (0.115)	-0.075 (0.096)
Mayor's vote (pct)	-0.006 (0.013)	-0.006 (0.013)	-0.008 (0.012)
Parties in the winning coalition (log)	-0.062 (0.349)	0.017 (0.363)	-0.102 (0.344)
Share of councilors that run again in 2016 (of all elected)	-0.022 (0.019)	-0.016 (0.019)	-0.014 (0.018)
Share of reelected councilors (of the ones that run in 2016)	0.020 (0.023)	0.018 (0.022)	0.024 (0.017)
Share of reelected coalition councilors (of the ones that run in 2016)	0.003 (0.032)	0.006 (0.033)	-0.019 (0.027)
Incumbent Party does not participate (binary variable, 1=does not participate)	0.008 (0.031)	0.001 (0.033)	-0.003 (0.032)
State effects and demographic covariates	N	Y	Y
Other covariates	N	N	Y

†p<0.1, *p<0.05. Standard errors are heteroskedasticity robust and presented in parenthesis. All regressions include fixed-effects for the assignment window. The demographic covariates are described in Table A.3. The specification in column (3) also every other covariate shown in this Table as a control, with the exception of the variable used as the outcome. The bandwidth is 3,520 for all regressions, in line with the first stage shown in Figure 3.

Continues...

Variable description (All data comes from TSE):

Mayoral candidates: Number of candidates in 2012 or 2016; **Mayor's vote:** vote share (in %) of the winning mayor in 2012 and 2016; **Share of elected coalition councilors aligned:** Share of the elected coalition councilors in 2012 from parties that also supports the same gubernatorial or presidential candidate as the mayor's party in 2014; **Parties in the winning coalition:** Number of parties in the pre-election coalition of the election winner; **Share of councilors that run again in 2016:** Share of all councilors elected in 2012 that decide to run for reelection in 2016; **Share of reelected councilors:** Share of all councilors running in 2016 that won reelection; **Share of reelected coalition councilors:** Share of all coalition councilors running in 2016 that won reelection; **Incumbent Party does not participate:** Indicates whether or not the incumbent party in the municipality supported any candidate in the 2016 mayoral race.

Table A.9: Loss of electoral strength by the local incumbent party (robustness)

Dep. variable: vote percentage	(1)	(2)	(3)	(4)
Vote Share Index (aggregates the elections below)	-5.284*	-4.674*	-4.056*	-4.734*
	(1.490)	(1.503)	(1.332)	(1.583)
Observations	1114	1114	1241	1716
<i>INDIVIDUAL ELECTION OUTCOMES</i>				
Gubernatorial (2014)	-5.592*	-4.936*	-4.540*	-5.526*
	(2.488)	(2.266)	(2.037)	(2.405)
Observations	1305	1305	1450	2004
Presidential (2014)	-5.274*	-4.648*	-4.016*	-4.715*
	(2.241)	(2.005)	(1.805)	(2.120)
Observations	1307	1307	1453	2008
Mayoral (2016)	-4.359*	-3.848*	-3.196†	-3.795†
	(1.976)	(1.877)	(1.674)	(1.958)
Observations	1116	1116	1244	1720
Bandwidth	3.52	3.52	3.90	5.11
Estimation	Reduced-form	FRD	FRD	FRD
Polynomial	linear	linear	quadratic	cubic

† $p < 0.1$, * $p < 0.05$. The dependent variable is the percentage of total votes in the municipality obtained by the candidate supported by the mayor's party in each election. Standard errors are heteroskedasticity robust and presented in parenthesis. All regressions include fixed-effects for the assignment window, as well as state dummies, and demographic and political party covariates described in Table A.3 and Table A.4. The reduced-form estimation corresponds to the sharp RD case, i.e., the direct effect of the treatment assignment on the outcome.

Table A.10: Loss of electoral strength by the local incumbent party (with congress)

Dependent variable: vote percentage	(1)	(2)	(3)
Vote Share Index (aggregates the elections below)	-4.605*	-4.690*	-4.178*
Observations	1114	1114	1114
<i>INDIVIDUAL ELECTION OUTCOMES</i>			
Gubernatorial (2014)	-4.936*	-4.904*	-4.573*
Observations	1305	1305	1305
Presidential (2014)	-4.648*	-4.181†	-3.918
Observations	1307	1307	1307
Mayoral (2016)	-3.848*	-3.714*	-3.089†
Observations	1116	1116	1116
Congressional (2014)	-4.038†	-3.690	-3.852
Observations	1307	1307	1307
Demographic covariates	Y	Y	N
Political Party covariates	Y	N	N

† $p < 0.1$, * $p < 0.05$. The dependent variable is the percentage of total votes in the municipality obtained by the candidate supported by the mayor's party in each election. Standard errors are heteroskedasticity robust and presented in parenthesis. The number of observations is shown right below. The regressions include fixed-effects for the assignment window, state dummies, and the covariates listed Table A.3 and Table A.4. The bandwidth is 3,520, in line with the first stage shown in Figure 3.

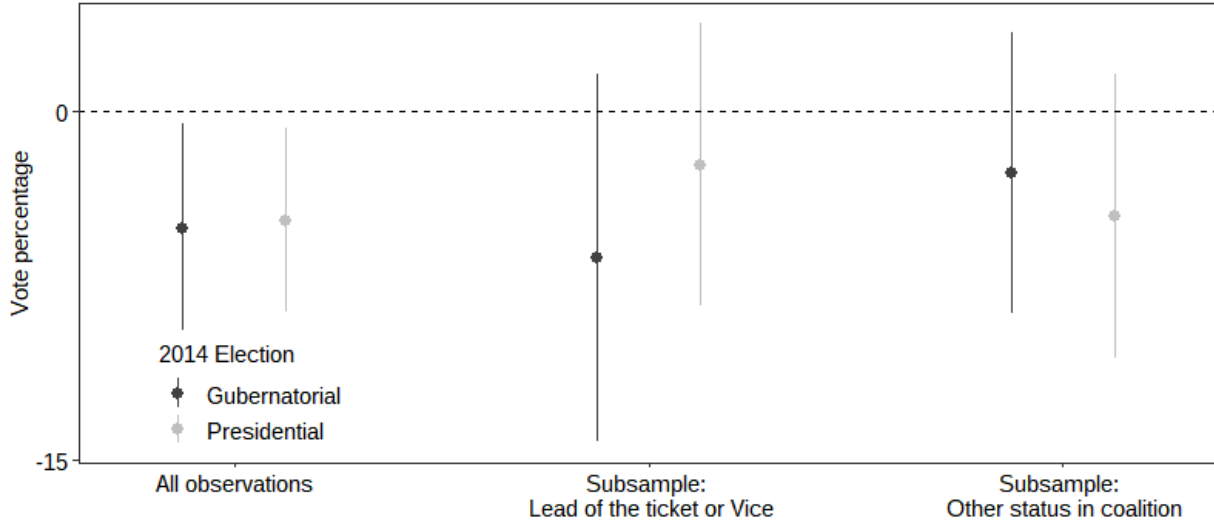
Table A.11: Heterogeneity of electoral effects, by budget

Sample split:	by Budget		by Alignment	
2014 Election:	Governor	President	Governor	President
Dependent variable: vote percentage of the candidate supported by the mayor's party				
Low Budget Sample	-7.450† (4.116)	-8.622* (3.566)	-7.010* (3.305)	-6.419* (3.023)
Observations	649	650	961	961
High Budget Sample	-2.509 (3.109)	-0.904 (2.955)	-1.012 (3.146)	-1.182 (2.604)
Observations	649	650	344	346

† $p < 0.1$, * $p < 0.05$. The coefficients are the effects of one additional seat for each sub-sample. Standard errors are heteroskedasticity robust and presented in parenthesis. The number of observations for each subsample is shown right below. The regressions include fixed-effects for the assignment window, state dummies, and the covariates listed Table A.3 and Table A.4. The bandwidth is 3,520, in line with the first stage shown in Figure 3. The first two columns have the sample split by the median value of the per capita municipal budget in 2013-2016. The last two columns have the sample split by the following proxy for access to budget resources: party alignment between the elected mayor and the governor and president in 2012 (i.e., the high budget sample has municipalities where the mayor's party is part of both the gubernatorial and presidential governing coalitions).

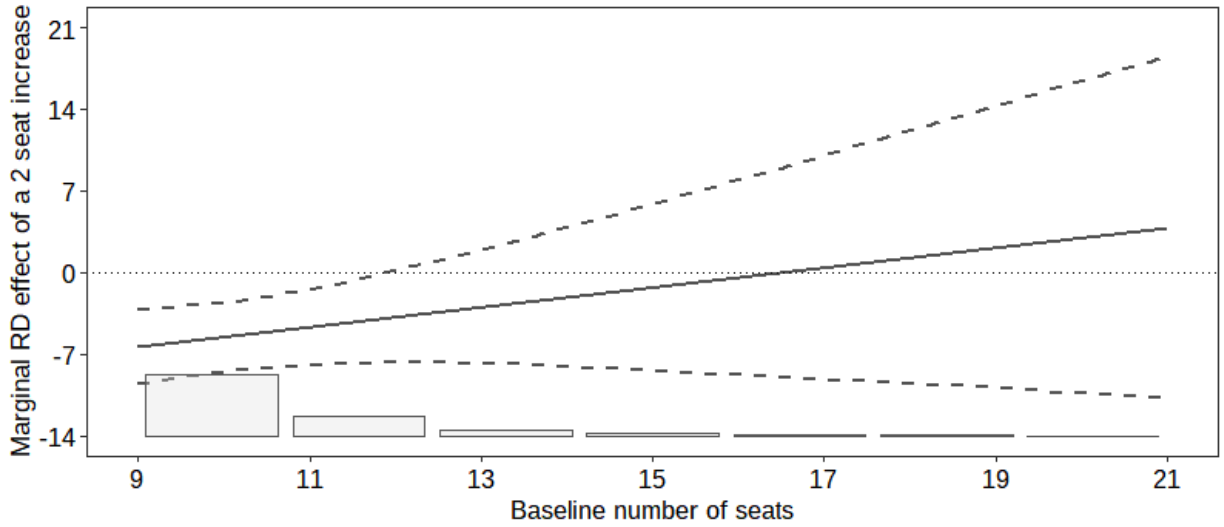
B FIGURES

Figure A.1: Heterogeneity in electoral losses, by status in higher coalitions



The coefficients represent the effect of council size on each election (outcomes as in Table 1). The plots show the 95% confidence intervals. As it is standard, the estimation is done using a single regression where the independent variable that measures the council seat number ($SE\hat{A}T_{i_w}$ in equation 2) is also interacted with a dummy that indicates whether the observation belongs to the “high share” sample. As usual, both these variables have now as instruments the treatment indicator T_{i_w} (as before), and its interaction with the dummy described above. Standard errors are heteroskedasticity robust. The first coefficient for each elections includes all observations; the second only captures cases where the mayor’s party also occupied one of the top positions in the gubernatorial or presidential coalition that it supported (governor or vice-governor, for example); the third captures the cases where the mayor’s party had any other status in the coalition. The regression includes fixed-effects for the assignment window, state dummies, and the covariates listed Table A.3 and Table A.4. The bandwidth is 3,520, in line with the first stage shown in Figure 3.

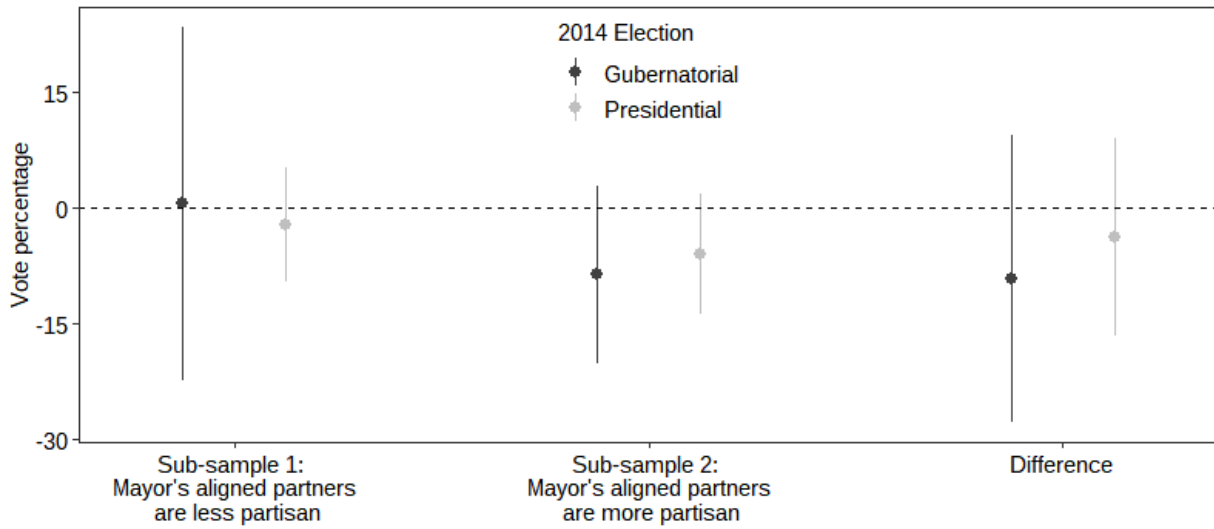
Figure A.2: Heterogeneity in electoral losses, by status in higher coalitions



The line represent the treatment effect at the discontinuity – an increase in 2 council seats – on the electoral results index, and how it changes as the baseline number of seats increases in the sample (these are shown in the x-axis). The dotted lines show the heteroskedasticity robust 95% confidence intervals. The columns are the share of the sample at each baseline number of seats shown in the x-axis.

The regression includes state fixed-effects and the covariates listed in Table A.3 and Table A.4. The bandwidth is 3,520, in line with the first stage shown in Figure 3. The estimation here is the reduced-form equation (equation 1), where the (i) treatment indicator T_{iw} , (ii) the running variable; and (iii) their interaction are all interacted with the baseline number of seats for each different assignment window (for example: for the 15,000 population assignment window, the baseline council size was 9. For the 30,000 window, it was eleven). The outcome is the electoral results index.

Figure A.3: Heterogeneity in electoral losses, by partisanship of aligned councilors



The coefficients represent the effect of council size on each election. The plots show the 95% confidence intervals. As it is standard, the estimation is done using a single regression where the independent variable that measures the council seat number ($SE\hat{A}TS_{i_w}$ in equation 2) is also interacted with a dummy that indicates whether the observation belongs to the sub-sample 2. Both these variables have now as instruments the treatment indicator T_{i_w} (as before), and its interaction with the dummy described above. Standard errors are heteroskedasticity robust. The regressions include fixed-effects for the assignment window, state dummies, and the covariates listed Table A.3 and Table A.4. The bandwidth is 3,520, in line with the first stage shown in Figure 3. The sub-samples are split by the median value of the share of the aligned coalition councilors elected in 2012 that belong to the mayor's party. Alignment is defined for each election separately (state or national), and the regression also controls for the total number of aligned councilors on each case.