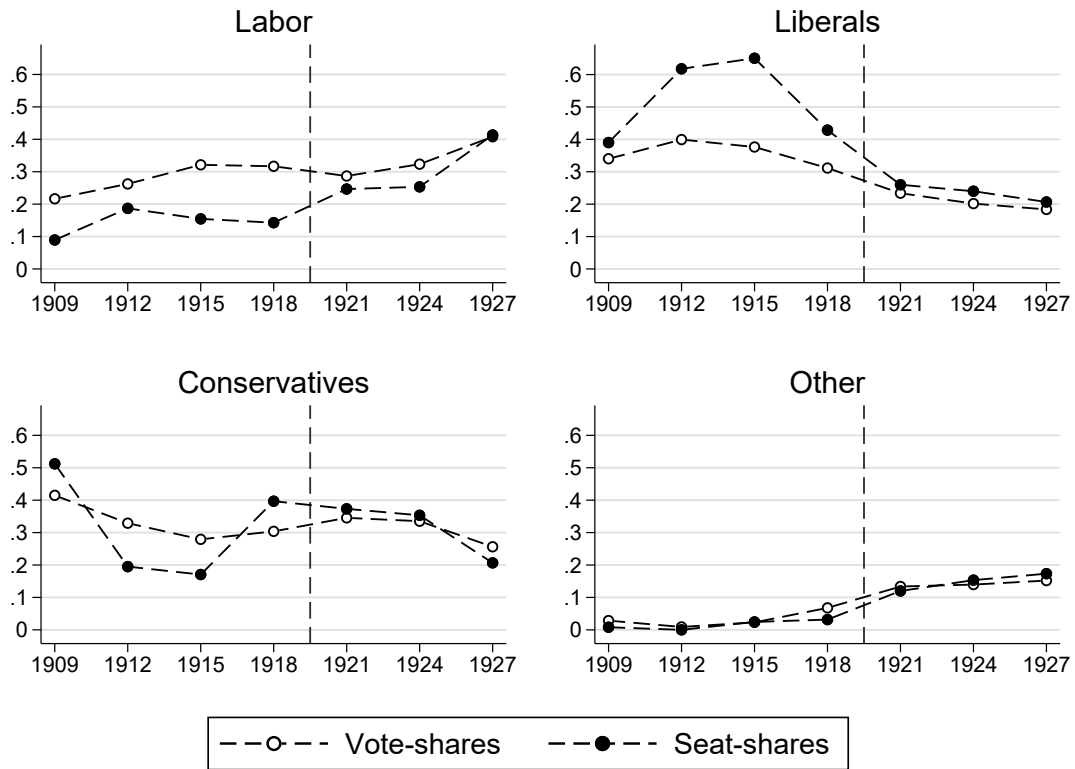# Electoral Reform and Strategic Coordination

*British Journal of Political Science*

Online Appendix

Jon H. Fiva and Simon Hix

Figure A.1: Vote-shares and seat-shares across blocs

Note: The figure shows national vote-shares (white) and seat-shares (black) for the four political blocs over the 1909 to 1927 period. The introduction of PR is marked with the dashed vertical line. The Social Democratic Labor Party of Norway, which ran in the 1921 and 1924 elections, and the Communist Party, which entered the political arena in 1924, are included in the Labor Party bloc. In the pre-reform period, vote-shares based on the first round are reported.

Figure A.2: The (effective) number of parties before and after PR
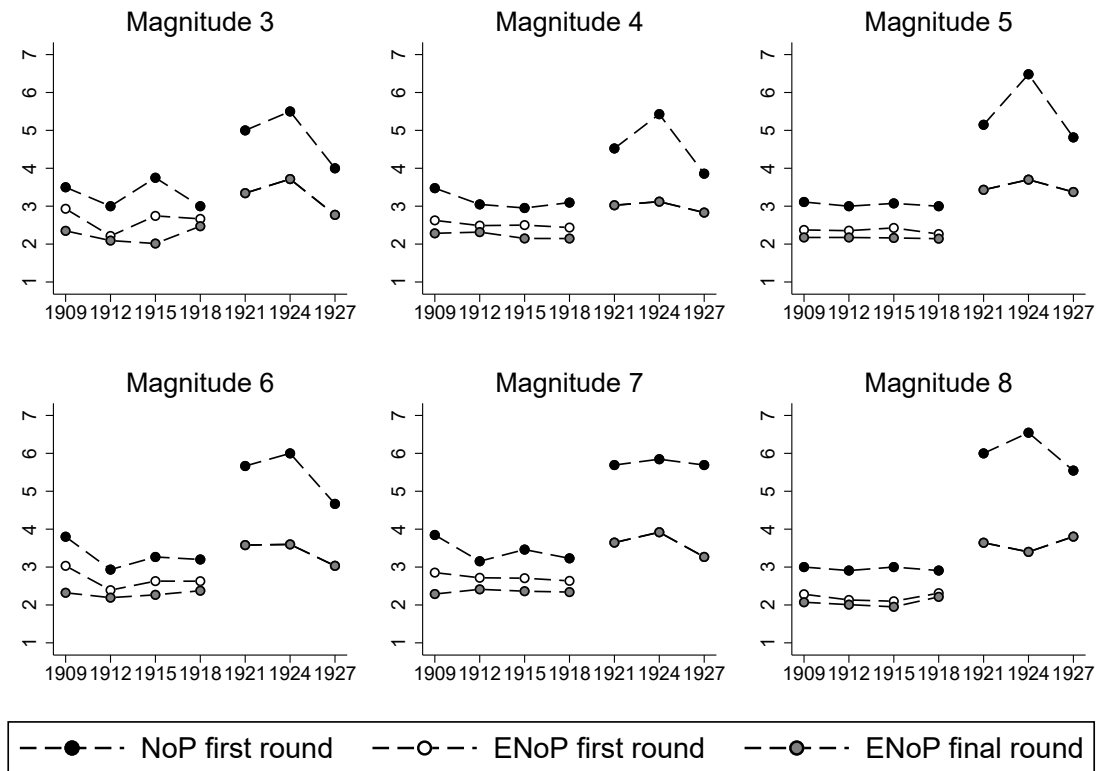
Note: The figure shows the average number of (effective) parties in each election by post-reform district magnitude. Two-round elections were used from 1909-1918, and proportional representation from 1921-1927. In the pre-reform period, we report the effective number of parties based on both first (white) and final (gray) round vote-shares. The data set is based on the pre-reform district structure.

Figure A.3: Fraction of SMDs Contested by Party
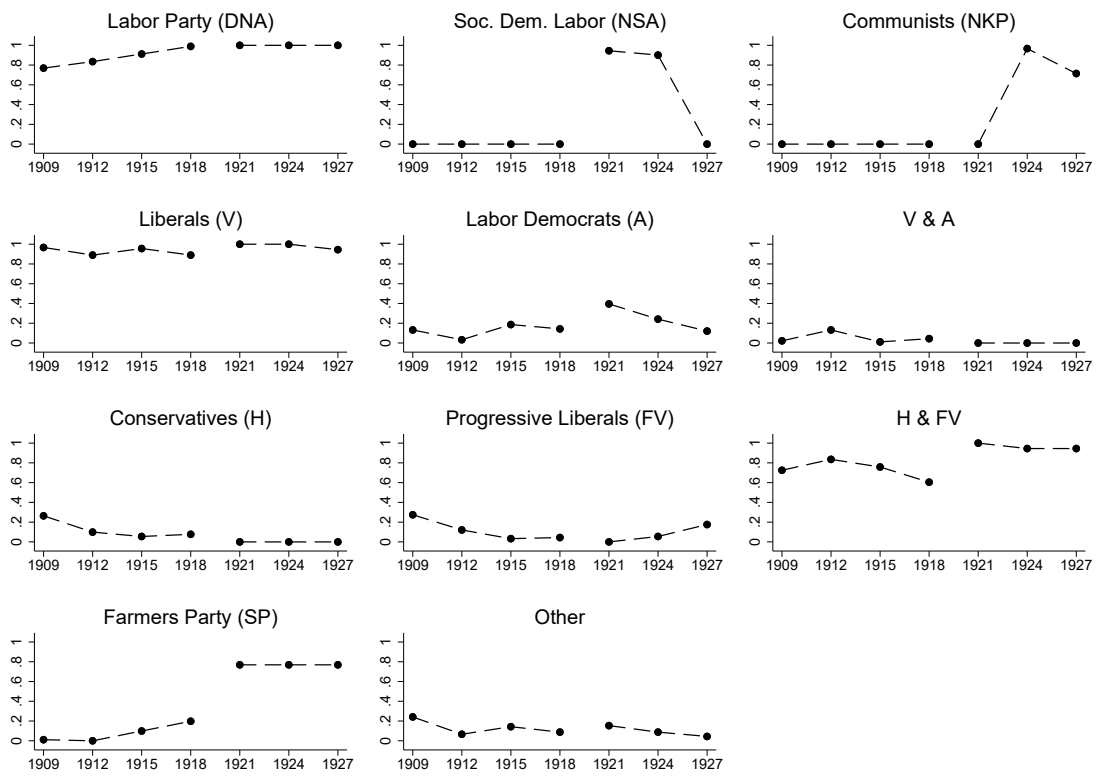
Figure A.4: Example of pre-reform vote counts: Nordland city district

|	1ste valg			Omvalg ($^{11}/_{11}$)		
Bodø og Narvik. (4 499 stemmeberettigede.) Repræsentant:	Bodø	Narvik	Sum	Bodø	Narvik	Sum
Owe, O. C., apoteker, Bodø . . . . H & FV (FV)	826	523	1349	1105	809	1914
Jørstad, E., redaktør, Bodø . . . . S	369	597	966	443	661	1104
Engen, L., frk., fotograf, Bodø . . . . . . T (V)	269	57	326	-	-	-
Sund, H. R. O., statsadvokat, Bodø V	77	117	194	-	-	-
Spredte (1ste valg 1 S, 1 V; omvalg 2 FV, 1 T)	-	2	2	1	2	3
	1541	1296	2837	1549	1472	3021

Note: Example comes from the 1918 election in Bodøand Narvik, the City District in Nordland County, which is labelled 'District A' in Figure 1. V = Liberals, S = Labor Party, H = Conservatives, FV = Progressive Liberals. The excerpt is from `Haffner, Vilhelm and P. A. Wessel-Berg (1919).` `Stortingsvalget 1918. Vol. 150 Kristiania: Aschehoug and Co.`

Figure A.5: Example of pre-reform vote counts: Nordland county 2nd district

|	Vefsn	Hatfjelldal	Dønnes	Nesna	Hemnes	Mo	Lurøy	Træna	Mosjøen	Sum
2den kreds, Nordre Helgeland. (11 998 stemmeberettigede.) Repræsentant, 1ste valg:										
Bolstad, P., lærer og gaardbruker, Hatfjelldal . . S	397	128	31	200	389	825	25	8	278	2382
Kulstad, N. J. A. M., gaardbruker, Vefsn V	523	178	57	141	351	192	103	26	135	1796
Sand, J. W. A., kirkesanger, Dønnes . . . . . V (L)	178	2	132	207	122	35	140	8	2	975
Ytteren, P. Pedersen, gaardbruker, Mo . H & FV (FV)	19	-	29	21	49	175	14	2	84	396
Spredte (1 L, 3 S, 48 V¹)	33	1	1	-	10	2	1	2	2	52
	1150	309	250	569	921	1229	283	46	501	5601
Omvalg:										
Kulstad V	930	248	180	401	678	363	243	77	191	3572
Bolstad . . . . S	507	170	66	207	475	1011	35	18	340	2983
Ytteren . . . . H & FV	27	1	20	7	28	131	11	2	90	326
Spredte (1 FV, 2 S, 36 V, 3 ukj.)	13	1	3	2	4	1	15	1	-	42
	1477	420	269	617	1185	1506	304	98	621	6923

Note: Example comes from the 1918 election in Nordre Helgeland, the 2nd District in Nordland County, which is labelled 'District B' in Figure 1. V = Liberals, S = Labor Party, H = Conservatives, FV = Progressive Liberals. The excerpt is from `Haffner, Vilhelm and P. A. Wessel-Berg (1919). Stortingsvalget 1918. Vol. 150 Kristiania: Aschehoug and Co.`

Figure A.6: Candidates' occupational background by party bloc over time
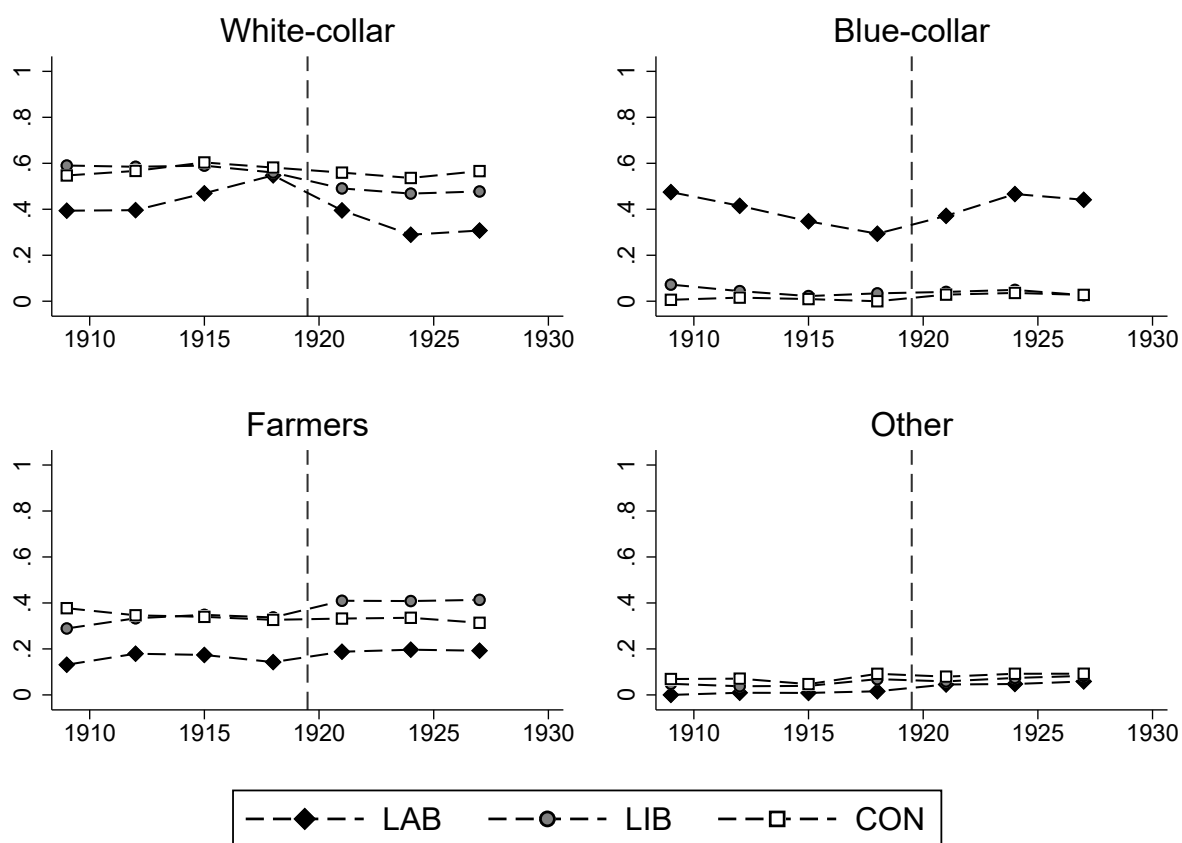
Note: The figure shows, for each bloc, the nation-wide fraction of candidates belonging to four different occupation categories: white-collar workers (ISCO codes 1, 2, 3, 4, and 5); farmers (ISCO code 6); blue-collar workers (ISCO codes 7, 8, and 9); and a residual "other" category (including armed forces [ISCO code 10], housewives, students, and pensioners). We use candidates' first-listed occupation on the ballot (if more than one occupation is listed). Data from Fiva and Smith (2017) (N=5055).

Figure A.7: Vote-trading in reform and non-reform years: Liberal advantage over Labor
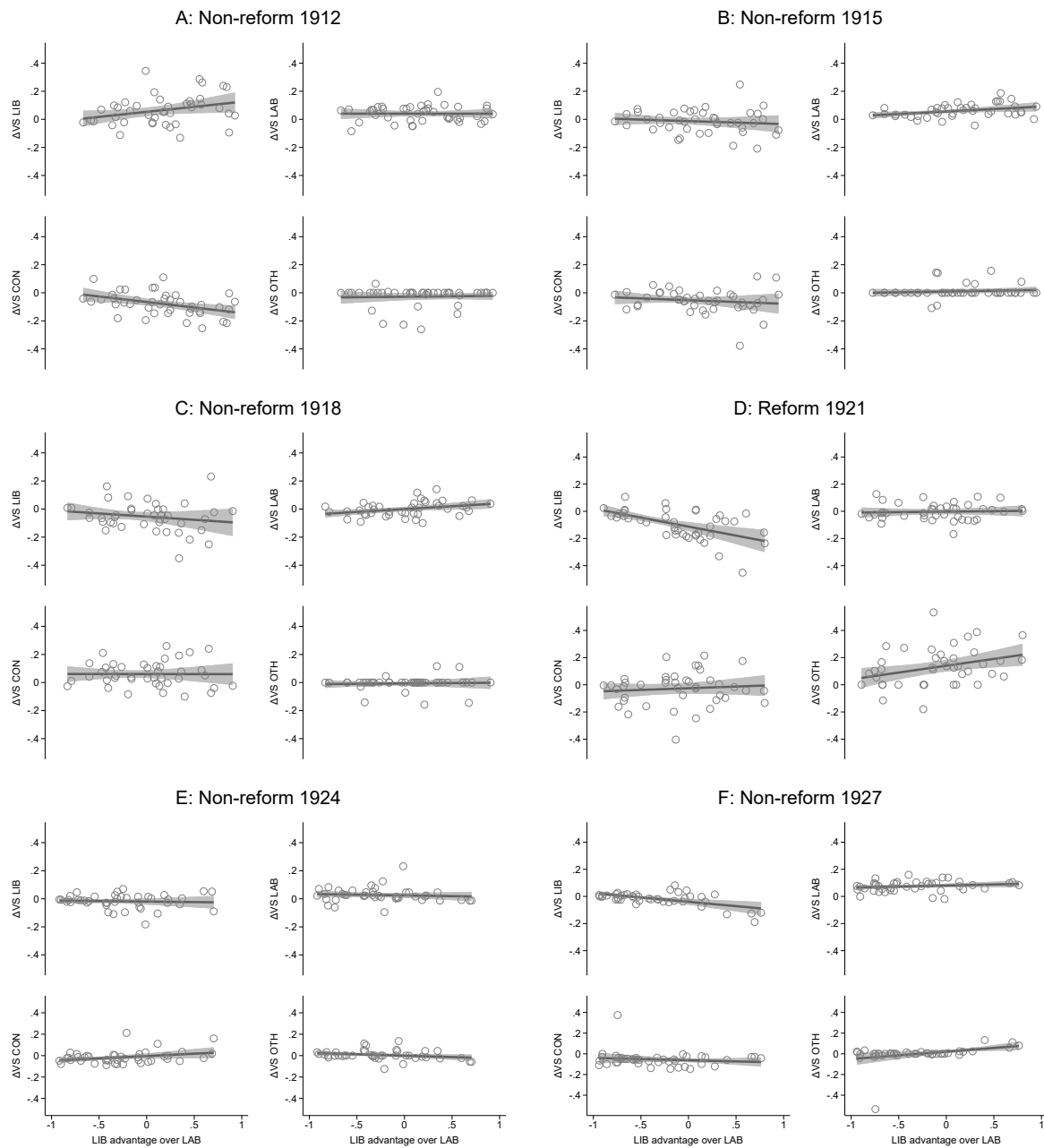
Note: The scatterplots and fitted lines correspond to specification (5), (6), (7), and (8) of Table 1. The y-axes measure the percentage point change in vote-share from year t-3 to year t for the bloc given in the title of the sub-panel. The x-axes measure the Liberal advantage over Labor in year t-3. In the pre-reform period we use first round vote-shares. The sample is restricted to 'SMDs' where the three dominating blocs are participating in all election years. Shaded areas represent 95% confidence intervals based on robust standard errors.

Figure A.8: Vote-trading in reform and non-reform years: Labor advantage over Conservatives
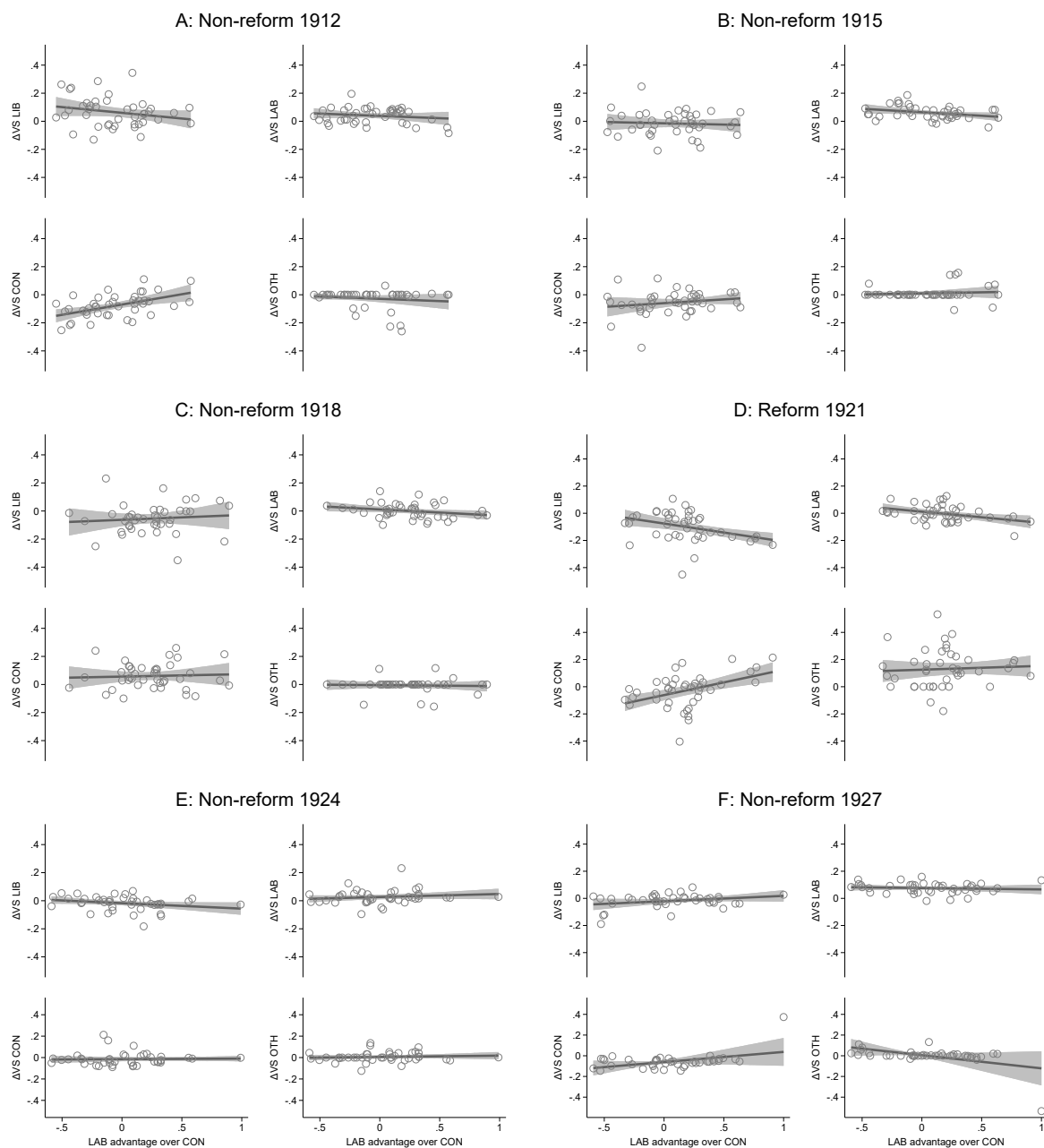
Note: The scatterplots and fitted lines correspond to specification (9), (10), (11), and (12) of Table 1. The y-axes measure the percentage point change in vote-share from year t-3 to year t for the bloc given in the title of the sub-panel. The x-axes measure the Labor advantage over the Conservative in year t-3. In the pre-reform period we use first round vote-shares. The sample is restricted to 'SMDs' where the three dominating blocs are participating in all election years. Shaded areas represent 95% confidence intervals based on robust standard errors.

Figure A.9: Vote-shares across blocs, split by top-two status 1918

LAB

LIB

CON

- - -o- - - Toptwo 1918 = 1
- - -●- - - Toptwo 1918 = 0
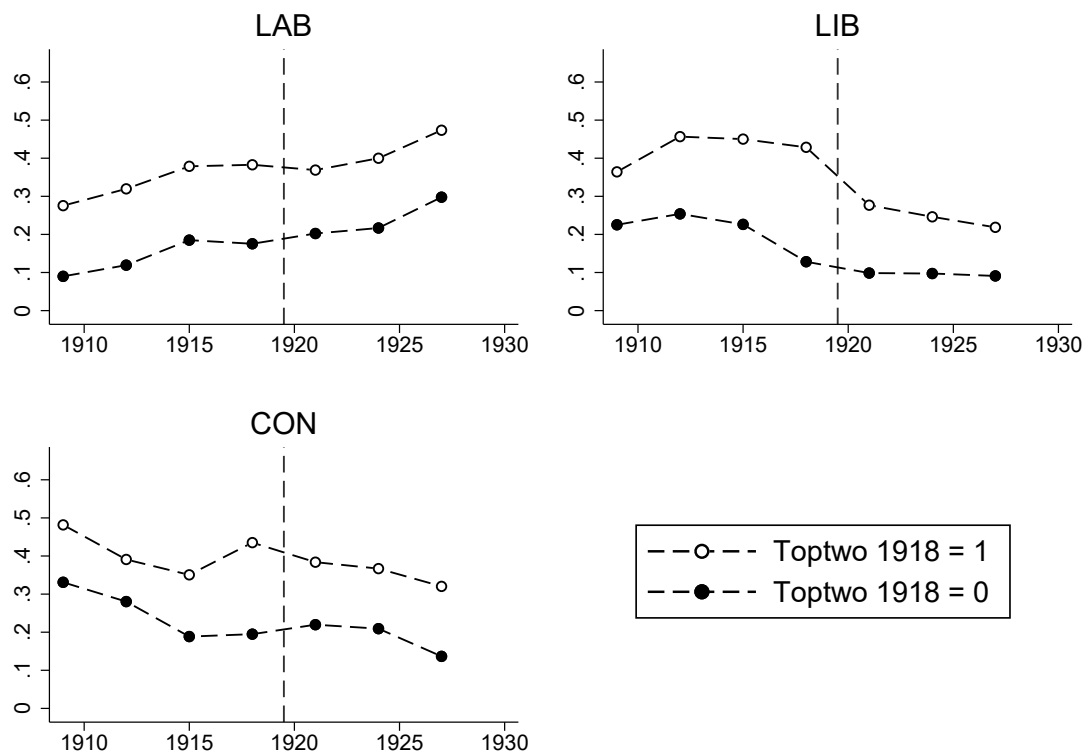
Note: The figure shows the vote-shares across blocs, split by top-two status in 1918. In the pre-reform period we use first round vote-shares. The sample is restricted to 'SMDs' where the three dominating blocs are participating in all election years.

Figure A.10: Pre-reform partisan advantage and voter turnout
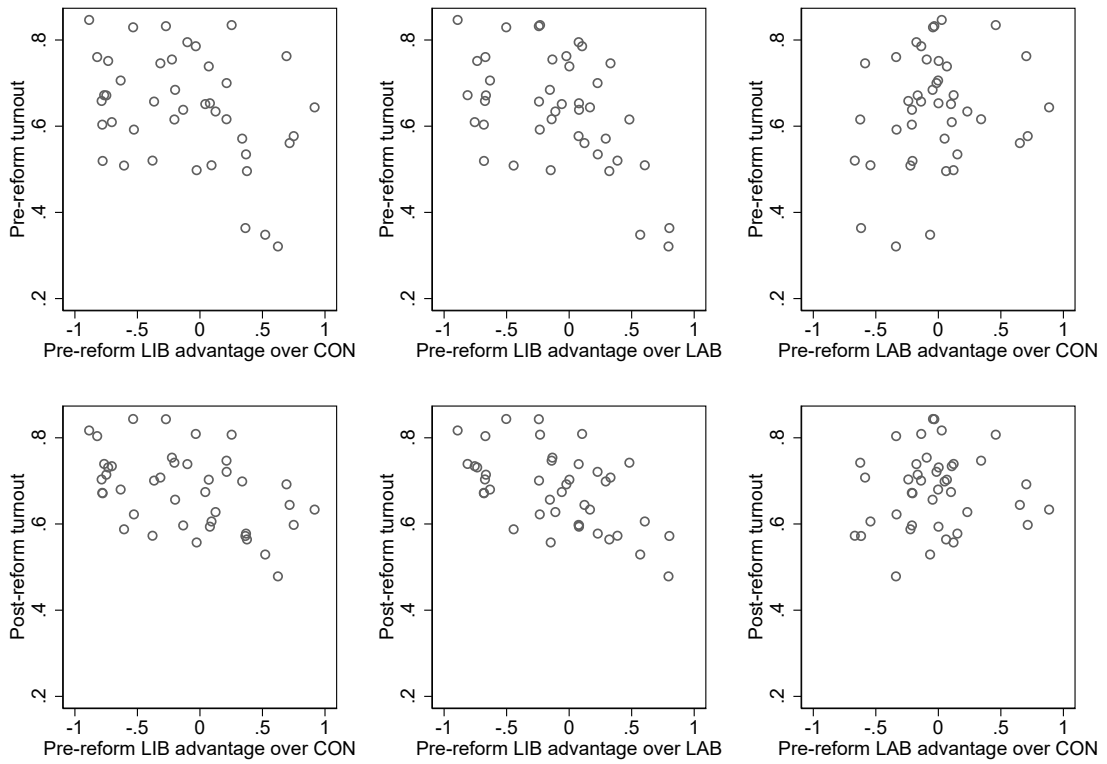
Note: The top panel plots voter turnout in 1918 against three measures of pre-reform partisan advantage. The bottom panel plots voter turnout in 1921 against the same three measures of pre-reform partisan advantage. The sample is restricted to 'SMDs' where the three dominating blocs are participating in all election years.

Table A.1: Description of estimation samples using data from the 1918 election

| | (1) | | (2) | | (3) | |
| | All | | Estimation sample 1 | | Estimation sample 2 | |
	Mean	SD	Mean	SD	Mean	SD
Urban district	0.33	(0.47)	0.21	(0.41)	0.31	(0.47)
Voteshare LAB	0.29	(0.16)	0.28	(0.14)	0.33	(0.12)
Voteshare LIB	0.37	(0.25)	0.40	(0.23)	0.30	(0.18)
Voteshare CON	0.27	(0.23)	0.25	(0.22)	0.36	(0.16)
Voteshare OTH	0.06	(0.13)	0.07	(0.14)	0.01	(0.04)
ENoP1	2.35	(0.54)	2.44	(0.54)	2.59	(0.43)
Second round	0.55	(0.50)	0.60	(0.49)	0.64	(0.48)
Post-reform magnitude	5.57	(1.42)	5.49	(1.42)	5.17	(1.34)
N	126		91		42	

Note: This table compares the estimation samples to the 126 SMDs existing in the last election before the electoral reform. In estimation sample 1, we drop SMDs that were located within the largest municipalities, SMDs that experienced boundary changes in the 1909-1918 period, and SMDs that were not nested within a post-reform MMD. Estimation sample 2 further restricts the sample to 'SMDs' where the three dominating blocs are participating in all election years.

Table A.2: Aggregate level analysis of how electoral reform impacts ENoP

Panel A: First round

	(1)	(2)	(3)	(4)	(5)
Proportional Representation	0.896	0.517	0.357	0.264	0.054
	(0.067)	(0.097)	(0.104)	(0.110)	(0.085)
	[0.114]	[0.137]	[0.158]	[0.169]	[0.124]
Farmers Party		0.548	0.557	0.564	0.700
		(0.102)	(0.103)	(0.102)	(0.079)
		[0.153]	[0.154]	[0.153]	[0.106]
Social Democratic Labor Party			0.250	0.276	0.266
			(0.071)	(0.074)	(0.069)
			[0.105]	[0.114]	[0.114]
Communist Party				0.129	0.188
				(0.055)	(0.052)
				[0.072]	[0.074]
N	637	637	637	637	637
R^2	0.446	0.492	0.506	0.510	0.676
SMD fixed effects	Yes	Yes	Yes	Yes	Yes
Party fixed effects	No	No	No	No	Yes

Panel B: Final round

	(1)	(2)	(3)	(4)	(5)
Proportional Representation	1.172	0.809	0.638	0.548	0.177
	(0.061)	(0.084)	(0.091)	(0.097)	(0.082)
	[0.102]	[0.115]	[0.136]	[0.150]	[0.128]
Farmers Party		0.524	0.534	0.540	0.669
		(0.087)	(0.087)	(0.087)	(0.071)
		[0.128]	[0.128]	[0.128]	[0.091]
Social Democratic Labor Party			0.266	0.291	0.256
			(0.071)	(0.074)	(0.069)
			[0.106]	[0.114]	[0.116]
Communist Party				0.126	0.194
				(0.051)	(0.051)
				[0.068]	[0.073]
N	637	637	637	637	637
R^2	0.621	0.655	0.668	0.671	0.754
SMD fixed effects	Yes	Yes	Yes	Yes	Yes
Party fixed effects	No	No	No	No	Yes

Note: The dependent variable is the effective number of parties (ENoP) measured at the pre-reform district structure. Two-round elections were used from 1909-1918, and proportional representation from 1921-1927. In panel A, we measure ENoP using first round vote-shares. In panel B, we measure ENoP using final round vote-shares. Cluster-robust standard errors based on the pre-reform district level in parentheses (91 clusters). Cluster-robust standard errors based on the post-reform district level in brackets (22 clusters).

Table A.3: Vote-trading between blocs between 1918 and 1921: Regression analysis when controlling for changes in candidate occupations at the district-bloc level

	(1) ΔVS^{LIB}	(2) ΔVS^{LAB}	(3) ΔVS^{CON}	(4) ΔVS^{OTH}	(5) ΔVS^{LIB}	(6) ΔVS^{LAB}	(7) ΔVS^{CON}	(8) ΔVS^{OTH}	(9) ΔVS^{LIB}	(10) ΔVS^{LAB}	(11) ΔVS^{CON}	(12) ΔVS^{OTH}
Pre-reform $\frac{VS^{LIB}-VS^{CON}}{VS^{LIB}+VS^{CON}}$	-0.152 (0.024)	-0.024 (0.025)	0.102 (0.047)	0.074 (0.041)								
Pre-reform $\frac{VS^{LIB}-VS^{LAB}}{VS^{LIB}+VS^{LAB}}$					-0.128 (0.029)	0.011 (0.023)	0.016 (0.041)	0.101 (0.035)				
Pre-reform $\frac{VS^{LAB}-VS^{CON}}{VS^{LAB}+VS^{CON}}$									-0.066 (0.043)	-0.059 (0.028)	0.160 (0.049)	-0.035 (0.046)
Δ White-collar CON	-0.050 (0.038)	-0.015 (0.044)	-0.041 (0.072)	0.106 (0.059)	-0.125 (0.039)	-0.035 (0.035)	0.026 (0.053)	0.133 (0.047)	-0.130 (0.056)	-0.009 (0.036)	-0.032 (0.055)	0.172 (0.063)
Δ White-collar LAB	-0.164 (0.241)	0.103 (0.149)	-0.495 (0.413)	0.557 (0.429)	-0.084 (0.376)	0.041 (0.165)	-0.385 (0.504)	0.427 (0.434)	-0.419 (0.393)	0.039 (0.132)	-0.269 (0.369)	0.649 (0.456)
Δ White-collar LIB	-0.060 (0.029)	-0.041 (0.043)	-0.081 (0.101)	0.182 (0.111)	-0.085 (0.038)	-0.045 (0.040)	-0.064 (0.091)	0.195 (0.118)	-0.073 (0.043)	-0.035 (0.039)	-0.091 (0.110)	0.200 (0.123)
Δ Blue-collar CON	-0.010 (0.319)	-0.033 (0.326)	0.218 (0.495)	-0.176 (0.516)	0.075 (0.397)	-0.115 (0.365)	0.372 (0.543)	-0.332 (0.487)	-0.378 (0.423)	-0.139 (0.328)	0.580 (0.422)	-0.063 (0.524)
Δ Blue-collar LAB	-0.188 (0.243)	0.075 (0.155)	-0.457 (0.444)	0.570 (0.465)	-0.125 (0.373)	0.010 (0.173)	-0.332 (0.529)	0.447 (0.468)	-0.458 (0.385)	0.015 (0.136)	-0.233 (0.406)	0.677 (0.483)
Δ Blue-collar LIB	0.031 (0.057)	-0.072 (0.044)	-0.086 (0.100)	0.127 (0.131)	-0.015 (0.067)	-0.085 (0.048)	-0.043 (0.095)	0.143 (0.124)	-0.011 (0.099)	-0.059 (0.046)	-0.104 (0.108)	0.174 (0.148)
Δ Farmers CON	0.015 (0.039)	-0.010 (0.041)	-0.012 (0.066)	0.008 (0.058)	-0.007 (0.038)	-0.019 (0.033)	0.014 (0.055)	0.011 (0.055)	-0.027 (0.046)	-0.014 (0.033)	0.009 (0.047)	0.032 (0.055)
Δ Farmers LAB	-0.160 (0.247)	0.126 (0.158)	-0.535 (0.433)	0.569 (0.451)	-0.089 (0.383)	0.054 (0.178)	-0.397 (0.530)	0.433 (0.456)	-0.462 (0.391)	0.055 (0.140)	-0.277 (0.389)	0.684 (0.466)
Δ Farmers LIB	-0.148 (0.039)	-0.017 (0.045)	-0.110 (0.088)	0.274 (0.094)	-0.164 (0.052)	-0.011 (0.043)	-0.116 (0.087)	0.291 (0.102)	-0.122 (0.062)	-0.006 (0.042)	-0.143 (0.093)	0.271 (0.106)
Constant	-0.105 (0.013)	-0.004 (0.012)	-0.033 (0.029)	0.142 (0.033)	-0.100 (0.015)	-0.002 (0.012)	-0.039 (0.031)	0.141 (0.033)	-0.097 (0.017)	-0.004 (0.012)	-0.035 (0.029)	0.136 (0.034)
N	42	42	42	42	42	42	42	42	42	42	42	42
R^2	0.676	0.156	0.228	0.299	0.560	0.135	0.116	0.333	0.377	0.228	0.285	0.258

Note: The dependent variables are percentage point change in the vote-share from 1918 to 1921 for the bloc given in the header. We include control variables for the change in the shares of candidates from each bloc that are white-collar workers, blue-collar workers, and farmers, respectively, based on the ISCO codes of the Fiva and Smith (2017) data set. The sample is restricted to 'SMDs' where the three dominating blocs are participating in all election years (N=42). In the pre-reform period we use first round vote-shares. Heteroscedasticity-robust standard errors in parentheses.

Table A.4: Vote-trading between blocs between 1918 and 1921: Regression analysis when controlling for pre-reform voter turnout

	(1) ΔVS^{LIB}	(2) ΔVS^{LAB}	(3) ΔVS^{CON}	(4) ΔVS^{OTH}	(5) ΔVS^{LIB}	(6) ΔVS^{LAB}	(7) ΔVS^{CON}	(8) ΔVS^{OTH}	(9) ΔVS^{LIB}	(10) ΔVS^{LAB}	(11) ΔVS^{CON}	(12) ΔVS^{OTH}
Pre-reform $\frac{VS^{LIB}-VS^{CON}}{VS^{LIB}+VS^{CON}}$	-0.136 (0.016)	-0.019 (0.020)	0.094 (0.033)	0.061 (0.031)								
Pre-reform $\frac{VS^{LIB}-VS^{LAB}}{VS^{LIB}+VS^{LAB}}$					-0.107 (0.030)	0.030 (0.020)	0.026 (0.039)	0.052 (0.044)				
Pre-reform $\frac{VS^{LAB}-VS^{CON}}{VS^{LAB}+VS^{CON}}$									-0.139 (0.025)	-0.076 (0.022)	0.159 (0.035)	0.057 (0.037)
Pre-reform turnout	0.177 (0.120)	0.071 (0.080)	0.090 (0.154)	-0.338 (0.161)	0.171 (0.143)	0.152 (0.082)	0.006 (0.185)	-0.329 (0.185)	0.446 (0.136)	0.141 (0.084)	-0.132 (0.139)	-0.455 (0.155)
Constant	-0.228 (0.081)	-0.051 (0.053)	-0.074 (0.093)	0.353 (0.096)	-0.219 (0.093)	-0.097 (0.053)	-0.029 (0.111)	0.345 (0.108)	-0.388 (0.091)	-0.095 (0.056)	0.061 (0.083)	0.423 (0.094)
N	42	42	42	42	42	42	42	42	42	42	42	42
R^2	0.557	0.066	0.133	0.194	0.341	0.080	0.008	0.172	0.395	0.239	0.201	0.171

Note: The dependent variables are percentage point change in the vote-share from 1918 to 1921 for the bloc given in the header. The sample is restricted to 'SMDs' where the three dominating blocs are participating in all election years (N=42). In the pre-reform period we use first round vote-shares. Heteroscedasticity-robust standard errors in parentheses.

Table A.5: Top-two reform analysis

Panel A: Baseline results

	(1) Lab.	(2) Lib.	(3) Con.
Reform1921	0.027	-0.030	0.025
	(0.014)	(0.015)	(0.035)
	[0.015]	[0.012]	[0.038]
Reform1921Xtop1918	-0.041	-0.122	-0.076
	(0.018)	(0.026)	(0.041)
	[0.020]	[0.026]	[0.040]
N	84	84	84
R^2	0.094	0.638	0.128
SMD fixed effects	Yes	Yes	Yes

Panel B: Control for entry of Farmers Party

	(1) Lab.	(2) Lib.	(3) Con.
Reform1921	0.044	-0.001	0.091
	(0.018)	(0.023)	(0.047)
	[0.018]	[0.017]	[0.047]
Reform1921Xtop1918	-0.041	-0.108	-0.099
	(0.018)	(0.024)	(0.039)
	[0.020]	[0.025]	[0.036]
Farmers Party running	-0.026	-0.058	-0.078
	(0.018)	(0.027)	(0.040)
	[0.018]	[0.026]	[0.044]
N	84	84	84
R^2	0.138	0.672	0.211
SMD fixed effects	Yes	Yes	Yes

Note: The dependent variable is the vote-share of the party bloc in the table header. The sample is restricted to 'SMDs' where the three dominating blocs are participating in all election years. Heteroscedasticity-robust standard errors in parentheses. Cluster-robust standard errors based on the post-reform district level in brackets (18 clusters).

Table A.6: Top-two placebo analysis

Panel A: 1918 Placebo reform

	(1) Lab.	(2) Lib.	(3) Con.
Reform1918	0.023	-0.054	0.059
	(0.017)	(0.023)	(0.029)
Reform1918Xtop1915	-0.031	-0.001	0.002
	(0.020)	(0.030)	(0.035)
N	84	84	84
R^2	0.073	0.215	0.321
SMD fixed effects	Yes	Yes	Yes

Panel B: 1915 Placebo reform

	(1) Lab.	(2) Lib.	(3) Con.
Reform1915	0.082	-0.018	-0.045
	(0.012)	(0.012)	(0.020)
Reform1915Xtop1912	-0.041	0.003	-0.013
	(0.014)	(0.022)	(0.027)
N	84	84	84
R^2	0.708	0.034	0.319
SMD fixed effects	Yes	Yes	Yes

Panel C: 1912 Placebo reform

	(1) Lab.	(2) Lib.	(3) Con.
Reform1912	0.043	0.043	-0.026
	(0.014)	(0.030)	(0.042)
Reform1912Xtop1909	-0.008	0.031	-0.060
	(0.020)	(0.034)	(0.046)
N	84	84	84
R^2	0.355	0.290	0.514
SMD fixed effects	Yes	Yes	Yes

Note: The dependent variable is the vote-share of the party bloc in the table header. The sample is restricted to 'SMDs' where the three dominating blocs are participating in all election years. Cluster-robust standard errors based on the post-reform district level in parentheses (18 clusters).