

Electoral Reform and Strategic Coordination*

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Abstract

Electoral reform creates new strategic coordination incentives for voters and elites, but endogeneity problems make such effects hard to identify. We address this issue by investigating an extraordinary dataset, from the introduction of proportional representation in Norway in 1919, which allows us to measure vote-shares of parties in the pre-reform single-member districts and in the same geographic units in the post-reform multi-member districts. The electoral reform had an immediate effect on the fragmentation of the party system, due in part to strategic party entry. We find, though, that another main effect of the reform was that many voters switched between existing parties, particularly between the Liberals and Conservatives, as the incentives for these voters to coordinate against Labor were removed by the introduction of PR.

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1 Introduction

Since the pioneering work of Duverger (1954), economists and political scientists have built up a substantial body of work explaining how electoral systems determine aggregate political outcomes. Theoretical work has posited a number of mechanisms linking electoral rules to individual level behavior and then to the number of parties in a country, mainly via changing strategic coordination incentives of voters and elites (Cox 1997; 2015). We also have an extensive set of empirical studies that aim to test these propositions at an aggregate level, for example by looking at the number of parties that receive votes in a national election (e.g., Taagepera and Shugart 1989; Lijphart 1999; Carey and Hix 2011). But clearly identifying the effects of the electoral system on aggregate voting patterns is fraught with endogeneity challenges (Rodden 2009*a*). Cross-country comparisons, between countries with different electoral systems, can identify some general regularities and correlations. But, because so many factors vary between countries in addition to the electoral rules, such as changes in the number and sizes of parties, these patterns cannot be interpreted causally. Responding to this constraint, laboratory studies have tried to isolate the causal effect of electoral rules on voting behavior and strategic coordination (e.g., St-Vincent, Blais and Pilet 2016; Hix, Hortala-Vallve and Riambau-Armet 2017).

Between the aggregate-level observational studies and the micro-level experimental studies there is new body of research that looks at real-world election outcomes at a low level of aggregation. The aim of this new research is to get closer to identifying the causal mechanisms at work when electoral systems change than is usually possible with national-level data, while claiming a higher level of external validity than can usually be inferred from laboratory experiments. For example, Fujiwara (2011) and Bordignon, Nannicini and Tabellini (2016) exploit regression discontinuity designs in the assignment of single-ballot and dual-ballot plurality systems in the context of Brazilian and Italian municipal elections, respectively. Fujiwara (2011) finds that a change from single-ballot plurality

rule to dual-ballot reduced the vote share of the top two candidates, to the benefit of the third placed candidate, consistent with strategic voting. Bordignon, Nannicini and Tabellini (2016), in contrast, find no evidence of strategic voting, but strong responses by political elites (strategic entry). Pons and Tricaud (2018) similarly exploit the discontinuity generated by the qualification rule for the second round in French elections. They find that the presence of a third candidate in the second round disproportionately harms the candidate ideologically closest to this candidate, suggesting that voters tend to vote expressively rather than strategically.

Our paper builds on this new generation of research, by studying how a major electoral system reform affected strategic coordination: the introduction of proportional representation (PR) in Norway in 1919. We use a new panel data set of stable *subnational* geographic units, which allows us to measure vote-shares of parties at a low level of aggregation: in the pre-reform SMDs (under the initial majoritarian system), and in the same geographic units within the larger multi-member districts (MMDs) (under the new proportional system) (Cox, Fiva and Smith 2016). With data for multiple elections before and after the PR reform we can investigate whether secular trends threaten the validity of our research design.

Electoral reform in Norway is a case of a more general phenomenon, as a large number of countries in Europe moved from single-member district electoral systems to PR in the first two decades of the 20th century. In addition, the particular political environment in Norway at that time means that it is a very good case for seeking to isolate the effects of electoral reform. The franchise had been extended some years before 1919: with full suffrage extended to all men in 1898 and all women in 1913. Also, even before the adoption of PR, Norway had a stable multiparty system, where the parties existing before the reform all existed afterwards. Cox, Fiva and Smith (2016) use the 1919 Norwegian reform to study voter mobilization under different electoral rules. In line with theories of elite mobilization, they find a substantial contraction effect in the distribution of voter turnout rates following the adoption of PR. In this paper, we study how the PR reform

affected strategic entry, voter coordination, and the fragmentation of the party system.

Duverger (1954, p.252) and others have pointed out that the adoption of PR in Norway led to an increase in the number of parties. Indeed, we show that the introduction of PR led to a step-change increase in the effective number of parties of about one; mainly due to the strategic entry of a new party (The Farmers Party, formally established in 1920). This change in the number of parties happened immediately after the election, rather than developing over several elections. This finding challenges the conventional view that the effects of electoral system reforms take a long time to play out (Renwick 2018).

In our main analysis, we identify how the electoral system reform shaped voting behavior using election outcomes in the same geographic units in all elections between 1909 and 1927. With this research design we believe we can isolate strategic coordination between *existing parties*. Following the standard theoretical understanding of strategic coordination, we expect the lower incentive to vote strategically under PR to lead to more votes for parties that were not competitive in 1918. We find precisely this dynamic, particularly for the Conservatives and Liberals, where voters changed how they coordinated between these two parties.

2 Electoral context

After the dissolution of the union with Sweden (1905), elections to the Norwegian Parliament (*Storting*) were decided by a two-round runoff system. The system worked as follows. In the first round, a candidate was elected if he received an absolute majority of votes cast in the district. If no candidate received an absolute majority in the first round, a second round was held within a few weeks. In the second round, candidates could enter even if they had not run in the first round.

The first formal political parties were established two decades before the dissolution with Sweden: the Liberals (*Venstre*) and the Conservatives (*Høyre*) in 1884, and the Labor Party (*Arbeiderpartiet*) in 1887. However, up until the 1909 election, the party

system was in a state of flux (Helland and Saglie 2003). From the 1909 election onwards, three party ‘blocs’ dominated: the Labor Party; the Liberals and the Labor Democrats (*Arbeiderdemokratene*; est. 1906); and the Conservatives and the Progressive Liberals (*Frisinnede Venstre*; est. 1909). Various other minor parties and organizations also fielded candidates in the runoff period, including the Norwegian Agrarian Association (*Norsk Landmandsforbund*; later *Norges Bondelag*; est. 1896).

In the first decades of the 20th century, the *Storting* agenda was dominated by discussions concerning the primary industry, military budgets, educational reforms, and infrastructure expansions (especially by rail) (Høyland and Søyland 2019). Class antagonisms were acute in this period and the labor movement was hostile to the bourgeois society (Helland and Saglie 2003).

With the expansion of the franchise, support for the Labor Party substantially increased. Appendix Figure A.1 shows the vote-shares and seat-shares for the three dominant and a residual ‘other’ category over the 1909-1927 period. The two-round runoff system led to a systematic underrepresentation of the Labor Party. This came mostly to the advantage of the Liberals, who formed a single-party government from 1913 to 1920.

The Liberal Party mainly represented rural interests against the interests of the urban Conservative establishment. The Liberals were also social reformers, though, introducing early welfare state reforms when in government, which extended their appeal to lower income rural voters after universal suffrage. Nonetheless, the Liberals shared strategic interests with the Conservatives, in a common ‘bourgeois bloc’ against the growing support for Labor amongst the industrial working class (Valen and Rokkan 1974).

In July 1917, parliament appointed a commission to consider changes in the electoral system. This commission presented its reform proposals in April 1919. Finally, in November 1919, MPs voted on five alternative reform proposals. A system of closed-list PR in MMDs obtained the necessary 2/3 majority (Cox, Fiva and Smith 2019). The new electoral system, effective from the 1921 election, grouped old SMDs into 29 MMDs with a magnitude varying from 3 to 8 seats. The total number of seats in the *Storting*

increased from 126 to 150. The seat allocation method chosen was the D'Hondt formula, which tends to be favorable to larger parties in smaller-magnitude districts.

The conventional wisdom holds that the adoption of PR in many European democracies in the early 1900s came about as a strategic effort by bourgeois parties to preserve political power (Rokkan 1970; Boix 1999).¹ However, there are many cases where PR reforms “*did not help old elites to maximize their seat shares*” Calvo (2009, p. 256). In the case of Norway, the Liberals dominated in parliament under the runoff system, but received only about a quarter of the seats after the adoption of PR. Rodden (2009b, p. 2) points out that the Rokkan-Boix argument “*has always had an uncomfortable relationship with certain facts. Above all, as a bulwark against the left, proportional representation can only be viewed as a colossal failure*”.

Leemann and Mares (2014) provides a reformulation of the Rokkan-Boix theory: they argue that PR is introduced when legislators face strong *district-level* competition and when their parties expect to gain seats from a change of the electoral law. Using data from Germany, they find support for this revised hypothesis. In the case of Norway, Cox, Fiva and Smith (2019) similarly find that the district-level electoral threat facing individual legislators explain roll-call votes concerning PR adoption. They also emphasize how PR affected party leaders' control over nominations, thereby enabling them to discipline their followers and build more cohesive parties, and find empirically that party leaders were more likely to vote in favor of PR adoption than rank-and-file members.²

After the introduction of PR, the Norwegian Agrarian Association decided to form the Farmers Party (*Bondepartiet*; later *Senterpartiet*) at the June 1920 national congress of the association; in other words only six months after the electoral reform bill had passed through parliament.³ In 1918, the association fielded candidates in approximately

¹In the case of Norway, Rokkan (1970, p. 158) argued that for Liberal MPs “*the decisive motive was clearly not a sense of equalitarian justice but the fear of rapid decline with further Labor advances across the majority threshold*”.

²In a related study, Høyland and Søyland (2019) find that the PR reform shifted the focus of speeches from individual MPs to parties.

³Key players in the organization believed the electoral rules cleared the way for the establishment of a political party (Aasland 1974, p. 230-231). Johan E. Mellbye, a former Conservative cabinet member and the first leader of the Farmers Party, put it this way in a 1921 speech: “*The new electoral rules was very*

20% of the single-member districts and won 3 seats.⁴ In the 1921 election, after the introduction of PR and the formal establishment of the Farmers Party, they presented lists of candidates in about 80% of the multi-member districts and won 17 seats.

There was also a change within the Labor bloc. Following the 1917 Russian Revolution and the establishment of the Communist International in 1919, the Labor bloc in Norway split between supporters of Communist revolution and supporters of a parliamentary road to Socialism. Initially, the Norwegian Labor Party joined the Communist International, which led to the formation of the Social Democratic Labor Party (NSA) in 1921, as a breakaway on the right of the party.⁵ These changes within the Labor bloc were driven more by external events than electoral reform in Norway. Nonetheless, without the electoral reform, it is unlikely that the NSA and DNA would both have stood candidates throughout the country.

3 Political fragmentation before and after reform

Following Cox, Fiva and Smith (2016) we construct a balanced panel data set of 91 ‘SMDs’ covering the elections between 1909 and 1927, which is a total of 637 observations.⁶ Based on this data, Appendix Figure A.2 documents a step-change increase in the ‘effective’ number of parties (ENoP) following the electoral reform, suggesting that

important... we have seen — in particular in the last two year — how the key idea of parliamentarism with two parties, where one party should criticize and control the other, no longer applies. We do not have two, but five or six parties.” (Aasland 1974, p. 231, paraphrased from Norwegian).

⁴The south-eastern part of Norway constituted the geographical strong-hold of the association (Aasland, 1974, p. 67). In the rural areas of *Hedemark* and *Opland*, the association fielded a candidate in five out of eleven single-member districts in 1918.

⁵Later, when the DNA withdrew from the Communist International in 1923, the Norwegian Communist Party (NKP) formed on the left of the DNA and remained a member of the International. Following this new split and the fact that the DNA had abandoned the Communist International, the DNA re-merged with the NSA.

⁶In the last pre-reform election, there were 126 SMDs. Because post-reform data only exist at the municipality level, we are forced to drop SMDs that were located *within* the largest municipalities (19 SMDs). We also drop SMDs that experienced boundary changes in the 1909-1918 period (13 SMDs) and SMDs that were not nested within a post-reform MMD (3 SMDs). This leaves us with 91 SMDs. Appendix Table A.1 compares our estimation sample to the 126 SMDs existing in the last election before the electoral reform. Naturally, after dropping the largest cities, the fraction of urban districts is lower than the 1/3 stipulated by the electoral law, but otherwise our data set is quite representative.

the fragmentation of the party system was immediate in Norway in the 1921 election.

In Appendix Table A.2 we analyze how ENoP changed with the introduction of PR when adding (district-level) controls for the Farmers Party, the Social Democratic Labor Party, and the Communist Party. The lack of any clear relationship between PR and ENoP when flexibly controlling for party entry via fixed effects (column 5 in Appendix Table A.2) suggests that voters were unresponsive to the new electoral rules. Yet, we consider estimates reported in Appendix Table A.2 to be lower bounds on how far PR affected voter behavior. These are lower bounds because not only do parties act strategically to decide whether to form *overall*, they also target their resources strategically, by deciding to stand in districts where they have the highest opportunity of winning seats. We therefore proceed with a sharper empirical test in the next section.

4 Strategic coordination between existing blocs

To isolate strategic switching between existing parties we restrict the panel data set to ‘SMDs’ where the three dominating blocs participated in all election years; 42 out of 91 SMDs fulfill this criterion.⁷ This essentially limits the sample to SMDs where all party blocs ran every year *before* the reform.⁸ Restricting the sample in this way is useful because it allows us to isolate shifts in the distribution of votes between these party blocs, while holding the number of blocs participating constant.

In this analysis, we are interested in how the electoral system reform affected the relative vote-shares of the three main parties. For example, if voters coordinated between the Liberals and Conservatives before the reform, we should expect Liberal votes to go down in places where they were stronger than the Conservatives and up where they were weaker than the Conservatives. To identify these effects we define the *pre-reform advantage* of party i over party j to be $\frac{VS^i - VS^j}{VS^i + VS^j}$, where VS denotes party vote-shares.

⁷In this estimation sample, the effective number of parties is 2.59, while it is 2.35 in the aggregate (Appendix Table A.1).

⁸There are 43 SMDs where all party blocs competed in every pre-reform election. With one exception (*Opland fylke* district in 1927), these are all contested by the main party blocs post-reform.

Because of what we know about the political positions of the three main party blocs - where the Conservatives are on the right, Labor are on the left, and the Liberals are between the other two blocs but much closer to the Conservatives - we expect the electoral system reform to have a bigger effect on vote-trading between the Liberal and Conservative blocs than between the Liberal and Labor blocs, and limited vote-trading between the Labor and Conservative blocs.

As discussed, the ‘bourgeois’ parties (the Conservatives and Liberals) shared common interests against the rising electoral support for Labor. Before PR, these two blocs had incentives to coordinate to defeat Labor candidates. As a result, in districts where the Liberals were not competitive, Liberal voters should strategically have supported Conservatives, and vice versa. Then, with the introduction of PR, and the lower electoral thresholds that resulted, these coordination incentives were reduced. As a result, Liberal voters who had previously voted Conservative could now support the Liberals, while Conservative voters who had previously supported the Liberals could now support the Conservatives, without these choices affecting the overall electoral fortunes of these two parties relative to Labor.

This is exactly what specification (1) and (3) from Table 1 show. We illustrate this key result in panel (1) and (3) of Figure 1. Overall, the vote-share of the Liberals fell between 1918 and 1921, as some of their voters switched to the Farmers Party, which had decided to stand candidates in most districts. The Farmers and the Liberal were now both competing for rural interests. However, in districts where the Conservatives were well ahead of the Liberals in 1918, such as in District A, the Liberal vote rose in 1921 (relative to the average), while in districts where the Liberals were well ahead of Conservatives in 1918, such as in District B, the Liberal vote fell in 1921.⁹

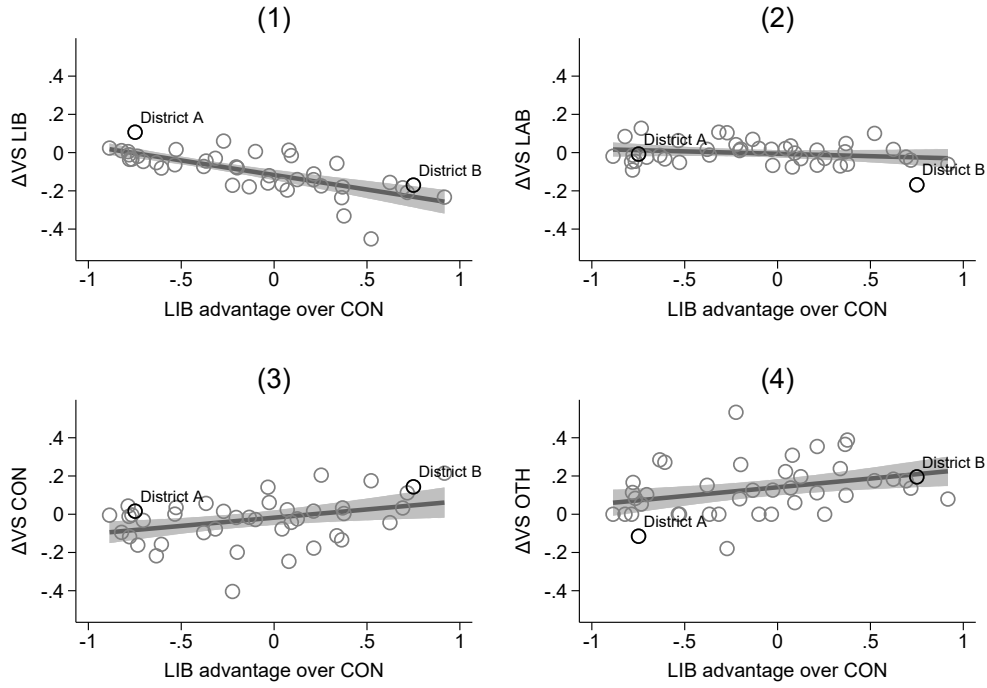
⁹District A in Figure 1 is *Nordland city district*. Appendix Figure A.4 displays 1918 vote counts for this district. It seems plausible that before the reform, many Liberal voters in this district strategically supported the Conservative candidate to keep Labor out. After the introduction of PR, the incentive to vote strategically was weakened, and the Liberal vote-share was expected to increase in this district (relative to the average), which is exactly what we find. District B in Figure 1 is *Nordland 2nd rural district*. Appendix Figure A.5 displays 1918 vote counts for this district. Here, in the pre-reform period, Conservative voters had an incentive to vote strategically for the Liberal candidate to keep Labor out, and the Conservative vote-share was expected to increase in 1921, which is again what we find.

Column (1) of Table 1 shows that 52% of the variation in ΔVS^{LIB} is explained by variation in the pre-reform Liberal advantage. A one standard deviation increase in the pre-reform Liberal advantage over the Conservatives (0.51) is associated with an eight percentage point reduction in the Liberal vote-share. Such a fall in the Liberal vote-share appears to have benefited the Conservatives and the Farmers Party in about equal proportions (column (3) and (4)), while leaving Labor vote-shares roughly unaltered (column (2)).

In columns (5)-(8) of Table 1 we analyze how the Liberal advantage over Labor correlates with vote-share changes pre- and post-reform. Again, we see that a large Liberal advantage is associated with a fall in the Liberal vote-share, but it seems that these votes were captured by the newly established Farmers Party, and not the Labor bloc.

In columns (9)-(12) of Table 1 we analyze how the Labor advantage over Conservatives correlates with vote-share changes pre- and post-reform. Here, the results shows that Labor tended to lose votes the stronger their (pre-reform) advantage over the Conservatives was (column 10), while the opposite is true for the Conservatives (column 11). Puzzlingly, we find that the Liberals tended to lose out when *Labor* had an advantage over the Conservatives (column 9). This unexpected correlation may be driven by the fact that in districts where Labor had an advantage over the Conservatives, then typically a similar advantage existed for the Liberals over the Conservatives.

Figure 1: Vote-trading between blocs between 1918 and 1921



Note: The scatterplots and fitted lines correspond to specification (1), (2), (3), and (4) of Table 1. The y-axes measure the percentage point change in vote-share for the four different blocs between 1918 and 1921. The x-axes measure the Liberal advantage over the Conservatives 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. Shaded areas represent 95% confidence intervals based on robust standard errors. We highlight two example districts: Nordland city district (District A) and Nordland county 2nd district (District B).

Table 1: Vote-trading between blocs between 1918 and 1921

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	ΔV_{SLIB}^{LIB}	ΔV_{SLAB}^{SLAB}	$\Delta V_{S^{CON}}^{S^{CON}}$	$\Delta V_{S^{OTH}}^{S^{OTH}}$	$\Delta V_{S^{LIB}}^{S^{LIB}}$	$\Delta V_{S^{LAB}}^{S^{LAB}}$	$\Delta V_{S^{CON}}^{S^{CON}}$	$\Delta V_{S^{OTH}}^{S^{OTH}}$	$\Delta V_{S^{LIB}}^{S^{LIB}}$	$\Delta V_{S^{LAB}}^{S^{LAB}}$	$\Delta V_{S^{CON}}^{S^{CON}}$	$\Delta V_{S^{OTH}}^{S^{OTH}}$
Pre-reform $\frac{V_{SLIB}^{LIB} - V_{S^{CON}}^{S^{CON}}}{V_{SLIB}^{LIB} + V_{S^{CON}}^{S^{CON}}}$	-0.152 (0.022) [0.019]	-0.025 (0.021) [0.015]	0.086 (0.031) [0.034]	0.091 (0.032) [0.031]								
Pre-reform $\frac{V_{SLIB}^{LIB} - V_{S^{LAB}}^{S^{LAB}}}{V_{SLIB}^{LIB} + V_{S^{LAB}}^{S^{LAB}}}$					-0.132 (0.033) [0.036]	0.007 (0.019) [0.019]	0.025 (0.033) [0.036]	0.100 (0.037) [0.040]				
Pre-reform $\frac{V_{SLAB}^{LAB} - V_{S^{CON}}^{S^{CON}}}{V_{SLAB}^{LAB} + V_{S^{CON}}^{S^{CON}}}$									-0.105 (0.029) [0.030]	-0.066 (0.022) [0.021]	0.149 (0.033) [0.035]	0.022 (0.043) [0.044]
Constant	-0.117 (0.013) [0.015]	-0.006 (0.010) [0.006]	-0.018 (0.019) [0.022]	0.141 (0.021) [0.023]	-0.113 (0.016) [0.018]	-0.003 (0.010) [0.007]	-0.025 (0.020) [0.023]	0.140 (0.021) [0.023]	-0.103 (0.015) [0.015]	-0.005 (0.009) [0.007]	-0.023 (0.017) [0.021]	0.131 (0.022) [0.024]
N	42	42	42	42	42	42	42	42	42	42	42	42
R ²	0.517	0.045	0.126	0.110	0.310	0.003	0.008	0.105	0.121	0.151	0.183	0.003

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. Cluster-robust standard errors based on the post-reform district level in brackets (18 clusters).

Strategic entry cannot drive our findings in Table 1 since our sample is restricted to cases where the relevant blocs participated in all election years. What about other elite-level explanations? For example, one could imagine that after the introduction of PR, parties might start to nominate better candidates in districts in which they were previously uncompetitive, and this might be driving the decisions of voters to switch their votes (see also Becher 2016).¹⁰ To address this concern, we use candidate-level occupation data from the Fiva and Smith (2017) dataset. Appendix Figure A.6 shows how the share of white-collar workers, blue-collar workers, farmers, and a residual other category, evolved over the 1909-1927 period by party bloc. For the Labor bloc, there is some indication that the introduction of PR led to an increase in the share of blue-collar candidates. For the Liberal and Conservative blocs the share of candidates from the four occupational groups are stable over the sample period. Still, this could mask across-district heterogeneity in the composition of candidates that potentially change with the PR reform. We therefore include a set of controls at the district-bloc level to our regression framework. Appendix Table A.3 provides the results. Even though the R^2 increase substantially in some specifications, the coefficients of interest do not change much, suggesting that elite-level adjustments are not driving the findings in Table 1.¹¹

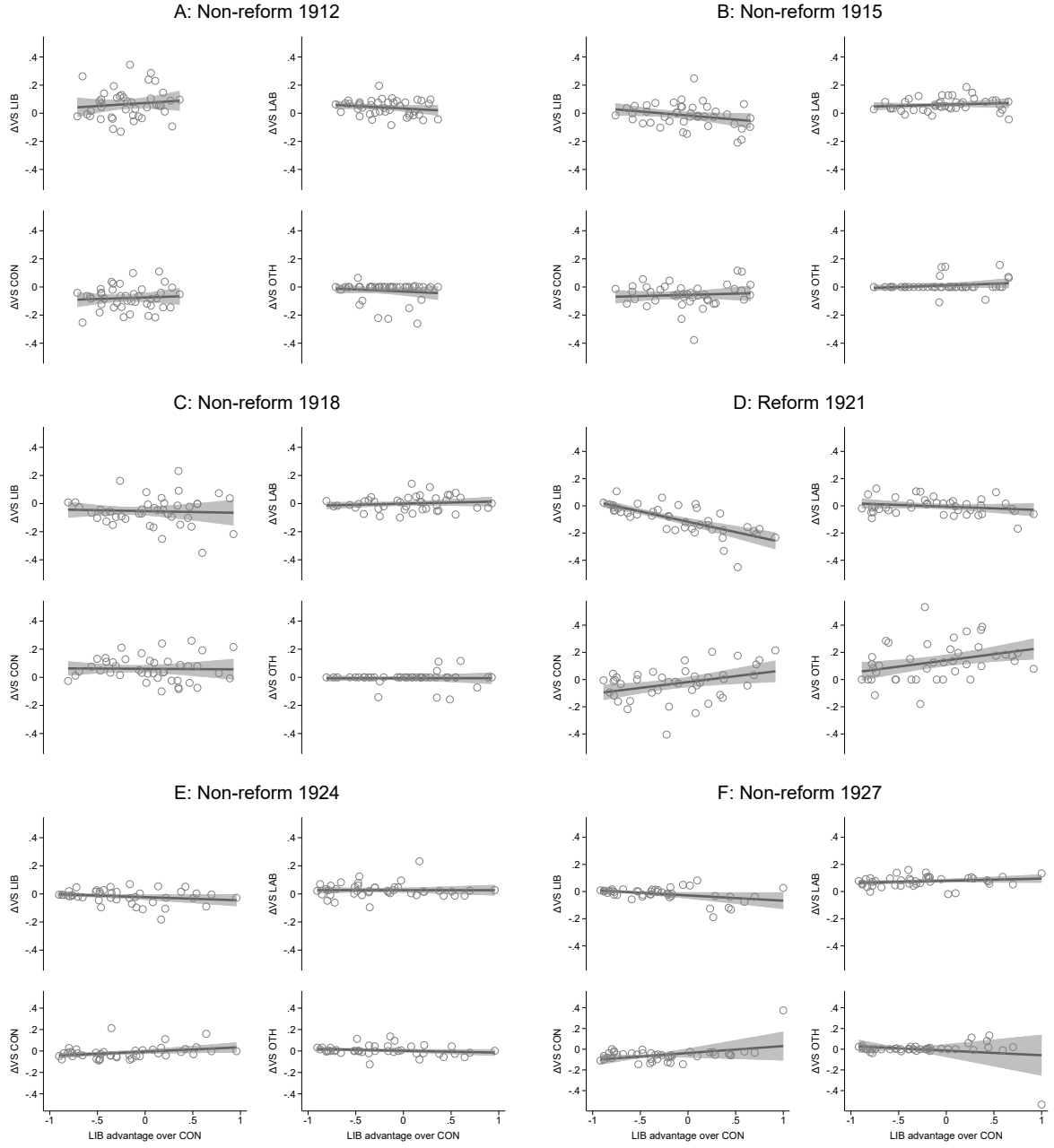
As a placebo test, we look at vote-share changes as a function of the (lagged) Liberal advantage over Conservatives in non-reform years. Figure 2 shows these results (Panel A, B, C, E, and F) along with the actual reform analysis (Panel D). We observe that the reform year stands out when compared to the non-reform years. In non-reform years there is no clear systematic pattern between the (lagged) Liberal advantage over Conservatives and the vote-shares of these blocs.¹²

¹⁰A residency requirement, effective both before and after the introduction of PR, limits parties scope for strategic resource allocation (Fiva and Smith 2017). They could not, for example, move their best candidates to districts in which they stand a chance of competing for victory while relegating the weaker ones to other districts.

¹¹Controlling for pre-reform voter turnout also does not change our main results in any substantial way (Appendix Table A.4).

¹²Appendix Figure A.7 and A.8 provides placebo checks corresponding to specification (5)-(8) and (9)-(12) of Table 1, respectively.

Figure 2: Vote-trading in reform and non-reform years



Note: The scatterplots and fitted lines correspond to specification (1), (2), (3), and (4) 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 the Conservatives 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.

5 Conclusion

Existing theories suggest that moving from a majoritarian to a proportional electoral system should affect how voters and parties strategically coordinate. Whereas under a majoritarian system some voters have incentives to vote for their second or third most-preferred party, to prevent an even less-preferred party from winning a seat, under PR these same voters should now be able to vote for their most-preferred party if they expect it to be competitive in a district where the party was not previously competitive.

We find exactly this effect in Norway between 1918 and 1921. The introduction of PR led to an immediate increase in the effective number of parties, measured at the pre-reform SMD level, of approximately one. This shift was mainly due to the Farmers Party deciding to stand candidates in more districts, knowing that it would have a better chance of winning seats under PR than under the previous two-round system. Nevertheless, controlling for the number of parties standing before and after the reform, we also identified vote-switching between the three main party blocs. In particular, the introduction of PR reduced the incentives for Conservative and Liberal supporters to coordinate to ‘keep Labor out’. This change in strategic incentives led to a reduction in support for the Conservatives in districts where they were ahead of the Liberals before the reform, and a reduction in support for the Liberals in districts where they were ahead of the Conservatives – although overall the Conservatives benefitted more from the reform than the Liberals. What is perhaps surprising is how quickly this coordination took place, as we only observe these changes between 1918 and 1921.

Our findings raise some interesting questions for future research on the transition to PR in the early 20th century, such as whether the speed of voter adaptation is unique to the Norwegian case or is generalizable to other cases, or whether Conservatives or Liberals benefitted more from the new strategic environment. On the one hand, the structure of the party system in Norway prior to suffrage extension and the introduction of PR and the level of economic development was similar to many Northern European

countries, which suggests that the result might be generalizable to other cases. On the other hand, the speed of this adaptation to the new strategic context might be unique to the Norwegian case, or at least specific to Scandinavian countries, where Conservatives and Liberals were traditionally more divided along urban-rural lines than along class lines, which might have made voter coordination easier.

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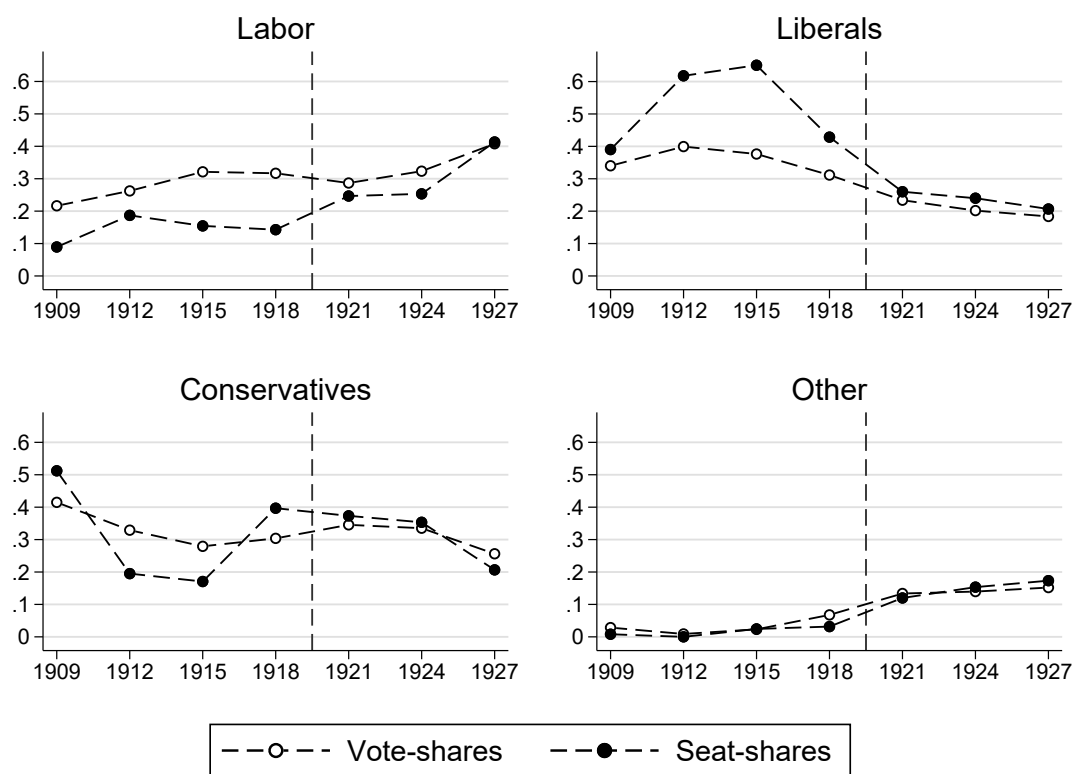
Electoral Reform and Strategic Coordination

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Online Appendix

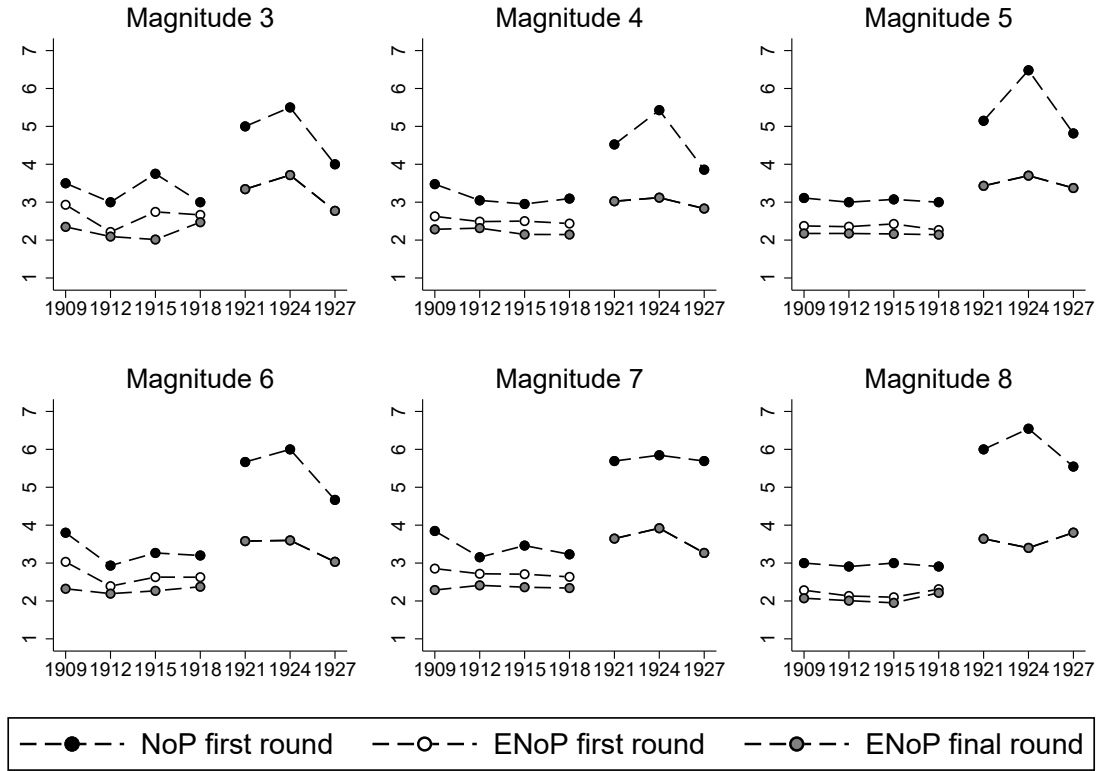
Jon H. Fiva and Simon Hix

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



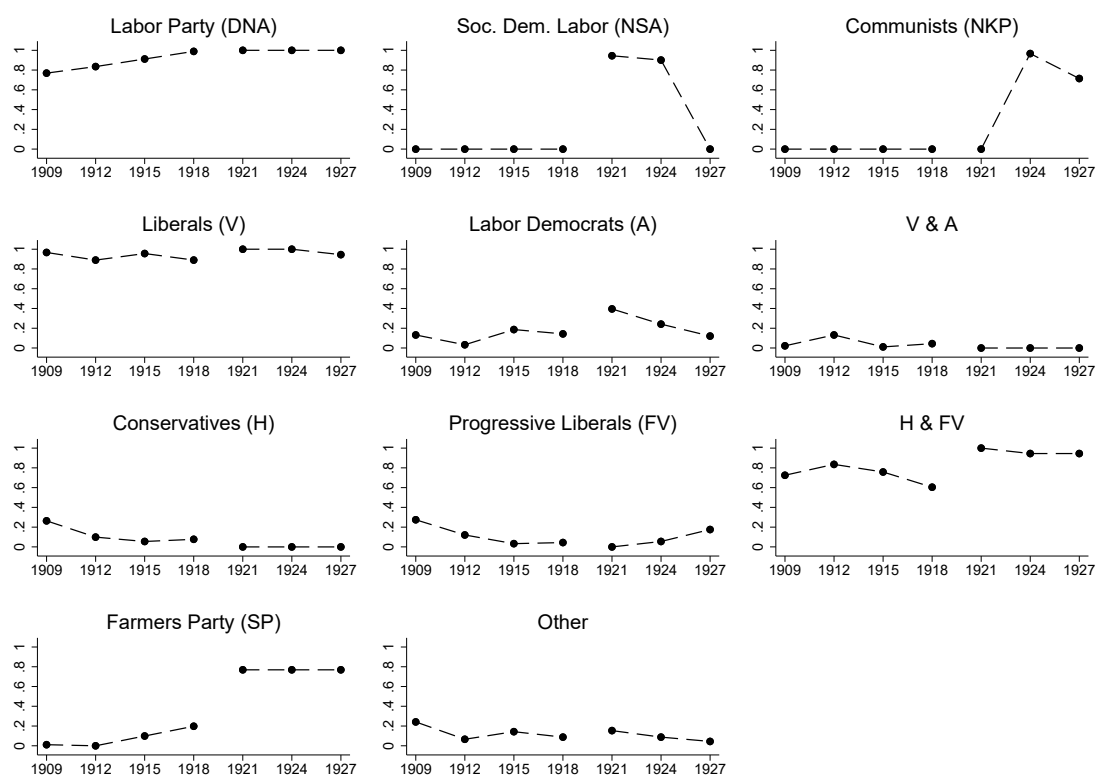
Note: The figure shows national vote-shares (white) and seat-shares (black) for the four political blocs over the 1909 to 1927 period. The introduction of PR is marked with the dashed vertical line. The Social Democratic Labor Party of Norway, which ran in the 1921 and 1924 elections, and the Communist 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



Note: The sample is restricted as in our baseline (see Appendix Table A.1).

Figure A.4: Example of pre-reform vote counts: Nordland city district

	1ste valg			Omvalg (¹¹ / ₁₁)		
	Bodø	Narvik	Sum	Bodø	Narvik	Sum
Bodø og Narvik.						
(4 499 stemmeberettigede.)						
R e p r æ s e n t a n t:						
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

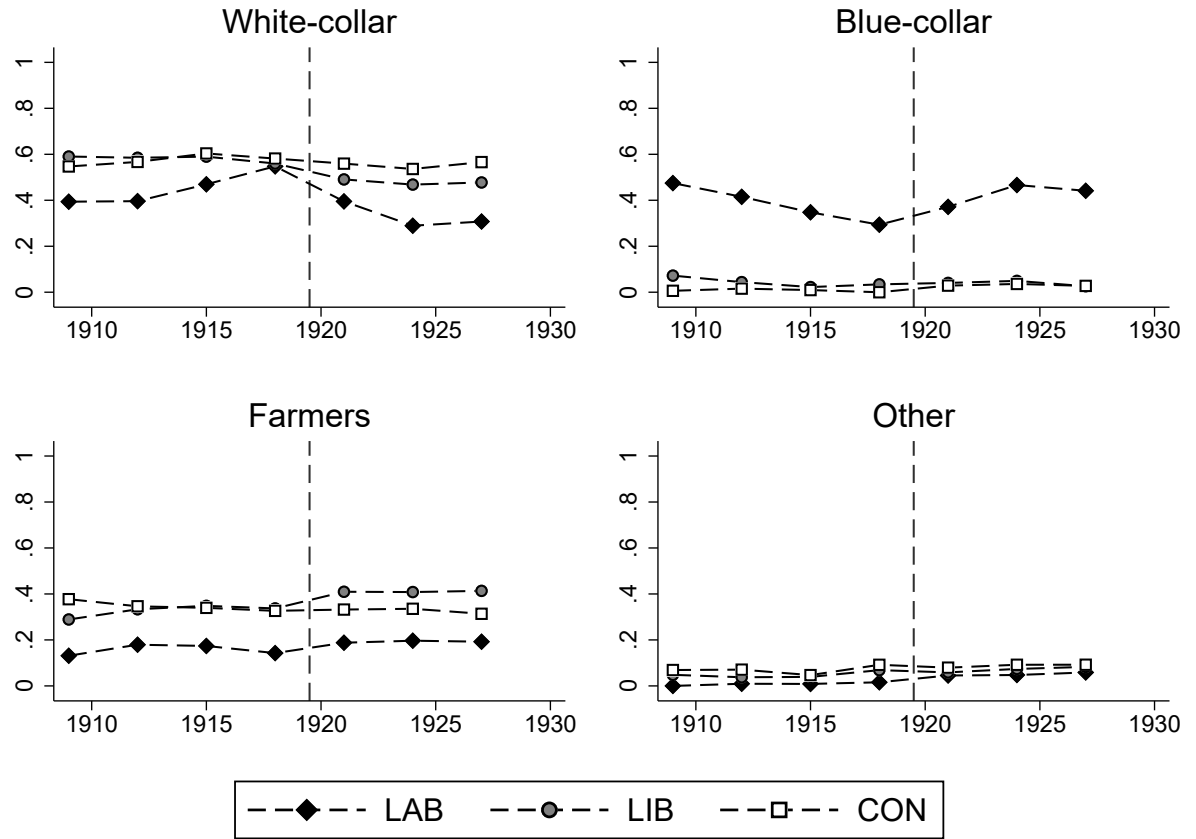
Note: Example comes from the 1918 election in Bodø and Narvik, the City District in Nordland County, which is labelled 'District A' in Figure 1. V = Liberals, S = Labor Party, H = Conservatives, FV = Progressive Liberals. The excerpt is from Haffner, Vilhelm and P. A. Wessel-Berg (1919). Stortingsvalget 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
<i>2den kreds, Nordre Helgeland.</i>										
(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 V)	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

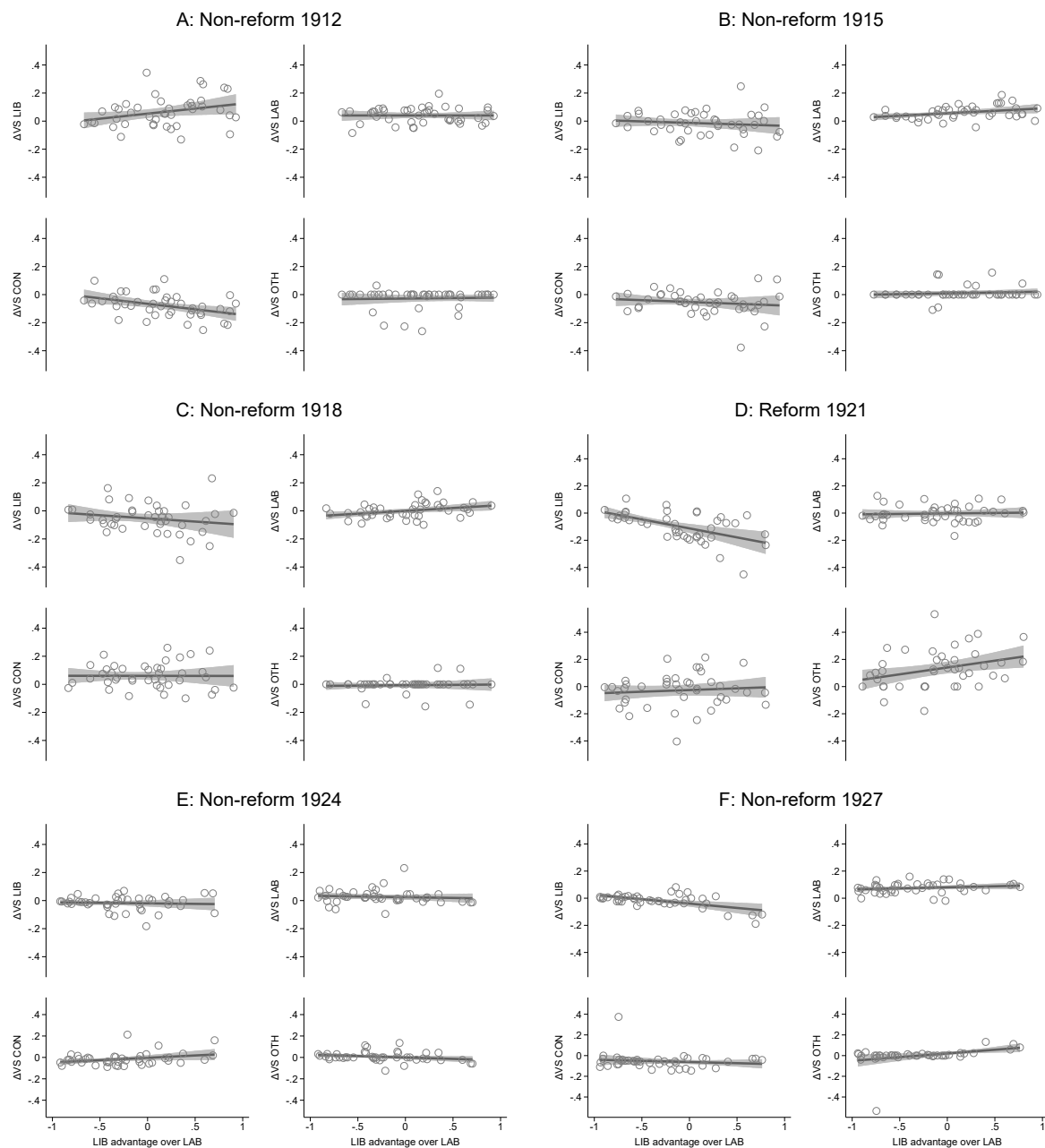
Note: Example comes from the 1918 election in Nordre Helgeland, the 2nd District in Nordland County, which is labelled 'District B' in Figure 1. V = Liberals, S = Labor Party, H = Conservatives, FV = Progressive Liberals. The excerpt is from Haffner, Vilhelm and P. A. Wessel-Berg (1919). Stortingsvalget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

Figure A.6: Candidates' occupational background by party bloc over time



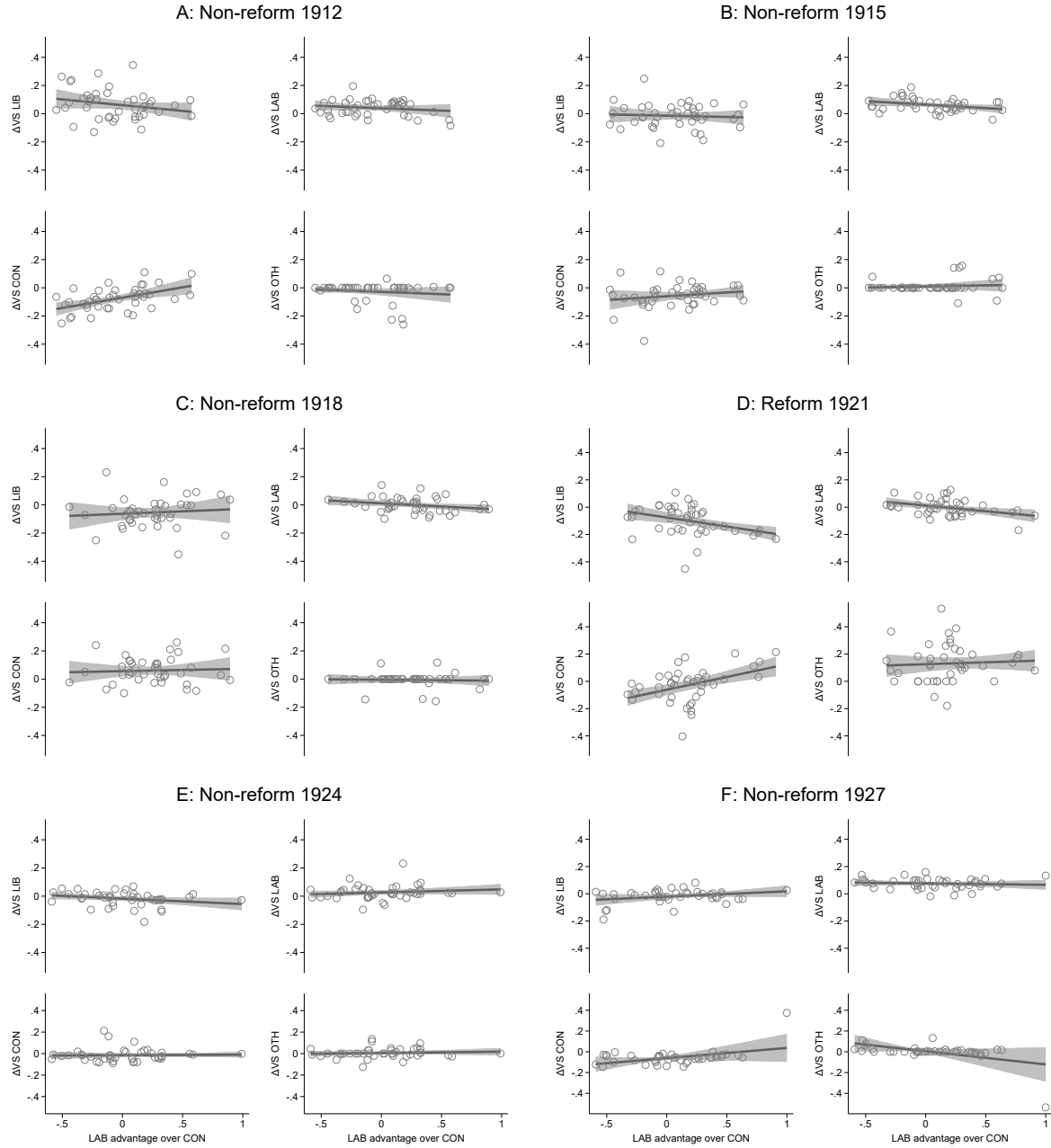
Note: The figure shows, for each bloc, the nation-wide fraction of candidates belonging to four different occupation categories: white-collar workers (ISCO codes 1, 2, 3, 4, and 5); farmers (ISCO code 6); blue-collar workers (ISCO codes 7, 8, and 9); and a residual “other” category (including armed forces [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



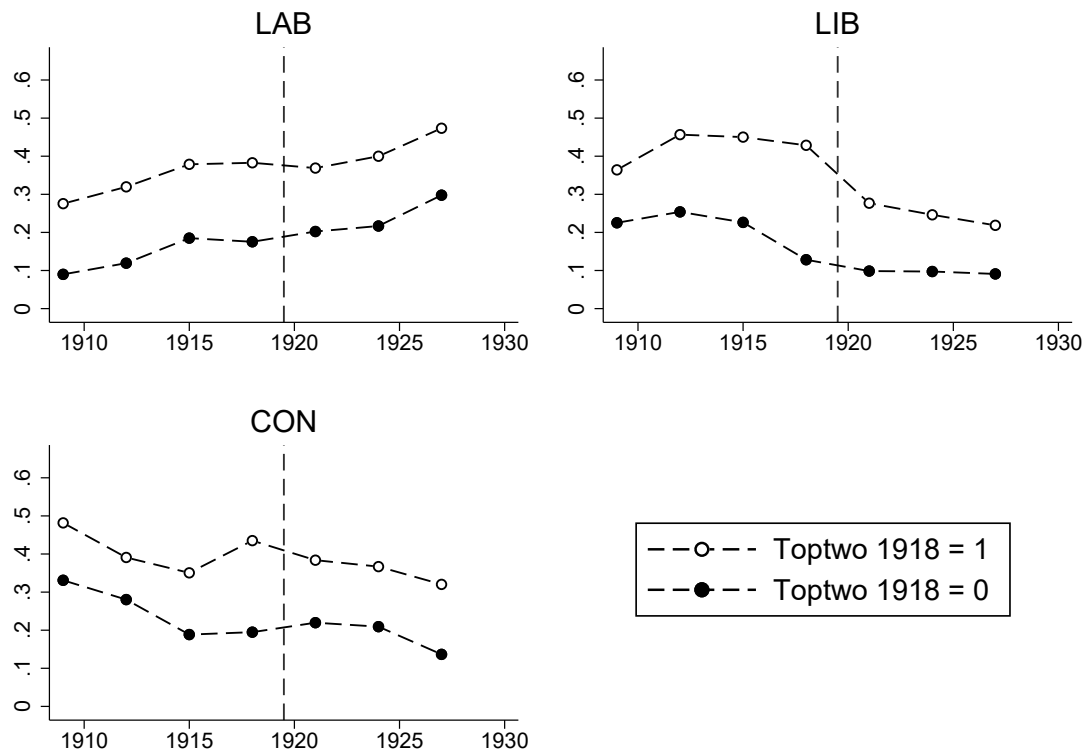
Note: The scatterplots and fitted lines correspond to specification (5), (6), (7), and (8) of Table 1. The y-axes measure the percentage point change in vote-share from year $t-3$ to year t for the bloc given in the title of the sub-panel. The x-axes measure the Liberal advantage over Labor in year $t-3$. 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



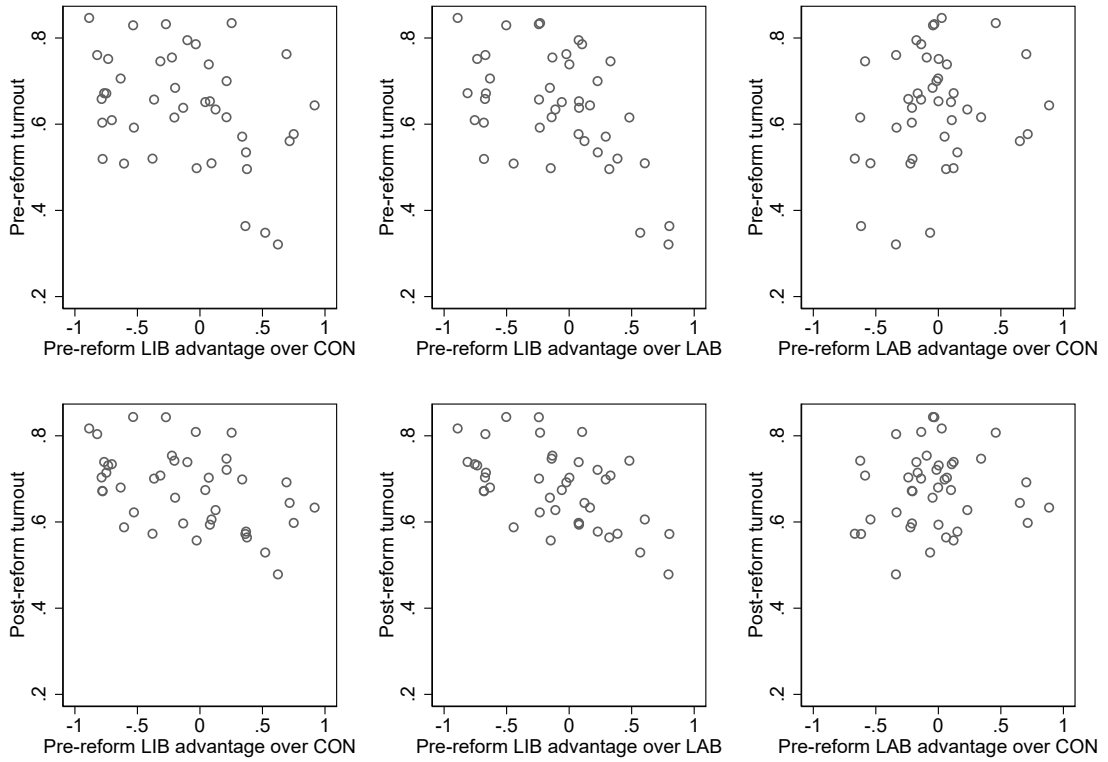
Note: The scatterplots and fitted lines correspond to specification (9), (10), (11), and (12) of Table 1. The y-axes measure the percentage point change in vote-share from year $t-3$ to year t for the bloc given in the title of the sub-panel. The x-axes measure the Labor advantage over the Conservative 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



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)
Votes share LAB	0.29	(0.16)	0.28	(0.14)	0.33	(0.12)
Votes share LIB	0.37	(0.25)	0.40	(0.23)	0.30	(0.18)
Votes share CON	0.27	(0.23)	0.25	(0.22)	0.36	(0.16)
Votes share 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 (0.067) [0.114]	0.517 (0.097) [0.137]	0.357 (0.104) [0.158]	0.264 (0.110) [0.169]	0.054 (0.085) [0.124]
Farmers Party		0.548 (0.102) [0.153]	0.557 (0.103) [0.154]	0.564 (0.102) [0.153]	0.700 (0.079) [0.106]
Social Democratic Labor Party			0.250 (0.071) [0.105]	0.276 (0.074) [0.114]	0.266 (0.069) [0.114]
Communist Party				0.129 (0.055) [0.072]	0.188 (0.052) [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 (0.061) [0.102]	0.809 (0.084) [0.115]	0.638 (0.091) [0.136]	0.548 (0.097) [0.150]	0.177 (0.082) [0.128]
Farmers Party		0.524 (0.087) [0.128]	0.534 (0.087) [0.128]	0.540 (0.087) [0.128]	0.669 (0.071) [0.091]
Social Democratic Labor Party			0.266 (0.071) [0.106]	0.291 (0.074) [0.114]	0.256 (0.069) [0.116]
Communist Party				0.126 (0.051) [0.068]	0.194 (0.051) [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) $\Delta V S^{LIB}$	(2) $\Delta V S^{LAB}$	(3) $\Delta V S^{CON}$	(4) $\Delta V S^{OTH}$	(5) $\Delta V S^{LIB}$	(6) $\Delta V S^{LAB}$	(7) $\Delta V S^{CON}$	(8) $\Delta V S^{OTH}$	(9) $\Delta V S^{LIB}$	(10) $\Delta V S^{LAB}$	(11) $\Delta V S^{CON}$	(12) $\Delta V S^{OTH}$
Pre-reform $\frac{V S^{LIB} - V S^{CON}}{V S^{LIB} + V S^{CON}}$	-0.152 (0.024)	-0.024 (0.025)	0.102 (0.047)	0.074 (0.041)								
Pre-reform $\frac{V S^{LIB} - V S^{LAB}}{V S^{LIB} + V S^{LAB}}$					-0.128 (0.029)	0.011 (0.023)	0.016 (0.041)	0.101 (0.035)				
Pre-reform $\frac{V S^{LAB} - V S^{CON}}{V S^{LAB} + V S^{CON}}$									-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)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	ΔVS^{LIB}	ΔVS^{LAB}	ΔVS^{CON}	ΔVS^{OTH}	ΔVS^{LIB}	ΔVS^{LAB}	ΔVS^{CON}	ΔVS^{OTH}	ΔVS^{LIB}	ΔVS^{LAB}	ΔVS^{CON}	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 (0.014) [0.015]	-0.030 (0.015) [0.012]	0.025 (0.035) [0.038]
Reform1921Xtop1918	-0.041 (0.018) [0.020]	-0.122 (0.026) [0.026]	-0.076 (0.041) [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 (0.018) [0.018]	-0.001 (0.023) [0.017]	0.091 (0.047) [0.047]
Reform1921Xtop1918	-0.041 (0.018) [0.020]	-0.108 (0.024) [0.025]	-0.099 (0.039) [0.036]
Farmers Party running	-0.026 (0.018) [0.018]	-0.058 (0.027) [0.026]	-0.078 (0.040) [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 (0.017)	-0.054 (0.023)	0.059 (0.029)
Reform1918Xtop1915	-0.031 (0.020)	-0.001 (0.030)	0.002 (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 (0.012)	-0.018 (0.012)	-0.045 (0.020)
Reform1915Xtop1912	-0.041 (0.014)	0.003 (0.022)	-0.013 (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 (0.014)	0.043 (0.030)	-0.026 (0.042)
Reform1912Xtop1909	-0.008 (0.020)	0.031 (0.034)	-0.060 (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).