Proportionality and Turnout: Competitiveness and the Contraction Effect of Electoral Reform

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— Preliminary first draft —

Abstract

A substantial body of research examines whether increasing the proportionality of an electoral system increases turnout, mostly based on cross-national comparisons. In this paper, we offer two main contributions to the previous literature. First, we exploit a within-country panel dataset based on stable subnational geographic units before and after Norway’s historic 1921 electoral reform. Second, we tie our predictions about the effect of the Norwegian reform—from a two-round, single-member district system to a multi-member district system with proportional representation—to recent theoretical work on elite mobilization. This work predicts that a transition from single-member to multi-member districts need not increase turnout. Whether it does or not will depend on the competitiveness of the pre-reform districts. Using our novel data, we find significant support for the predictions of the elite mobilization models.

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1 Introduction

A substantial body of research examines whether increasing the proportionality of seat allocation rules in an electoral system increases voter turnout (e.g., Powell, 1980, 1986; Jackman, 1987; Blais and Carty, 1990; Ladner and Milner, 1999; Blais, 2006; Eggers, 2014). The verdict has been characterized in widely different ways, with some (e.g., Selb, 2009, p. 527) insisting that “evidence that turnout is higher under proportional representation (PR) than in majoritarian elections is overwhelming,” and others (e.g., Herrera, Morelli and Palfrey, 2014, p. 4) opining that the empirical results are “rather mixed.” In a meta-analysis of 14 studies, Geys (2006) reports that 70% of the estimated correlations between proportionality and turnout are significantly positive.

Most of the studies surveyed by Geys conduct cross-sectional analyses of a relatively small sample of industrialized democracies; two focus on subnational units, and a few include larger samples of countries. In this paper, we offer two main departures from the previous literature. First, we exploit what is essentially a panel dataset—a series of observations on stable subnational geographic units before and after the 1921 Norwegian electoral system reform from a single-member district (SMD) majority runoff system to a multi-member district PR system. Our within-country analysis allows us to avoid relying on cross-sectional comparisons that may be plagued by multiple confounds.

Second, we tie our predictions about the turnout effects of the Norwegian reform to recent theoretical work on elite mobilization (Cox, 1999; Herrera, Morelli and Palfrey, 2014). This work predicts that a transition from single-member to multi-member districts will produce two off-setting effects. Turnout should decline in hotly contested SMDs but increase elsewhere. Thus, the overall distribution of turnout will contract toward an intermediate level. Depending on how many pre-reform SMDs are hotly contested, mean turnout may increase or decrease. With our data, we can measure the competitiveness of each district before the switch to PR, which allows us to make and test a more theoretically grounded set of predictions about the effect of electoral reform on turnout.
We find substantial support for the elite mobilization models. In particular, we observe a \textit{contraction} of the turnout rates observed in the pre-reform SMDs toward the post-reform PR mean: turnout tends to decline in competitive SMDs, falling toward the PR level, but to increase in the non-competitive SMDs, rising toward the PR level. Aggregating across districts, mean turnout increases (because most of the pre-reform SMDs were non-competitive), while cross-district variance declines. Aside from a few observations made long ago by Gosnell (1930, p. 183) and Tingsten (1937), our study is the first to provide systematic evidence of the contraction effect produced by reforming electoral systems from SMD to PR.

2 Previous work on proportionality and turnout

Multiple studies using cross-national comparisons of advanced industrialized democracies have found that mean turnout is higher under PR electoral systems than under SMD systems (e.g., Powell, 1980; Blais and Carty, 1990; Franklin, 1996; Blais and Dobrzynska, 1998). Within the set of industrialized democracies, the most widely acknowledged exceptions to the rule that turnout is higher under PR are Switzerland (relatively low turnout, despite PR) and pre-reform New Zealand (relatively high turnout, despite plurality rule). These exceptions suggest the importance of other variables—for example, the disaggregation of the electoral calendar (high in Switzerland, low in pre-reform New Zealand)—many of which are country-specific.\footnote{The relationship between proportionality and turnout is less consistent in new and developing democracies (e.g., Perez-Linan, 2001; Kostadinova, 2003; Fornos, Power and Garand, 2004; Blais and Aarts, 2006; Gallego, Rico and Anduiza, 2012).}

A few notable studies look at before-and-after evidence from within countries that experience electoral reform. For example, Gosnell (1930) and Tingsten (1937) observe that aggregate turnout increased in Germany and Norway, respectively, following the adoption of PR. In a more recent study, Karp and Banducci (1999) examine turnout in New Zealand following the switch from SMD to a mixed-member proportional (MMP)
system in 1993. They find an increase in (the already high, but declining) voter turnout.

A handful of other studies look at subnational variation within countries. For example, Ladner and Milner (1999) find that turnout is higher in Swiss cantons that use PR. Similarly, Bowler, Brockington and Donovan (2001) find higher turnout in U.S. municipalities that use cumulative voting rather than plurality rule. Eggers (2014) uses a regression discontinuity design applied to municipal elections in France—where towns with populations above 3,500 must use PR rather than a type of plurality system. He finds a slight (1 percentage point) increase in mean turnout under PR, and a lower level of variance in turnout across PR municipalities than across plurality-rule municipalities.

Three basic, and partially related, explanations have been advanced in the existing literature to explain higher turnout under PR (Blais and Carty, 1990). The first explanation is that, especially at higher levels of district magnitude, the translation of votes into seats is less distorted, thereby increasing voter efficacy. In a survey of voters before and after New Zealand’s electoral reform, for example, Banducci, Donovan and Karp (1999) find an increase in voters’ perceptions of the efficacy of their votes under the MMP system, especially among supporters of smaller parties.

A second explanation is that PR is more permissive to the entry of smaller parties (Duverger, 1954; Cox, 1997), so voters have less reason to abstain for lack of options matching their preferences (especially since they need be less concerned that their votes will be “wasted” on losing parties) (e.g., Powell, 1986; Jackman, 1987; Cox, 1997; Ladner and Milner, 1999). However, although many studies have found a relationship between PR and the number of parties entering competition (e.g., Cox, 1997; Eggers, 2014), the relationship between the number of parties and turnout has little to no empirical support (e.g., Brockington, 2004; Blais and Aarts, 2006; Grofman and Selb, 2011). This may be because more parties can lead to coalition governments and less clarity in voter choice (Jackman, 1987).

The third basic explanation is that PR elections tend to be more competitive (Jackman, 1987). Early rational choice work argued that close elections increase the chance
that a single voter might be “pivotal” in determining the outcome, and thus increase voter turnout (Downs, 1957; Tullock, 1968; Riker and Ordeshook, 1968). After the realization that these pivotal voter theories of turnout predict vanishingly small turnout rates in large electorates (Palfrey and Rosenthal, 1985), several scholars—beginning with Morton (1987, 1991) and Uhlaner (1989)—sought to resolve the “paradox of voting” by highlighting the mobilizational efforts of politicians and interest groups (e.g., Cox and Munger, 1989; Shachar and Nalebuff, 1999). The gist of the argument is that elite actors might rationally invest in mobilizing voters, while those voters might rationally respond to such mobilization by turning out to vote. Subsequent mobilization models, such as Cox (1999) and Herrera, Morelli and Palfrey (2014), have explored how these incentives to mobilize are conditioned by electoral rules. Aggregate turnout should be higher under PR because there are likely to be fewer “safe” districts, so voters and parties have incentives to mobilize across all districts. This should also result in a decrease in variance in turnout across districts.

However, a reform to PR need not increase turnout. Whether it does or not will depend on the competitiveness of the pre-reform districts. In the next section, we make our own contribution to the elite mobilization literature on voter turnout by exploring the potentially heterogeneous effects of a PR electoral reform on turnout.

3 Elite mobilization models of turnout and the contraction effect of electoral reform

We use an elite mobilizational model based on Herrera, Morelli and Palfrey (2014) to consider the effect of a hypothetical reform from plurality rule in SMDs to “perfect” PR. The model’s basic predictions can be explained with a little notation.

Imagine that two parties compete in pre-reform SMDs of equal size, indexed by \( j = 1, \ldots, J \). Denote the expected margin of victory in a pre-reform district \( j \) by \( M_{j,\text{pre}} \); the expected level of mobilizational effort by each party by \( E_{j,\text{pre}} \); and the expected turnout
of voters in district \( j \) by \( T_{j,\text{pre}} \). After the transition to PR, let the expected level of mobilizational effort in the geographic area corresponding to the pre-reform district \( j \) be \( E_{j,\text{post}} \); and the expected turnout be \( T_{j,\text{post}} \).

Initially, we can think of the PR system as collapsing all \( J \) pre-reform SMDs into a single \( J \)-seat nationwide district, with the allocation of seats based on some method of PR.\(^2\) We shall also imagine that the party system remains fixed (just two parties), and that voters’ preferences for the two parties also remain fixed (in our empirical analysis, we will investigate the effect of an increase in the number of parties). Finally, we hold fixed year effects. That is, we imagine that year-specific influences on turnout, such as rainfall affecting the cost of voting, are comparable before and after reform.

When pre- and post-reform years are otherwise comparable, there will exist a threshold margin of victory \( M \in (0,1) \) with the following three properties. First, in sufficiently competitive pre-reform SMDs—those for which \( M_{j,\text{pre}} < M \)—expected pre-reform mobilization and turnout will be higher than in the same area post-reform. That is, \( E_{j,\text{pre}} > E_{j,\text{post}} \) and \( T_{j,\text{pre}} > T_{j,\text{post}} \). The intuition is that mobilization is driven by how close the contest is (or is expected to be). In the pre-reform era, district \( j \) may be a “swing” seat closely contested by the two parties and thus heavily mobilized. After the reform, the parties’ incentives to mobilize in the same area will hinge on how close the contest is for the last-allocated seat in the nationwide district (Selb, 2009). While that last-allocated seat will typically be closely contested, given nationwide PR, there will still be a threshold \( M \) such that parties in SMDs with expected margins less than \( M \) will face greater mobilizational incentives. Second, in pre-reform SMDs such that \( M_{j,\text{pre}} = M \), the expected mobilization and turnout levels will be the same before and after reform. That is, \( E_{j,\text{pre}} = E_{j,\text{post}} \) and \( T_{j,\text{pre}} = T_{j,\text{post}} \). Third, in all other pre-reform SMDs—those for which \( M_{j,\text{pre}} > M \)—expected pre-reform mobilization and turnout will be lower than in the same area post-reform. That is, \( E_{j,\text{pre}} < E_{j,\text{post}} \) and \( T_{j,\text{pre}} < T_{j,\text{post}} \).

Putting these three predictions together, the elite mobilization model predicts a con-

\(^2\)For the purposes of the model, the seat allocation formula under the PR system (e.g., D’Hondt, Sainte-Lagué, etc.) is not important.
traction effect on turnout in the pre-reform SMDs toward the post-reform level:

- (D1) Turnout in competitive pre-reform SMDs (for which $M_{j,\text{pre}} < M$) will decline toward the post-reform level, $T_{PR}$.

- (D2) Turnout in intermediate pre-reform SMDs (for which $M_{j,\text{pre}} = M$) will remain at the post-reform level, $T_{PR}$.

- (D3) Turnout in non-competitive SMDs (for which $M_{j,\text{pre}} > M$) will increase toward the post-reform level, $T_{PR}$.

We should note that the contraction effect can be partially obscured when pre- and post-reform years differ systematically. For example, if the introduction of PR coincides with a large uniform reduction in the cost of voting, then even the most hotly contested pre-reform districts will experience increases in turnout. We can formally accommodate this pattern by allowing $M$ to take negative values, in which case only (D3) is observed. On the other hand, if the introduction of PR coincides with a large uniform increase in the cost of voting, then the contraction effect turns into a simple downward shift in turnout, which we can formally accommodate by allowing $M$ to exceed 1, in which case only (D1) is observed. Whether shifts in the cost of voting—or other year-specific effects—swamped the contraction effect in Norway is an empirical issue on which our results below will shed some light. The theoretical point is just that for any $M$ strictly between 0 and 1, we should observe a contraction of turnout toward the PR level.

The mobilization model also yields two predictions about aggregate turnout effects:

- (A1) Nationwide mean turnout will decline if the fraction of competitive pre-reform SMDs, $\kappa$, exceeds a threshold $K$; will remain the same if $\kappa = K$; and otherwise will increase.

- (A2) The cross-SMD variance in turnout will decline, as long as $\kappa \in (0, 1)$.
The first prediction (A1) is a straightforward consequence, although one cannot predict the precise value of $K$. The intuition of (A2) is that, under PR, the areas corresponding to the previous SMDs are all equally competitive post-reform. Their competitiveness is determined by the contest for the last-allocated seat in the nationwide district in which they all reside. Other time-invariant turnout-relevant features of these areas are held constant. Thus, we expect a reduction in post-reform variance. These theoretical predictions for the effect of PR on aggregate turnout are illustrated in Table 1.

<table>
<thead>
<tr>
<th>Fraction of competitive pre-reform districts ($\kappa$)</th>
<th>Expected change in mean turnout</th>
<th>Expected change in turnout variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0 &lt; \kappa &lt; K$</td>
<td>$+$</td>
<td>$-$</td>
</tr>
<tr>
<td>$\kappa = K$</td>
<td>$0$</td>
<td>$-$</td>
</tr>
<tr>
<td>$K &lt; \kappa &lt; 1$</td>
<td>$-$</td>
<td>$-$</td>
</tr>
</tbody>
</table>

Only a few existing studies, including Selb (2009) and Eggers (2014), have tested the prediction that PR will lead to lower variance across districts. We hope to contribute to this growing literature and add to the existing body of within-country evidence on how proportionality affects turnout.

4 Our empirical case: Norway, 1909-1936

From 1906 to 1918, members of the Norwegian Storting (parliament) were elected in SMDs with a two-round majority runoff system. If a candidate secured a majority of votes in the first round, he or she would be elected. Otherwise, a second round was held in which the candidate with a plurality of votes would get the seat. The majority runoff system was unusual in that there were no restrictions on candidate entry in the second round—even a candidate who did not compete in the first round could do so in the runoff. The average number of candidates competing in the first and second round was 3.41 and 2.77, respectively (Fiva and Smith, 2015).

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3We exclude the 1906 election from our analysis due to the lower quality of data for that first election.
Male suffrage (for those 25 years and above) was implemented in 1898. Female suffrage was gradually extended during the first decade of the 20th century, and universal suffrage was implemented in 1913. With the expansion of suffrage, support for the socialist Labor Party (*Det Norske Arbeiderparti*) increased, but the SMD system resulted in the party’s consistent under-representation. In part as a strategy of socialist “containment” similar to the pattern in many other European democracies in the early 20th century (Rokkan, 1970; Boix, 1999; Blais, Dobrzynska and Indridason, 2005), the non-socialist parties in the Norwegian parliament conceded in 1919 to change the electoral system to a multi-member PR system using the D’Hondt seat allocation formula. Our empirical analysis is based on four parliamentary elections preceding this reform (1909, 1912, 1915, and 1918) and six elections following the reform (1921, 1924, 1927, 1930, 1933, and 1936). Our primary aim is to quantify how the electoral reform affected voter turnout in the short run. The 1918 and 1921 elections are therefore of particular interest.

Table 2 summarizes the key differences between the electoral reform assumed in our theoretical model and the electoral reform experienced in Norway. We can think about extending the predictions (D1)-(D3) for plurality rule to majority runoff with the aid of two assumptions. Assumption 1 is that second-round contests are at least as closely contested as a counterfactual plurality contest in the same district would have been. This assumption seems reasonable because second-round contests occur only if there is enough competition to force a second round. Thus, second-round elections should be particularly likely to be “competitive” for purposes of prediction (D1). Assumption 2 is that first-

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4 The voting age was lowered from 25 to 23 in 1920.
5 See also Cusack, Iversen and Soskice (2007) for an alternative explanation. In addition to Norway, Austria (1907-19), France, Germany, Italy, the Netherlands (apart from urban districts), and Switzerland (three-rounds until 1900) also switched from two-round systems to PR. Belgium, Luxembourg, and the urban districts of the Netherlands switched from multi-member runoff systems to PR. Denmark, Iceland, pre-independence Ireland, Spain, and Sweden switched from single-round plurality to some form of PR (Boix, 1999).
6 See Aardal (2002) for a detailed overview. In 1953, the D’Hondt method was replaced by a Modified Sainte-Lagué seat allocation formula, which mechanically produces a more proportional seat allocation outcome (Fiva and Folke, forthcoming). Adjustment seats were introduced in 1989, contributing further to increasing the proportionality of the system.
7 The literature has not provided a full analysis of mobilizational incentives in two-round SMD elections. However, consistent with Assumption 1, several studies find that closer competition in the first round tends to result in increased turnout in the second round (Fauvelle-Aymar and François, 2006;
round contests that someone wins are no more closely contested than a counterfactual plurality contest in the same district would have been. This seems reasonable since, if someone wins the first round, that same person would likely win the plurality contest; and the other candidates’ incentives to coordinate are thus relatively weak regardless of the electoral rules.

If these assumptions hold, then a turnout contraction is weakly more likely when a country transitions from majority runoff to PR than when it transitions from plurality to PR.\textsuperscript{8} If both assumptions are reversed, then contraction is more likely to be observed in plurality-to-PR reforms than in runoff-to-PR reforms. Finally, if exactly one assumption is false, then we can no longer say which kind of reform is more likely to generate a turnout contraction (but we can still say that a contraction is theoretically possible under both).

<table>
<thead>
<tr>
<th>Table 2: Theory vs. Empirics</th>
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<tbody>
<tr>
<td>Model Pre-reform</td>
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<tr>
<td>---------------------</td>
</tr>
<tr>
<td>Number of Parties</td>
</tr>
<tr>
<td>Number of Districts</td>
</tr>
<tr>
<td>District Magnitude</td>
</tr>
<tr>
<td>Seat Allocation Method</td>
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</table>

In the 1909, 1912, and 1915 elections, 123 SMDs existed. In 1918, three additional districts were established. After the electoral reform, the total number of seats increased from 126 to 150. At the same time, the number of districts was reduced from 126 to 29. Our analysis is based on municipality-level election data provided by Statistics Norway. In the period we study, about 700 municipalities existed. Since municipalities map into SMDs, and SMDs map into PR districts, these data allow us to construct a panel data set covering the 1909-1936 period based on the pre-reform district structure. Most of the SMDs covered multiple municipalities. However, the most populous municipalities contained multiple SMDs. The capital, Oslo, for example, contained five SMDs. Since we only have post-reform election outcomes measured at the municipality level, we exclude

\textsuperscript{8}This assumes that we use second-round turnout as, in fact, we do.
19 SMDs that covered less than one municipality. In addition, we exclude all districts that did not contain the same set of municipalities over the entire pre-reform period (12 SMDs), and districts that contained municipalities that ended up in separate multi-member districts after reform (3 SMDs). Our final data sample is a balanced panel of 92 units covering 10 elections.

Based on the elite mobilization models and the contraction effect discussed above, we expect to observe heterogeneous effects on turnout at the district level depending on the competitiveness of pre-reform districts: very competitive districts should experience a decrease in turnout following reform (D1), while less competitive districts should either experience no effect (D2), or an increase in turnout (D3). At the aggregate level, we expect mean turnout to increase as long as safe districts are sufficiently common in the pre-reform period (A1) and variance to decrease (A2). We begin our empirical analysis with these aggregate-level predictions, as they are the most straightforward.

5 Aggregate turnout effects

We measure voter turnout by the ratio of approved votes to eligible voters in the final round. In other words, for the pre-reform period, we use the second-round turnout if two rounds were held, otherwise we use first-round turnout. In our sample, 45% of elections were decided in the first round. For the post-reform period, there is only one round of voting.

Figure 1 shows kernel density plots of voter turnout before (thin line) and after (thick line) the electoral reform.\(^9\) Mean voter turnout was 60% in the pre-reform period and 72% in the post-reform period. This indicates that the fraction of competitive pre-reform SMDs \(\kappa\) was below the theoretical threshold \(K\) at which the introduction of PR would actually result in a decrease in aggregate turnout.

The box-and-whisker plots in Figure 2 illustrate the distribution of voter turnout

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\(^9\)Appendix Figure A.1 shows cross-sectional distributions for turnout by election year.
Figure 1: Kernel Density Plot of Voter Turnout, Pre- and Post-Reform

Note: The figure shows separate kernel density plots of voter turnout in the pre- and post-reform period. Two-round elections were used from 1909-1918, proportional representation (D’Hondt) from 1921-1936. The level of observation in the data is based on the pre-reform district structure (n=92).
over time in the 10 elections in our sample. Together, Figure 1 and Figure 2 give clear support for the predictions that PR increases mean turnout (A1) and decreases cross-district variance (A2). Mean turnout increased from 0.58 to 0.65 from 1918 to 1921. This suggests that competitive SMDs were relatively rare prior to the reform. The standard deviation of voter turnout fell from 0.15 in 1918 to 0.09 in 1921.

Figure 2: Voter Turnout 1909-1936

Note: Box-and-whisker plot based on yearly district-level (final round) turnout. Two-round elections were used from 1909-1918, proportional representation (D’Hondt) from 1921-1936. The level of observation in the data is based on the pre-reform district structure (n=92).

6 The contraction effect

The above graphical analysis supports the aggregate-level predictions for mean turnout and variance under SMD and PR systems: the introduction of PR in Norway increased mean turnout (A1) and decreased cross-district variance (A2). We now turn our attention to the predictions regarding district-level competitiveness and the contraction effect.
To quantify the differences in competitiveness in the pre-reform period, we rely on the average differences in vote shares of the front-runner and runner-up in the first round ($\text{Margin}_{j,\text{pre}}$ in the following). $\text{Margin}_{j,\text{pre}}$ is the empirical counterpart to $M_{j,\text{pre}}$ from Section 3. In our sample, some districts were very competitive, others much less so. For example, 27 SMDs had an average $\text{Margin}$ below 10 percentage points, while 8 had an average $\text{Margin}$ above 30 percentage points.\(^{10}\) Figure 3 shows how mean turnout developed over time for districts with below and above the median value of $\text{Margin}$ in the pre-reform period. The below-median group (“competitive districts”) experienced a much smaller increase in turnout than the above-median group (“non-competitive districts”).\(^{11}\)

Figure 3: Turnout in Competitive vs. Non-competitive Pre-Reform Districts

Note: The figure shows the average turnout rate by election year using the pre-reform district structure, split by electoral closeness in the 1909-1918 period. Electoral closeness is measured as the average difference in vote shares between the first round front-runner (sometimes winner) and the runner-up in the 1909-1918 period. A district is classified as competitive if closeness $< 0.149$ ($n=46$), and non-competitive if pre-reform closeness $> 0.149$ ($n=46$).

\(^{10}\)Appendix Figure A.2 shows the frequency of observations by $\text{Margin}$.

\(^{11}\)Appendix Figure A.3 shows corresponding figures based on finer splits in the sample.
To analyze the district-level contraction effect more formally we use a regression framework. Exploiting data from the two elections immediately before and after the electoral reform, 1918 and 1921, we estimate variants of the following equation:

$$\Delta T_j = f(Margin_{j,pre}) + u_j$$

(1)

where $j$ is a pre-reform district under the SMD system and its geographic counterpart under the PR system, and $\Delta T_j$ measures change in voter turnout for $j$ from 1918 to 1921. We relate this to the average first-round difference between the front-runner and runner-up in the pre-reform period, $Margin_{j,pre}$. This allows us to test the variance hypothesis explicitly, and also allows us to investigate for which threshold of $Margin_{j,pre}$ ($M$ from Section 3) the predicted $\Delta T$ turns negative.

Table 3 provides the main results. Specification (1) reproduces the jump from 1918 to 1921 illustrated in Figure 3. This specification shows that the increase in turnout was 8.7 percentage points higher for the non-competitive districts than for the competitive districts. The effect is highly statistically significant with a t-value of 4.85. Specifications (2) and (3) suggest that the effect of PR on turnout appears to have a roughly linear relationship to the pre-reform margin. In specification (2), we estimate a simple linear regression model relating $\Delta T_j$ to $Margin_{j,pre}$. This model fits the data remarkably well: 42.8% of the variation in $\Delta T_j$ is explained by $Margin_{j,pre}$. Adding a second order term to the model—cf. specification (3)—does not further increase the $R^2$. We therefore consider specification (2) as our preferred specification. The point estimate of 0.65 suggests that a 10-percentage point increase in $Margin_{j,pre}$ (roughly corresponding to a standard deviation increase) increases $\Delta T_j$ by 6.5 percentage points.

Figure 4 graphically illustrates the relationship between $Margin_{j,pre}$ and $\Delta T_j$. The scatter points are the values for the 92 “SMDs” in our sample; the fitted line represents the predicted values for $\Delta T$ based on specification (2); the shaded area represents a 95% confidence interval of these predicted values. The dashed vertical line indicates
Table 3: Pre-Reform Margin and Change in Turnout

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
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<tbody>
<tr>
<td>Non-competitive</td>
<td>0.087***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Margin</td>
<td></td>
<td>0.649***</td>
<td>0.684**</td>
</tr>
<tr>
<td>Margin²</td>
<td></td>
<td></td>
<td>-0.083</td>
</tr>
<tr>
<td>Constant</td>
<td></td>
<td>0.024**</td>
<td>-0.040***</td>
</tr>
<tr>
<td><strong>N</strong></td>
<td>92</td>
<td>92</td>
<td>92</td>
</tr>
<tr>
<td><strong>R²</strong></td>
<td>0.207</td>
<td>0.428</td>
<td>0.428</td>
</tr>
</tbody>
</table>

Note: The dependent variable is the change in voter turnout from 1918 to 1921. Robust standard errors in parentheses. **p < 0.05, ***p < 0.01.

Figure 4: Relationship Between Pre-Reform Margin and Change in Turnout

Note: This figure shows the relationship between the pre-reform margin and the change in turnout $\Delta T$ based on a simple linear regression model. The fitted line shows the predicted values for $\Delta T$ and a corresponding 95 percent confidence interval, in addition to the 92 scatter points. The dashed vertical line indicates the point at which the fitted line crosses the x-axis.
the point at which the fitted line crosses the x-axis. In other words, specification (2) suggests that for a pre-reform SMD where $M < 0.067$, the introduction of PR reduced voter turnout. This finding provides support for the theoretical argument advanced by Herrera, Morelli and Palfrey (2014) and the corresponding predictions (D1), (D2), and (D3) presented above, that the introduction of PR may have heterogeneous effects on turnout, depending on the competitiveness of the pre-reform SMDs.

7 Sensitivity analyses

The above findings are robust to a number of sensitivity analyses. Our research design is based on within-district changes in voter turnout, which implies that time-invariant differences between high and low competition areas are unproblematic. Our electoral reform estimates could be biased, however, if high and low competition areas followed different trends in voter turnout. To investigate this potential problem, we re-estimate equation (1) using non-reform election years. Figure 5 presents the results from this falsification exercise based on specification (1) in Table 3. We see that in non-reform years there is no systematic relationship between $\Delta T$ and high and low competition areas. This is not surprising given the pattern shown in Figure 3, above. For completeness, we also provide results from a falsification exercise based on the simple linear regression model—specification (2) in Table 3. Figure 6 shows the results.

Another possibility is that our results might be due to a change in the number of electoral parties. With the introduction of PR, the number of parties running for office increased from about three to about five (cf. Appendix Figure A.4). A concern might be that the number of parties ($NoP$) increased more in low competition areas, and that this increase is responsible for the observed change in turnout. If so, the mechanism through which PR increases turnout doesn’t go through increased competitiveness, but rather through increased options (parties) for voters. To explore this alternative explanation, we include $\Delta NoP$ as a control variable in our regression framework. Specification (1)
Figure 5: Falsification Test: Dummy Variable Model

Note: The figure shows estimated regression coefficients from a regression relating change in turnout to a dummy for being a non-competitive district in the 1909-1918 period. Electoral closeness is measured as the average difference in vote shares between the first round front-runner (sometimes winner) and the runner-up in the 1909-1918 period. A district is classified as competitive if pre-reform Margin < 0.149 (n=46), and non-competitive if pre-reform Margin > 0.149 (n=46).
Figure 6: Falsification Test: Linear Regression Model

Note: The figure shows the relationship between the change in turnout and pre-reform margin based on simple linear regression models for each election year in our sample. The fitted lines show the predicted values for $\Delta T$ and corresponding 95 percent confidence intervals.
in Table 4 shows that the estimated effect of $\Delta NoP$ is close to zero and statistically insignificant. In specification (2), we replace $\Delta NoP$ with $\Delta NoB$, the number of political blocs participating in the election (Left, Center, Right, Agrarian, Other), and find a small positive effect, statistically significant at the 5% level. The point estimate of 0.02 indicate that when one additional bloc is participating in the election, turnout increases by two percentage points. Importantly, however, the estimated effect of Margin is not significantly altered when $\Delta NoP$ or $\Delta NoB$ are included in the model.

Another potentially important mechanism relates to district magnitude. The post-reform PR districts vary in magnitude from three to eight. It is plausible that turnout may increase more in “SMDs” under PR that are part of districts with larger magnitude, as larger magnitude will increase the proportionality of the seat allocation results and potentially attract greater mobilization effort by party elites. To investigate this possibility, we include $\Delta Magnitude$ as a control variable in specification (3). The results in Table 4 show that the effect of this variable is close to zero and statistically insignificant.$^{12}$

In specification (4), we include a set of fixed effects capturing the post-reform district structure. In this specification, we are comparing changes in turnout for “SMDs” ending up in the same post-reform district. The post-reform fixed effects improve the model considerably (the $R^2$ is roughly doubled). The point estimate of interest, however, does not change much. It falls only moderately in comparison to our baseline estimate and is still highly statistically significant (t-value of about 8).

Finally, we implement analyses with alternative operationalizations of $\Delta T$ and Margin. In specification (5), we use Margin measured in 1918, rather than Margin measured as the average in the pre-reform period. We find results similar to our baseline analysis, but we explain much less of the variation in $\Delta T$. In specification (6), we rely on the average pre-reform Margin in the final round rather than the average pre-reform Margin in the

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$^{12}$We also tested models where $\Delta NoP$, $\Delta NoB$, and $\Delta Magnitude$, were interacted with Margin. These interaction terms were, however, always statistically insignificant, and results are omitted for brevity. Another concern might be a potential heterogeneous effect of suffrage on turnout. However, the expansion of suffrage occurred in 1913, rather than at the time if the adoption of PR, and is therefore unlikely to confound our findings.
Table 4: Sensitivity Analyses

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Note: The dependent variable in columns (1) - (6) is the change in voter turnout from 1918 to 1921 using final-round turnout in the pre-reform period. The dependent variable in column (7) is the change in voter turnout from 1918 to 1921 using first-round turnout in the pre-reform period. Robust standard errors in parentheses. ** p < 0.05, *** p < 0.01.

The results are almost unaltered from our baseline analysis. Lastly, in specification (7) we use first-round turnout rather than final-round turnout to measure $\Delta T$. Again, we find a positive and significant relationship between $\Delta T$ and Margin. The positive constant term suggests, however, that even the most competitive SMDs experienced an increase in turnout from 1918 to 1921 when we compare with the first-round turnout in the pre-reform period.

## 8 Conclusion

Most existing studies of how proportional electoral rules affect voter turnout have examined cross-sectional datasets and focused on turnout measured at the aggregate, national level. In other words, previous scholars have explored whether turnout tends to be higher...
on average in countries that use PR than in countries that use SMDs.

However, the most recent theoretical models illuminate more than just aggregate mean turnout. Elite mobilization theories of turnout make detailed predictions about how turnout should change at the district level when national electoral reforms are adopted. More specifically, these models predict that mobilizational incentives (hence turnout) will contract following the adoption of PR, falling in highly competitive pre-reform SMDs, but increasing elsewhere.

In this paper, we have exploited a rich dataset on Norwegian parliamentary elections, before and after the major electoral system reform from two-round majority runoff to PR in 1921, in order to provide the first systematic assessment of the contraction hypothesis. We find that the data fit the theory’s predictions quite well.

References


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Appendix

Figure A.1: Cross-sectional Voter Turnout Distributions 1909-1936

Note: The figure shows the distribution of district-level voter turnout by election year. Two-round elections were used from 1909-1918, proportional representation (D'Hondt) from 1921-1936. The width of each bin is 5 percentage points. The level of observation in the data is based on the pre-reform district structure (n=92).
Figure A.2: Frequency of Observations by Average Pre-Reform Margin

Note: The figure shows the average difference in vote shares obtained by the front-runner and runner-up in the first round. The width of each bin is 2.5 percentage points. The level of observation in the data is based on the pre-reform district structure (n=92).
Figure A.3: Mean Voter Turnout 1909-1936 - Split by 1909-1918 Closeness

Note: The figure shows the average district-level turnout rate by election year, split by electoral closeness in the 1909-1918 period. Electoral closeness is measured as the average difference in vote shares between the first-round front-runner (sometimes winner) and the runner-up in the 1909-1918 period. The top-left panel is based on districts belonging to the first quantile of the closeness distribution (“competitive districts”), the bottom-right panel is based on the sixth quantile of the closeness distribution (“non-competitive districts”). The other panels show the intermediate categories. The level of observation in the data is based on the pre-reform district structure (n=92).
Note: The figure shows the average number of parties running in each election. Two-round elections were used from 1909-1918, proportional representation (D’Hondt) from 1921-1936. In the pre-reform period, the number of parties running in the first round is reported. The level of observation in the data is based on the pre-reform district structure (n=92).