This paper was published in the Journal of Politics, 2023,
Volume 85, Issue 3, pp. 1123-1138.

CC BY

Designing Electoral Districts for Proportional Representation Systems. How Electoral Geography and Partisan Politics Constrain Proportionality and Create Bias*

André Walter† and Patrick Emmenegger‡

Short title: Designing Electoral Districts

Proportional representation (PR) electoral systems have grown widespread because they are expected to ensure the representation of interests with small or geographically inefficiently distributed voter bases. Yet in reality, most PR systems consist of a large number of districts that vary strongly in size and some have surprisingly low magnitude. Existing research shows that such differences matter greatly for political outcomes but offers no explanation for their origins. We argue that the design of electoral districts in newly adopted PR systems is systematically linked to electoral geography and partisan politics. If parties with concentrated voter bases can influence the design of the new electoral system, they will create a significant number of low magnitude districts. In general, parties involved in designing districts benefit from electoral disproportionalities under the new PR rules. Empirically, we use newly collected district-level data for several Western European countries in the early 20th century.

Keywords: Electoral System, Proportional Representation, Electoral Geography, Political Parties, Quantitative Methods

†. Address: Müller-Friedberg-Strasse 8, 9000 St. Gallen, Department of Political Science, University of St. Gallen, Switzerland. URL: https://andrewalter.netlify.com/, Email: andre.walter@unisg.ch.

‡. Address: Müller-Friedberg-Strasse 8, 9000 St. Gallen, Department of Political Science, University of St. Gallen, Switzerland. URL: https://pemmenegger.com/, Email: patrick.emmenegger@unisg.ch.

§. Supplementary material for this article is available in the appendix in the online edition. Replication files are available in the JOP Dataverse (https://dataverse.harvard.edu/dataverse/jop). The empirical analysis has been successfully replicated by the JOP replication analyst.

Introduction

Over the last one hundred years, numerous democracies have adopted proportional representation (PR) electoral systems because, at least in theory, they are supposed to ensure a close relationship between votes cast for each party at an election and the number of seats won in parliament (Colomer 2005). However, these PR systems differ strongly with regard to district magnitude (the number of seats awarded per district) both within and across countries. For instance, within a one-year period, Norway adopted PR with rather small and uniform districts, the Netherlands created one nation-wide district with 100 seats, whereas Switzerland designed electoral districts whose magnitude ranged from one to 32 seats (see Table 1 below). These differences matter. Recent research has shown that variation in district magnitude influences, among others, the representation of urban interests, the seat-share of left-wing parties, the electoral support for small parties, the selection of candidates, and the effective proportionality of PR systems (e.g., Monroe and Rose 2002; Carey and Hix 2011; Iversen and Soskice 2006; Lachat 2015; Kedar et al. 2016; Lucardi 2019; Walter and Emmenegger 2019; Grofman 2016; Becher 2016; Becher and González 2019). What explains these differences in the design of electoral districts in PR systems?

Recent contributions have greatly expanded our knowledge about the reasons for moving from majoritarian rule (MR) to PR (e.g., Boix 1999; Calvo 2009; Cox et al. 2019; Emmenegger and Walter 2021). This literature typically emphasizes that parties choose electoral systems based on expectations about their future electoral performance (Benoit 2004; Colomer 2005). Moreover, research has demonstrated that the process of adapting electoral districts is typically driven by partisan interests under both MR and PR rules (e.g., King and Browning 1987; Engstrom 2013; McGhee 2020; Pilet 2007; Brady and Mo 1992). Yet remarkably little is known about the reasons for the design of electoral districts in *newly adopted* PR electoral systems. This is an important lacuna in the otherwise rich literature on electoral system reform. While partisan redistricting can be a powerful instrument under MR (Engstrom 2013), dis-

trict reforms under PR rules are often incremental, primarily concerned with adapting district magnitude to account for population growth. More substantial district reforms are rare (Nunez and Jacobs 2016; Pilet and Bol 2011).

However, PR systems offer great potential for partisan districting *at the moment of their adoption*, especially when there is geographic variation in parties' electoral strength and districts vary in magnitude (Grofman 2016). As countries adopt PR, electoral maps have to be completely redrawn, which results in singular changes in district magnitude. As we show in the next section, there is considerable variation in district magnitude within and across countries adopting PR. Moreover, this initial design of electoral districts is highly resilient, as countries often stick to these initial district maps. Still today, the Netherlands rely on one nation-wide district, whereas the Norwegian districts are considerably more uniform than the Swiss ones. Hence, the design of electoral districts in newly adopted PR systems creates a *unique* opportunity for parties to gain a decisive long-term advantage in the translation of votes into seats.

This paper accounts for differences in district magnitude within and across countries in newly adopted PR systems. We argue that, based on the geographical distribution of their voters, parties prefer different designs of electoral districts. More precisely, the designing party engages in either the making of its own electoral strongholds or the breaking of other parties' strongholds. If their voters are highly concentrated in certain areas, parties advocate low district magnitude in these areas and, if necessary, mergers of districts with homogeneous voter bases to maximize their number of seats in parliament. Under these conditions, entry barriers remain high even under PR. In contrast, if their voters are geographically dispersed, parties have an interest in increasing district magnitude to reach the minimum threshold for turning votes into seats. Importantly, parties' geographical distribution of voters varies within a country, suggesting different strategies in different regions. Hence, the same party might opt for low district magnitude in some regions of the country, while favoring high district magnitude in others.

To support our argument, we have collected data for several Western European countries on electoral outcomes at district level, party influence on district design, and geographical boundaries of districts before and after the introduction of PR. Following the existing literature, we focus on these cases for reasons of data availability and comparability (multiple countries adopting PR in the same region and at the same time). Based on this information, we have created a novel data set with pre-reform districts as the unit of analysis. Subsequently, we geo-referenced the location of all pre-reform districts to match them with the post-reform districts under PR. By focusing on electoral geography and whether parties were able to influence the district design, we find robust evidence that geographical variation in partisan support is an important determinant of district magnitude within and across countries. Importantly, these results hold when we control for administrative structures at subnational level, which might have served as focal points in the design of districts. Finally, we show that parties that influenced the district design continue to benefit from electoral disproportionalities in subsequent elections under the new PR system.

Our contribution links the literature on electoral system choice to existing work on partisan redistricting (Pilet and Bol 2011; Engstrom 2013; McGhee 2020), electoral geography (Calvo and Rodden 2015; Rodden 2010; Bochsler 2019; Colomer 2005), and the impact of district magnitude on political outcomes (Carey and Hix 2011; Kedar et al. 2016; Monroe and Rose 2002). We are, to our best knowledge, the first to provide quantitative evidence that partisan interests influence the design of districts in newly adopted PR systems and, thus, their long-term electoral fortune. Moreover, we emphasize the importance of political geography not only for MR but also for PR electoral systems. In this way, we contribute to the development of a theory on electoral district design and the effective proportionality of PR systems.

Our paper is structured as follows. We first discuss the neglected role of design questions in the literature on electoral system change. Subsequently, we demonstrate that existing approaches fail to explain differences in district magnitude under PR

rules. Next, we forward a novel argument on the link between electoral geography and district design. After presenting our data and research design, we subject our theoretical expectations to a systematic empirical test. A final section concludes.

District Design in New PR Systems

The literature has developed a number of approaches to explain why some countries adopted PR (e.g., Ahmed 2013; Boix 1999; Calvo 2009; Cox et al. 2019; Schröder and Manow 2020; Emmenegger and Walter 2021; Leemann and Mares 2014). Yet existing research does not appreciate the extent to which parties try to design PR systems to their advantage. In the following, we review differences in district design in newly adopted PR systems.

The PR electoral systems introduced in Western Europe at the beginning of the 20th century displayed considerable differences in terms of district magnitude (see Table 1). Mean district magnitude ranged from 1.15 in Germany in 1917 to 100 in the Netherlands in 1918. In addition, most electoral systems had at least one district with a magnitude of less than four, which can result in large disproportionalities also under PR (Carey and Hix 2011). Finally, countries with lower mean district magnitude display a higher coefficient of variation, which suggests that certain areas within these countries were more likely to benefit from potential vote-seat distortions than others.

Existing evidence shows that districting for new PR systems was highly contentious. The examples of Norway, Switzerland, and the Netherlands are instructive (more examples can be found in the appendix). For Norway, Cox et al. (2019) show that legislators preferred different district plans. Voting records indicate that Labor supported large districts across the country, whereas the Conservatives preferred single-member districts (SMD) or small multi-member districts (MMD) in their strongholds (small cities). Finally, the Liberals wanted to maintain as many elements of the old system

Table 1: Distribution of PR District Magnitude in Ten Countries

Country	N	Mean	Median	Std. Dev.	Min.	Max.	Coef. of Var.
Austria (1918)	38	6.68	7	2.61	1	12	0.39
Belgium (1899)	30	5.07	4	3.41	2	18	0.67
Denmark (1915)	93	1.25	1	2.38	1	24	1.91
France (1919)	97	6.01	5	3.12	2	23	0.52
Germany (1917)	388	1.15	1	0.71	1	10	0.62
Italy (1919)	54	9.41	8	3.84	5	20	0.41
Netherlands (1918)	1	100	100		100	100	
Norway (1919)	29	5.17	5	1.49	3	8	0.29
Sweden (1909)	56	4.11	4	1.14	3	7	0.28
Switzerland (1918)	25	7.56	6	7.61	1	32	1.01

as possible to shield their rural strongholds. In the end, Norway adopted PR with rather small districts and uniform district magnitude.

The outcome was different in Switzerland. Here, the Socialists and the conservative Catholic Party used direct democratic instruments to introduce PR and break the dominance of the Radical Party, the main faction of the liberal movement. The proponents of PR agreed to use the cantonal boundaries as electoral districts, which meant that the rural strongholds of the Catholic Party remained low in magnitude, while the urban centers ended up in large districts. For instance, five predominantly Catholic regions remained SMDs even under the new PR system, whereas urban districts received up to 32 seats. In fact, the Radical Party, which opposed PR, highlighted that PR in low magnitude districts would defeat the very purpose of PR and suggested the merger of small districts. However, the Radicals were not in the position to influence district design and the proponents of PR did not take the bait, which had been launched to break up the reform coalition (Emmenegger and Walter 2021). Thus, Switzerland adopted a PR system with electoral districts that differed considerably in terms of magnitude.

The adoption of PR in the Netherlands was equally controversial. While ultimately all parties agreed on the introduction of PR as part of a policy package to pacify the state-church cleavage, their preferences on district magnitude differed considerably. The Catholic Party with its highly concentrated voter base in the South supported

the "Belgian solution", i.e. PR with small districts on the countryside. In contrast, the Liberals wanted a nation-wide district to abolish disproportionalities as much as possible. The Socialists, finally, were primarily concerned with suffrage extension and spent little thought on whether to support PR or not, let alone the specific design of electoral districts under PR. Given that the liberal minority government, tolerated by the Socialists, initiated the reform and dominated the relevant reform commission, the Netherlands adopted one nation-wide district (Loots 2004).

These examples show that the specific design of electoral districts is highly controversial in newly adopted PR systems. However, what explains why the Netherlands designed a nation-wide district, Norway created uniform low-magnitude districts across the country, and Switzerland introduced districts ranging from one to 32 seats?

Electoral System Choice and District Design

The literature on electoral system choice has produced several explanations for the adoption of PR. In the following, we discuss their implications for electoral district design. As we show, they are unable to account for variation in district magnitude within and across countries.

In general, this literature focuses on why parties, groups within parties, or individual members of parliament (MPs) support or oppose PR. These actors' position on electoral system choice is typically assumed to be based on past experiences and, to some extent, expectations about their future electoral performance (Benoit 2004; Colomer 2005). More concretely, party-based approaches start with the entry of a new challenger party that alters the existing electoral equilibrium. If the new entrant can gather enough electoral support or has a concentrated voter base (Boix 1999; Calvo 2009; Boix 2010), established parties may lose a significant number of seats. Under these conditions, established parties may be increasingly disadvantaged and push for PR to abolish the distorting electoral consequences of MR systems. Related

approaches focusing on party factions and individual MPs argue that even if a party is advantaged by MR, individual MPs might defect from the party line if they face fierce competition from insurgent parties in their districts (Leemann and Mares 2014). Again, the expectation is that MPs begin to support PR because they want to reduce electoral barriers in order to increase their *own* re-election prospects.

Although often not explicitly spelt out, the implication of these contributions is that large districts under PR provide a lifeline for parties with inefficiently distributed voter bases (possibly due to competition among established parties) and neutralize the most adverse effects of the emergence of insurgent parties. As a result, these approaches to electoral reform cannot account for the creation of low magnitude districts. In fact, such districts would neutralize the very effect PR adoption was supposed to have on the future electoral viability of established parties.

Other approaches highlight party elites' interest in legislative cohesion (Cox et al. 2019; Schröder and Manow 2020). More specifically, party elites advocate PR in order to monopolize control over the candidate selection process to limit vote defection from the party line. In turn, backbenchers oppose electoral reform because PR would weaken responsiveness to their local constituency. In terms of electoral design, this argument implies that party elites prefer large electoral districts to be able to channel their resources to fewer districts. In contrast, backbenchers are expected to support SMDs and oppose PR. Thus, electoral district design is the result of a bargaining process between party elites and backbenchers. From this perspective, however, it is unclear why district magnitude should vary within countries.

In sum, although the literature has made great progress in explaining the adoption of PR, it cannot account for variation in district magnitude in newly adopted in PR systems. In the following, we turn to the literature on redistricting and electoral geography to explain parties' positions on district design.

Making and Breaking Electoral Strongholds

There is a rich literature on how electoral districts are adapted for partisan advantage, in particular the maximization of seat shares (e.g., McGhee 2020).[1] Yet this literature suffers from two shortcomings. First, unlike research on MR systems, research on partisan districting in PR systems has paid little attention to electoral geography. This is a mistake, because geographic variation in parties' electoral strength has the "potential for bias even under PR, and this potential is enhanced when districts vary in magnitude" (Grofman 2016, 532). As Table 1 above shows, there is considerable variation in district magnitude both within and across countries.

Second, research on partisan districting has failed to explore the design of electoral districts in *newly adopted* PR systems. District reforms under PR rules are often concerned with adapting district magnitude to account for regional differences in population growth, whereas more substantial district reforms with significant implications for entry barriers are rare. In fact, the lack of district reforms under PR rules has even triggered research investigating why such reforms are rare despite potential benefits (Pilet and Bol 2011; Nunez and Jacobs 2016).

Yet PR systems offer great potential for partisan districting at the moment of their adoption. Figure 1 displays the effective electoral threshold for the mean district magnitude under PR or, alternatively, the PR tier in mixed electoral systems. Following Boix (1999), we use the effective electoral threshold as an indicator of electoral systems' (dis-)proportionality.[2] The dashed line indicates the year PR was adopted.

Figure 1 shows that in each case, the adoption of PR was associated with a massive decrease in the electoral systems' entry barriers. This is because as countries adopt PR, electoral maps have to be completely redrawn since districts under MR

1. There are also other reasons for district reform (Hooghe et al. 2006; Pilet 2007; Renwick 2010).

2. The threshold captures the vote share a party must receive to have a 50% chance to win one seat in a district. The figure provides data for all countries used in the analysis with the exception of France, which used PR alongside MR in the 1919 and 1924 elections and PR from 1945 to 1956 (on France, see Boix 1999, 618). The data come from Mackie and Rose (1982), Nohlen and Stöver (2010), Pilet et al. (2016), Ucakar (1985), Fiva and Smith (2017), and Grofman and Lijphart (2002).

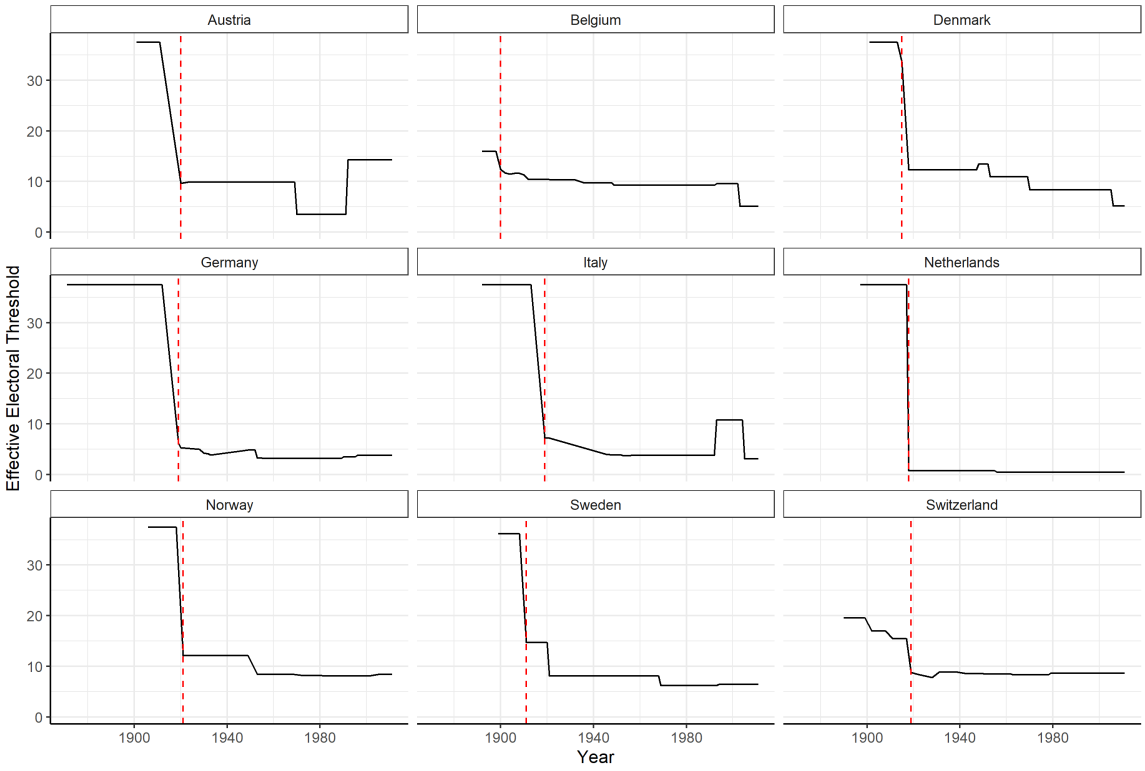


Figure 1: Development of Effective Electoral Threshold in Mean-Sized Districts (Dashed line: Year of PR adoption)

are often very small (typically single-member districts) and thus unsuitable for PR.[3] Subsequent changes in the effective electoral threshold pale in comparison with the changes caused by the adoption of PR.

Moreover, Figure 1 displays large differences in the effective proportionality of PR systems. For instance, after the adoption of PR, the effective electoral threshold in the mean-sized district was 1% in the Netherlands (1918), whereas it remained above 10% in neighboring Belgium (1899). Moreover, as Table 1 above shows, there are also important within-country differences with Norwegian districts ranging from 3 to 8 seats (1919), whereas French districts ranged from 2 to 23 (1919).

In the following, we develop an argument about how parties can maximize their seat share by strategically drawing electoral districts for the new PR system. We

3. Pilet and Bol (2011) argue that uncertainty about the effects of electoral reform impedes parties from supporting even seemingly advantageous change. Yet in the case of PR adoption, electoral district reform is *unavoidable*, because the 'old' districts are typically too small for the new PR system.

assume that once the decision to adopt PR has been made, a coalition of parties engages in a bargaining process about electoral district design. Based on the literature on electoral geography (Brady and Mo 1992; Boix 2010; Rodden 2010), we argue that parties develop their position on district magnitude based on the ideological composition of these districts, which is reflected in the geographical distribution of party voters. More precisely, depending on their electoral geography, parties can pursue two strategies to maximize their seat share.[4]

On the one hand, if the parties' voters are comparatively concentrated, we expect them to create high entry barriers for other parties. Such parties strive to keep a large number of districts with low magnitude and oppose mergers with ideologically heterogeneous districts. As a result, these districts constitute "strongholds" in which other parties struggle to make any advances due to high electoral thresholds (due to small district magnitude) and homogeneous voter bases. By sheltering locally dominant parties from competition, these districts inherit some of the distorting features of the previous MR systems.

On the other hand, if the parties' voters are comparatively dispersed, we expect them to reduce electoral barriers. Such parties are harmed by low magnitude districts. Thus, they are expected to push for large districts that guarantee the proportional translation of votes into seats, thus allowing them to win seats despite their dispersed voter bases. Put differently, they prefer the creation of large and ideologically heterogeneous districts with low electoral thresholds. If necessary, this strategy also implies the breaking up of strongholds of other parties.[5]

4. Our argument focuses on the electoral geography of the political parties involved in district design for the new PR system. Therefore, we do not consider the electoral geography of the parties *not* involved in electoral district design. Most notably, we do not examine the fragmentation of the parties not involved in the design of electoral districts. This fragmentation is a key variable in explanations of why parties might prefer PR to MR (most notably Boix 1999). However, the fragmentation of the remaining parties is considerably less relevant in PR systems, because these electoral systems do not follow a winner-takes-all logic.

5. Of course, other features of an electoral law can weaken or amplify these strategies. For instance, most new PR systems relied on the D'Hondt formula for vote to seat allocation (Bormann and Golder 2013). In case of a large number of mid-sized parties, countries switched to the Sainte-Laguë formula over time (Grofman and Lijphart 2002). Thus, even within PR systems, seat distribution favors larger parties, which provides further incentives to strategically design electoral districts (Schuster

Based on their electoral geography, we thus expect parties to favor low magnitude districts if their voter bases are comparatively concentrated and high magnitude districts if their voter bases are comparatively dispersed. Importantly, the degree of voter base concentration varies within a country, which implies that party positions on electoral district design are likely to differ between regions. Hence, the same party might pursue low magnitude districts in some regions of a country and large magnitude districts in other regions.

Of course, party positions on the design of electoral districts matter only if these parties are involved in the design of these districts (Calvo and Micozzi 2005). In the empirical analysis, we capture party influence on electoral district design directly. However, at this point, two theoretical observations are important. First, if a single party influences electoral district design, we can expect this party to design electoral districts to its specific needs. However, often, multiple parties will be involved in electoral district design. In these cases, it is plausible to assume that all coalition members benefit to some extent from participating in the reform coalition. Empirically, such compromises should work against finding a strong effect of electoral geography on district magnitude.

Second, electoral district design is a zero-sum game, because any efficiency gains in the translation of votes into seats must come at the expense of another party. Designing coalitions that exclude at least one party are likely to make the excluded party the loser in this process. In turn, if no (major) party can be excluded, for instance because institutional hurdles prevent such an exclusion, we should expect to observe PR systems with medium-sized districts whose magnitude barely varies across the country. In such encompassing coalitions, all major parties have to agree to the reform, which implies that no major party can gain large benefits from district reform at the expense of another major party. This should result in a compromise deal on electoral districts.

et al. 2003). Alternatively, parties may try to influence electoral thresholds (Walter and Emmenegger 2019; Bol et al. 2015).

To make these claims empirically testable, we formulate two hypotheses on region-specific district magnitude, which link the design of electoral districts to parties' electoral geography but differ depending on whether a party is part of the designing coalition. More precisely, in case of geographically concentrated voter bases, we have the following theoretical expectations about parties with influence on district design:

Hypothesis 1: *A high geographical concentration of a party's voter base in a specific region leads to a low district magnitude in this region if this party is able to influence the design of electoral districts.*

In contrast, for geographically dispersed voter bases, we expect the effect of electoral geography and political influence on district magnitude to change.

Hypothesis 2: *A low geographical concentration of a party's voter base in a specific region leads to a large district magnitude in this region if this party is able to influence the design of electoral districts.*

Hence, we expect the creation of large electoral districts in regions where parties' voter bases are inefficiently distributed or, alternatively, concentrated but parties were unable to influence the district design. At the most extreme, this can result in the creation of a single nation-wide district. In contrast, we expect the creation of small electoral districts in regions where parties' voter bases are concentrated or, alternatively, inefficiently distributed but parties were unable to influence the district design. Finally, given that strategic redistricting is a zero-sum game, we expect that the larger the reform coalition, the weaker is the ability of individual parties to bias the district design to their advantage. At the most extreme, a national unity coalition involving all relevant parties will design rather uniform, mid-sized electoral districts that do not particularly benefit any of the involved parties.

To illustrate our argument visually, we discuss redistricting in the context of the French electoral reform. Until 1914, elections were conducted in a runoff system with SMDs. After the First World War, France adopted PR with MMDs. According

to the new electoral law, the administrative structure which divided the country in differently sized departments ought to serve as blueprint for the electoral districts. In addition, district magnitude was supposed to vary between three and six seats. Figure 2 provides a map showing the division of France into SMDs (1914) with grey borders, MMDs with black borders (1919), and the combined vote share of the dominant center parties, i.e. Radicals and Republicans.

The legal requirements of the new electoral system, however, were violated in numerous instances. Many electoral districts featured between 7 and 23 seats and thus exceeded the maximum threshold of six seats. In other instances, departments were divided in a manner that benefited the dominant parties. We show two examples in Figure 2 in which departments had more than six seats and were divided into multiple electoral districts.

In Bouches-du-Rhône on the upper left hand side, two districts with nine seats in total were created. As the figure shows, the low magnitude district containing large parts of the department was clearly dominated by the center parties. More precisely, three seats were allocated to the district in which the center block received a majority of votes in all areas. In contrast, the geographically smaller but more populous district in the east that covers the city of Marseille and its surrounding areas had six seats but was ideologically more heterogeneous.[6] On the upper right hand side, the eastern district in Maine-et-Loire was dominated by the center parties with a district magnitude at the lower legal threshold of three seats. In contrast, the electoral support in the western district was more diverse and the district magnitude slightly larger. These examples thus suggest that there is a link between the geographical distribution of parties' support base and district magnitude.

Critical readers might argue that parties with concentrated voter bases are expected to oppose PR and are therefore unlikely to be part of the designing coalition in the

6. The city of Marseille contained multiple SMDs. However, we did not have sufficient information and detailed data to locate the three districts within the city. Thus, we display the Marsaille as a single SMD in Figure 2.

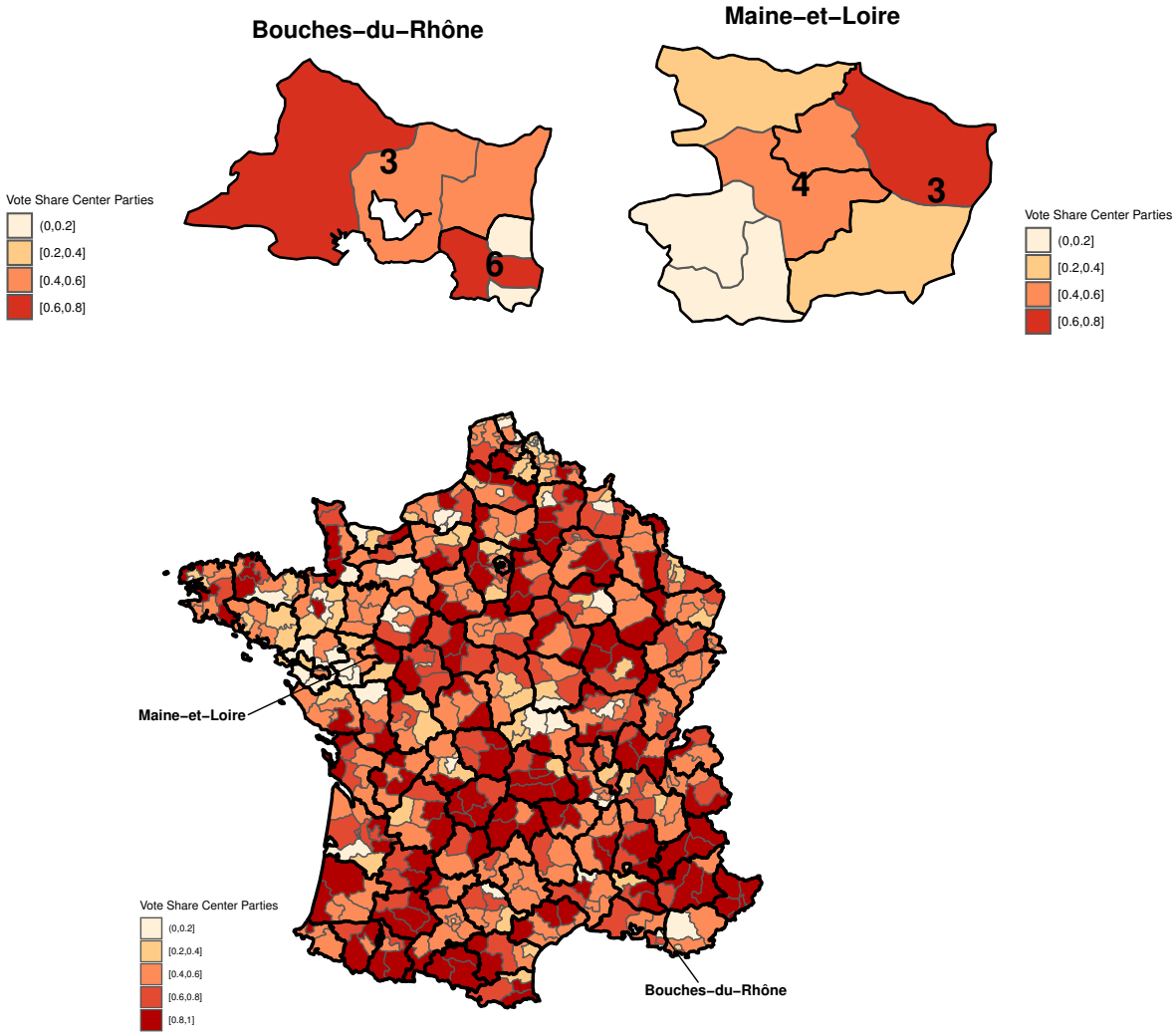


Figure 2: Pre-Reform and Post-Reform Districts in France

first place. While this would indeed be the prediction of some electoral geography approaches, several parties with geographically concentrated voter bases were in favor of PR such as different catholic and conservative parties in France, Germany, Italy, and Switzerland (Boix 2010). In addition, the geographical voter base of parties can vary considerably within a country. The Belgian Catholic Party, for instance, was essentially unchallenged in rural Flanders but also held a large number of seats in highly competitive urban districts such as Brussels (Emmenegger and Walter 2019; Ahmed 2013). Among the countries examined in this paper, there are multiple examples of parties with regionally concentrated voter bases participating in the coalitions that designed the new electoral districts. Finally, the ability to influence electoral districts under the new PR rules and support for the adoption of PR are not identical. For instance, Belgian and Swiss Liberals supported PR but were not able to influence the district design (see Table 2 below).[7] In contrast, Denmark's Venstre, the Norwegian Liberals, and Sweden's Social Democrats opposed PR but were part of the coalition designing the new districts (cf. Boix 2010; Särlvik 2002; Emmenegger and Walter 2019; Cox et al. 2019; Emmenegger and Walter 2021).

For this reason, we sidestep the question why certain political parties supported the adoption of PR. This question is the topic of a rich literature, which has identified a multitude of reasons why parties might favor or oppose PR. Instead, we aim to explain the design of electoral districts under the new PR rules. *This* question – although largely overlooked by the existing literature – is of great importance for a range of political outcomes (e.g., Carey and Hix 2011; Lachat 2015; Lucardi 2019; Walter and Emmenegger 2019; Monroe and Rose 2002; Kedar et al. 2016).

7. In the Belgian case, the Liberals participated in successful public protests against electoral reform proposals that were even more in favor of the Catholic Party.

Research Design and Data

In the following, we describe our data set and discuss our estimation strategy. Our empirical analysis consists of three parts. First, we employ the available data to provide evidence for our argument in a larger set of countries. Second, we limit our sample to countries where multiple electoral reforms were legislated by different reform coalitions over a short period of time or where multiple competing proposals were on the table at the same time. These cases allow us to use more restrictive specifications to increase the credibility of our findings, in particular by taking into account administrative structures at subnational level, which could have served as focal points in the design of electoral districts. Third, we show that parties that influenced the electoral district design benefited from disproportionalities in the subsequent election under PR.

To test our hypotheses, we have engaged in a large data collection effort. We have assembled a data set with the electoral outcomes at district level in the last election before the introduction of PR in six countries.[8] In all of these cases, we use the electoral reform that abolished MR in the first step of the analysis. The six countries are Belgium (1899), Denmark (1915), France (1919), Germany (1917), Norway (1919), and Switzerland (1918). Subsequently, we geo-referenced the location of all pre-reform districts in these countries to match them with the post-reform districts under PR.

The data thus cover the majority of Western European countries that introduced PR before the Great Depression and had elections as independent states under pre-PR electoral systems. In contrast, we do not cover Austria (1919), Italy (1919), the Netherlands (1918), and Sweden (1909) in this first step of the analysis. In the case of Italy and Sweden, we could not find the relevant data. For Italy, to our best knowledge, the relevant electoral data is simply not available at the pre-reform district level. In Sweden, by contrast, the data is available at the pre-reform district level. Yet it is not

8. In electoral systems with runoffs, we have used the first-round vote share because we expect less strategic candidate entry and voting.

possible to allocate all candidates at district level to the relevant parties, which makes an examination of party strategies in the reform of electoral districts impossible. We have also collected data on Austria and the Netherlands. However, we were forced to exclude both countries from the analysis. In Austria, most pre-reform SMDs did not map onto the post-reform districts, making it impossible to identify how SMDs were divided and assigned to different PR districts.[9] In contrast, the Netherlands created a single nation-wide district with the magnitude of 100, which implies that there is no variation in district magnitude under PR (see Table 1).[10]

Existing research on districting in MR systems has used simulations based on a number of objective criteria to disentangle partisan bias from naturally occurring bias originating from the geographical sorting of voters (e.g., Chen and Rodden 2013). In MR systems, both types of bias are difficult to disentangle because elections are held in SMDs that might cover only few densely populated municipalities or communities. If these areas are also ideologically homogeneous, partisan bias might arise without intentionally (re-)drawing boundaries.

However, these issues are less important under PR because elections are held in multi-member districts. The geographical scope of a district can be expanded by adding more seats. Put differently, the problem is not primarily where district boundaries are drawn but how many seats are allocated, making electoral geography endogenous to party strategies. Based on these considerations, we define pre-reform districts as our unit of analysis. Our *dependent variable* is the magnitude of the electoral district under

9. After excluding Austria, there are only three cases in Germany in which pre-reform districts were divided and assigned to different PR districts (out of 1406 cases in our sample). In these cases, we focused on the part with the largest population when assigning pre-reform districts to PR districts.

10. It is worth emphasizing that at the aggregate level, the district design in these countries' newly adopted PR systems corresponds to our expectations. In the Netherlands, the Liberals were in charge of district design (see Table 2 below). With their dispersed voter base (cf. Boix 2010, 407), they created a single nation-wide district. In the other three countries, the designing coalitions had mixed electoral geographies (i.e. concentrated in some regions, dispersed in others). In Sweden, all major parties were part of the coalition designing the electoral districts, which resulted in medium-sized districts whose magnitude barely varied across the country (ranging from 3 to 7, see Table 1) because no party could gain benefits from district design at the expense of another major party. In contrast, in both Austria and Italy, some major parties were not able to influence the design of electoral districts. As a consequence, variation in district magnitude is considerably higher in these two countries than in Sweden (ranging from 1 to 12 in Austria and 5 to 20 in Italy).

PR to which this pre-reform district was assigned.

What explains whether pre-reform districts under MR are assigned to small or large districts under PR? The basic intuition of our modeling strategy is as follows. For the sake of simplicity, let us assume that pre-reform districts have a magnitude of one (SMDs), whereas post-reform districts (now under PR) must have a magnitude greater than one.[11] A party with regional strongholds is interested in keeping district magnitude in these regions low. For instance, if a party has a vote share of 75% (plus one vote) in two contiguous SMDs, a merger (now district magnitude two) would result in an effective electoral threshold that is still large enough to prevent any other party from gaining a seat. In this example, the party has merged two SMDs into a district under PR with magnitude greater than one. However, by merging two strongholds and keeping district magnitude small, the party is able to preserve some of the advantages of the regionally concentrated voter base. The opposite logic applies for parties whose voter base is dispersed. If a party's vote shares in a larger number of proximate SMDs is 5% (plus one vote), a district with magnitude of 14 would be sufficient to allow the party to gain a seat under the new PR system. In this example, the party has managed to turn 14 SMDs, which it all had lost under MR, into a large PR district, where it has a reasonable chance to win at least one seat.

However, whether parties can shape the design of electoral districts depends on their ability to influence electoral reform. To measure parties' influence on the design of districts under the new electoral system, we have consulted country experts and reviewed primary and secondary sources on the policy processes that resulted in the adoption of PR. Based on these reviews, we have created a binary indicator to capture whether a party was able to influence the design of electoral districts and, thus, was part of the designing coalition. An overview can be found in Table 2. The data sources as well as a detailed explanation of our coding decisions are documented in

11. Some countries had multi-member districts already under MR (Colomer 2007). In addition, there are examples of districts with magnitude one under PR. However, as a general rule, PR districts are equal or larger than MR districts in magnitude. Hence, the logic of the example applies to all cases examined in this paper.

the appendix.

We capture the geographical distribution of parties' voter bases using two variables. First, among the coalition of parties influencing the design of electoral districts in the newly adopted PR system, we use the vote share of the coalition party that has the highest electoral support in a pre-reform district. While parties pursue different strategies depending on their electoral geography, we argue that they are first and foremost interested in preserving local strongholds (cf. Cox et al. 2020). It is here where parties have concentrated benefits (in terms of seats to be won), whereas the other coalition parties have rather diffuse costs (in terms of seats they might be able to win if districts were larger). Therefore, coalition parties' distribution of concentrated voter bases are crucial to understand the design of electoral districts under PR.

Second, its vote shares in neighboring pre-reform districts capture whether a designing party had the opportunity to merge districts with homogeneous voter bases. In all PR systems, pre-reform districts had to be contiguous in order to be merged. Therefore, we create a measure of the maximum vote share of the (locally) dominant coalition party in all neighboring pre-reform districts. We use the maximum instead of the mean because in case of an unequal distribution of a party's vote share in contiguous districts, the mean vote share underestimates the potential for a party to create low-magnitude districts with homogeneous voter bases under PR.

To put both measures in a relationship, we use an interaction term of the vote share of the dominant coalition party in a pre-reform district and its maximum vote share in the neighboring districts. This interaction allows us to capture the parties' electoral geography. High vote shares in two neighboring districts allow designing parties to create low-magnitude districts with a concentrated voter base ("strongholds"). The coefficient of the interaction term should thus be negative (low-magnitude district).

We include three control variables. First, we add a variable for the magnitude of pre-reform districts. Switzerland and Belgium already had multi-member districts,

Table 2: Coding of Party Influence on Electoral Laws (District Design)

Country	Year	Party	Influence	Sources
Austrian Empire	1918	Catholic Party, Social Democratic Party	Yes	Ucakar (1985)
		German Nationals	No	
Belgium	1899	Catholic Party	Yes	Emmenegger and Walter (2019)
		Liberals, Socialists	No	
Denmark	1915	Venstre, Radical Venstre, Social Democrats	Yes	Elklit (1988)
		Conservatives	No	
Denmark	1918	Conservatives, Radical Venstre, Social Democrats	Yes	Elklit (1988)
		Venstre	No	
France	1919	Right Block, Center Block	Yes	Marty (2013)
		Socialists	No	
Imperial Germany	1917	Centre Party, National Liberals, Progressive People's Party, Social Democrats	Yes	Schanbacher (1982)
		Free Conservative Party, German Conservative Party	No	
Imperial Germany	1918	Social Democrats	Yes	Schanbacher (1982)
		Centre Party, National Liberals, Progressive People's Party, Free Conservative Party, German Conservative Party	No	
Italy	1919	Liberals, Radicals	Yes	Noiret (1997)
		Catholics, Socialists	No	
Netherlands	1918	Liberals	Yes	Loots (2004)
		Socialists, Religious Parties	No	
Norway	1919 (I)	Liberals (failed reform)	Yes	Cox et al. (2019)
		Conservatives, Labor	No	
Norway	1919 (II)	Liberals, Conservatives, Labor	Yes	Cox et al. (2019)
Sweden	1909	Conservatives, Liberals, Social Democrats	Yes	Särlvik (2002)
Switzerland	1918	Catholic Party, Social Democratic Party	Yes	Gruner (1978), Linder et al. (2010)
		Radical Party, Liberals, Democrats	No	

whereas the other countries relied on SMDs before the adoption of PR (Colomer 2007). In our sample, none of the pre-reform multi-member districts were broken up, not even the exceptionally large Brussels district, presumably because this would have damaged the legitimacy of the new PR system. Second, we include a dummy variable for socialist parties to account for the possibility that socialist parties might have an ideological preference for large districts (Bol 2016). Third, we use country fixed effects (FE) to capture idiosyncrasies of electoral laws that apply nation-wide such as differences in the seat allocation formula.[12] The summary statistics can be found in Table 3.

Variable	Mean	Median	Standard Deviation	Minimum	Maximum
Pre-Reform District Magnitude	1.19	1.00	1.00	1.00	18.00
Post-Reform District Magnitude	5.34	4.00	5.41	1.00	32.00
Socialist Party	0.21	0.00	0.41	0.00	1.00
Max. Vote Share Contiguous Districts	0.65	0.65	0.26	0.00	1.00
Vote Share	0.55	0.53	0.21	0.00	1.00

Table 3: Summary Statistics

To get our quantities of interest, we employ the following estimation equation for all pre-reform districts i:

$$PRdismag_i = \alpha + \beta_1 votsh_i + \beta_2 maxshnd_i + \beta_3 votsh_i \cdot maxshnd_i + \beta_4 X_i + \epsilon_i$$

where *PRdismag* is the magnitude of the post-reform district after PR was introduced. In addition, *votsh* represents the vote share of strongest party in a pre-reform district i and *maxshnd* is the maximum vote share of the party in all neighboring districts of pre-reform district i. We are especially interested in the estimate of β_3 of the interaction term that tests whether there is a systematic effect of electoral geography on the magnitude of PR districts. Furthermore, X is a stacked matrix that contains the control variables.

The first part of our analysis exploits variation within countries and between pre-

12. In Germany and Denmark, adjustment seats are used on the subnational level for multiple districts and are, therefore, not captured by our country FE. However, adjustment seats should weaken the incentive to strategically draw electoral districts. Including both countries in our analysis, therefore, constitutes a conservative test.

reform districts by focusing on the design of the electoral system that abolished MR. However, some scholars might be concerned that certain administrative structures at the subnational level or other historically grown constituencies (e.g., departments, states, cantons) offer focal points for or present "natural" barriers to the design of electoral districts and are only insufficiently captured in our model.[13]

To account for this problem, the second part of our analysis uses information on multiple electoral reforms that were proposed or passed in parliament in Denmark, Germany, and Norway (see Table 4). This empirical strategy allows us to focus on variation in party positions while holding above-mentioned natural barriers and electoral geography constant. Therefore, in the second part of our analysis, we exploit only variance in post-reform district magnitude and differences in political influence. More precisely, we use the electoral reforms in Denmark in 1915 and 1918, in Germany in 1917 and 1918, and the failed proposal to maintain SMDs as well as the adopted version of PR in Norway in 1918.[14]

Table 4: District Magnitude by Country: Two Subsequent Reforms

Country	N	Mean	Median	Std. Dev.	Min.	Max.	Coef. of Var.
Denmark (1915)	93	1.25	1	2.38	1	24	1.91
Denmark (1918)	22	6.32	6	1.59	2	9	0.25
Germany (1917)	388	1.15	1	0.71	1	10	0.62
Germany (1918)	37	11.70	12	2.90	6	17	0.25
Norway I (1919)	126	1	1		1	1	
Norway II (1919)	29	5.17	5	1.49	3	8	0.29

Norway I: 126 SMDs with 24 adjustment seats (Cox et al. 2019, 114).

The sample thus consists of six countries (first analysis) and six reforms in three countries (second analysis), respectively, that differ in terms of number of districts. For instance, we have 579 observations for France but only 41 observations for Belgium. To avoid that our results are primarily driven by countries with many pre-reform dis-

13. There are many examples where administrative structures were taken as reference points for the design of electoral districts such as departments in the French reform in 1914, the cantons in the Swiss reform in 1918, or the administrative districts (Regierungsbezirke) in the Weimar Republic in 1918.

14. In Germany and Norway, no elections were held between the reforms. In Denmark, a "silent election" took place in most constituencies (i.e. no competition due to war-time emergency), providing parties with no new information on their electoral support. Therefore, vote shares in pre-reform districts are held constant as well. We discuss the details of these reforms in the appendix.

tricts, we employ inverse probability weights to give every country the same leverage in our estimation.

In the third part of our analysis, we demonstrate that the parties that influenced the design of electoral districts benefited from disproportionality in the first election under the new PR system. In this part, we use information on 47 parties in ten countries.[15] We use the difference between seat and vote share as the dependent variable and our binary influence measure as the predictor. In addition, we include a measure for disproportionality under MR using the data for the last election before the introduction of PR to demonstrate that disproportionalities on the party level are not simply inherited from the old electoral system.

To obtain our estimates for the first two parts of our analysis, we rely on negative binomial regression (NB) for count data. The Cameron-Trivedi test for overdispersion suggests that PR district magnitude, conditional on the covariates in equation 1, is not equidispersed (Cameron and Trivedi 1990). Therefore, we employ a negative binomial instead of a poisson regression. In addition, we present OLS estimates with the log-transformed district magnitude as the dependent variable. We also account for the non-independence of observations within and across parties by clustering the standard errors on the country level. Moreover, we include party FE in some of our specifications as well as use multilevel models with random intercepts on the party and country level as robustness tests. In the third part of our analysis, we use outlier-robust regressions with cluster-robust standard errors to estimate the effect of influence on disproportionalities under PR.

15. We have included all parties that received more than 1% of the national vote share. The data come from Mackie and Rose (1982) except for the Austrian election in 1911, for which we obtained data from Nohlen and Stöver (2010).

Results

Above, we have outlined our theoretical expectation that reform coalitions with mixed electoral geography create districts with smaller magnitude than coalitions with dispersed voter bases. In the first part of our analysis (see Table 5), we now investigate this link in detail. Our main interest is the interaction between parties' vote share in a pre-reform district and their maximum vote share in the neighboring districts, which we expect to be negative (i.e. the creation of local strongholds).

In model 1, we use negative binomial regression with country FE. Our interaction is significant at the 1% level. Adding party FE to the specification in model 2 does not affect our main result. For model 3, we use random intercepts on the country and party levels instead of FEs. However, the results are virtually unchanged. In models 4-6, we use OLS with the same specifications as in models 1-3 but a log-transformed dependent variable. Yet our interaction term remains significant across all model specifications. Hence, Table 5 provides strong evidence that districts in newly adopted PR system were strategically drawn.[16] More precisely, the constitutive term vote share shows that a higher vote share in a pre-reform district is associated with a higher post-reform district magnitude. This relationship holds if the maximum vote share in neighboring districts is low, which mirrors a dispersed voter base. However, the negative coefficient of the interaction term suggests that with larger values of the maximum vote share in neighboring districts, the positive relationship between the vote share in pre-reform districts and post-reform district magnitude weakens and reverses eventually. This provides support for our hypothesis that a concentrated voter base (i.e. high values of both constitutive terms) is associated with lower post-reform district magnitude. We discuss this finding visually and more substantively below.

However, readers might be concerned that unobserved constant confounders, most notably the existence administrative structures at subnational level (e.g., departments, states, cantons), limit the strategic design of electoral districts in newly adopted PR

16. In the appendix, we show in Table A2 that our results are not driven by individual countries.

	Neg. Binomial			OLS		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Vote Share	2.49***	2.58***	2.58***	2.21**	2.34**	2.34***
	(0.52)	(0.49)	(0.11)	(0.74)	(0.73)	(0.10)
Max. Vote Share Neigh. Districts	0.74	1.06	1.06***	0.86	1.03	1.03***
	(0.64)	(0.56)	(0.08)	(0.48)	(0.59)	(0.07)
Vote Share X Max. Vote Share Neigh. Districts	−3.20***	−3.34***	−3.34***	−2.83**	−2.98**	−2.98***
	(0.72)	(0.66)	(0.14)	(0.88)	(0.91)	(0.13)
Pre-Reform District Magnitude	0.11***	0.10***	0.10***	0.13***	0.13***	0.13***
	(0.01)	(0.01)	(0.00)	(0.02)	(0.01)	(0.00)
Socialist Party	0.23	−0.12	0.31	0.22*	−0.07	0.21
	(0.14)	(0.12)	(0.25)	(0.10)	(0.10)	(0.11)
Intercept	0.60	0.38	0.37	0.34	0.22	0.17
	(0.31)	(0.28)	(0.32)	(0.23)	(0.34)	(0.30)
Country FE	Yes	Yes	No	Yes	Yes	No
Party FE	No	Yes	No	No	Yes	No
Country RE	No	No	Yes	No	No	Yes
Party RE	No	No	Yes	No	No	Yes
Cluster-Robust Std. Err. by Country	Yes	Yes	No	Yes	Yes	No
AIC	39029.10	38144.68	38222.75			14858.96
BIC	39091.13	38248.07				
Log Likelihood	−19502.55	−19052.34	−19102.37			−7420.48
Deviance	6996.28	6693.85				
Num. obs.	1299	1299	1299	1299	1299	1299
Num. groups: Country			6			6
Num. groups: Party			15			15
Var: Country (Intercept)			0.49			0.52
Var: Party (Intercept)			0.17			0.03
R^2				0.62	0.64	
Adj. R^2				0.62	0.63	

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$

Table 5: Electoral Geography & PR District Magnitude

	Neg. Binomial	OLS
	Model 1	Model 2
Vote Share	2.35***	2.37*
	(0.70)	(0.95)
Max. Vote Share Neigh. Districts	0.45	0.45
	(0.55)	(0.73)
Vote Share X Max. Vote Share Neigh. Districts	−4.14***	−4.17**
	(1.17)	(1.54)
Socialist Party	2.17***	2.11***
	(0.07)	(0.09)
Intercept	1.38***	1.05*
	(0.31)	(0.42)
District FE	Yes	Yes
AIC	1284.09	
BIC	4547.27	
Log Likelihood	−7.05	
Deviance	2.94	
Num. obs.	1260	1260
R^2		0.46
Adj. R^2		−0.08

Cluster Robust Standard Errors by Electoral District. *** p < 0.001; ** p < 0.01; * p < 0.05.

Table 6: Electoral Geography & PR District Magnitude: District FE

systems. If these subnational structures are associated with parties' electoral strength, the observed correlation might be spurious. To address this problem, the second part of our analysis uses six electoral reforms in Denmark[17], Germany, and Norway (see Table 6). These estimations include pre-reform district FEs and thus exploit only variation in PR district magnitude and differences in political influence. As before, we use OLS and negative binomial regression. Table 6 shows that our interaction term remains statistically significant at the 0.1% and 1% level, respectively, when accounting for unobserved constant confounders.

To give a substantive interpretation to our interaction term, we present two hypothetical scenarios with predictions in Figure 3 using estimates from model 1 in Table 5.

17. Copenhagen constituted an electoral district with a magnitude of 24 in 1915. The 1918 reform divided Copenhagen into three districts with 7, 8, and 9 seats, respectively. We were unable to identify how the pre-reform districts were assigned to the three new electoral districts. In Table 6, we have set district magnitude to 8 for all three post-reform districts. Please note that dropping Copenhagen from the sample does not affect our results (not reported, available in replication file).

To avoid that our results depend on extrapolation, we select two examples with the highest density of pre-reform vote shares and maximum vote shares in neighboring districts (see Figure A1 in the appendix for a density plot of pre-reform vote shares). In the first scenario, we fix the vote shares of the (locally) dominant coalition party at 90% in the pre-reform and the neighboring district. Following hypothesis 1, we label this scenario as *concentrated* and expect that the post-reform districts are small in magnitude. In the second scenario, we provide evidence for hypothesis 2 by fixing the vote shares of the dominant coalition party at 28% in the pre-reform and the neighboring district. We label this scenario as *dispersed* and expect larger post-reform district magnitudes.

The predictions for our sample displayed in Figure 3 provide evidence for our hypotheses. We find that district magnitudes are small if the voter bases of the (locally) dominant coalition party are highly concentrated. More precisely, the predictions suggest that the district magnitude is below three. In contrast, district magnitude is larger if the voter base of the dominant coalition party is dispersed. On average, the magnitude exceeds four seats.

Even though the strategic drawing of electoral districts can have unintended consequences, we should expect parties that influenced the district design to benefit from electoral disproportionalities under the new PR rules. The third part of our analysis presents evidence that this was indeed the case. Table 7 examines whether parties that influenced the design of electoral districts benefited from disproportionalities in the first election under the new PR system (controlling for disproportionalities in the last election under MR rules). The dependent variable is the difference between seat and vote share of a party under PR. In both models, we include our dummy variable capturing a party's influence on the district design (see Table 2) as the main independent variable. In the first model, we add parties' seat to vote difference under MR as an independent variable while adding country FE in model 2. As expected, levels of electoral disproportionality under MR are negatively related to changes in

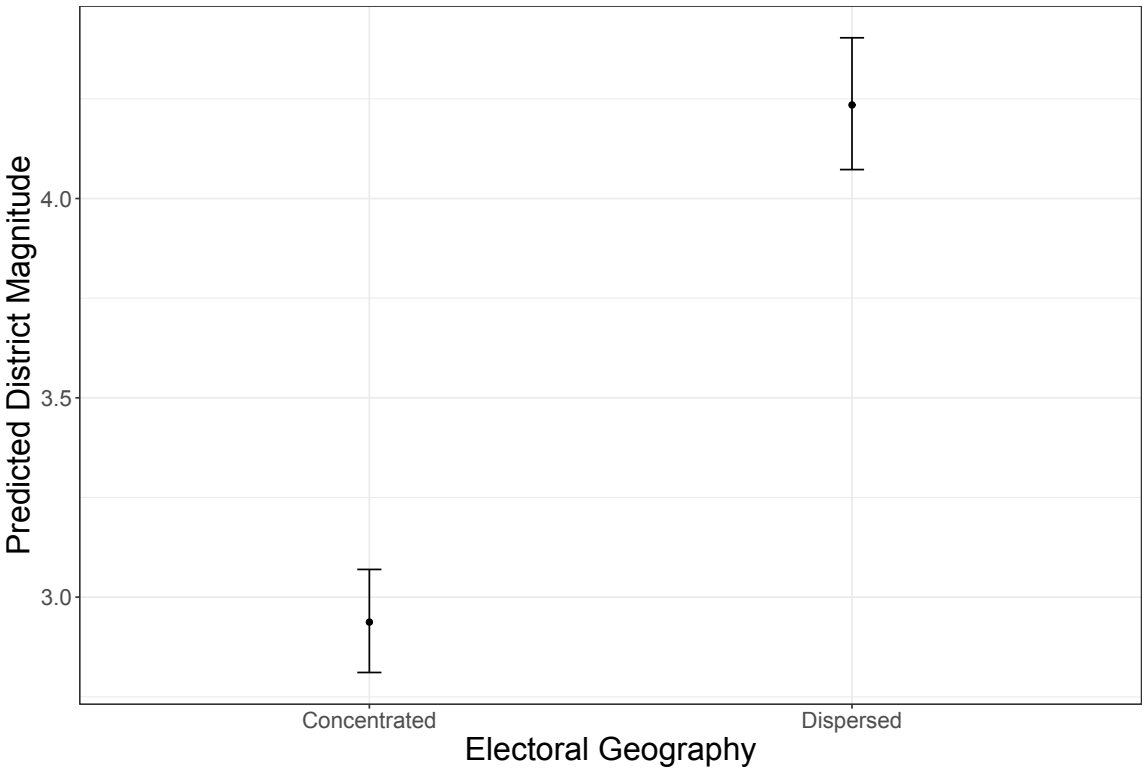


Figure 3: Party Influence, Electoral Geography, and District Magnitude

disproportionality in the first election under PR. This finding is of course not surprising, as PR systems generally feature lower levels of electoral disproportionality. More importantly in the context of this paper, our influence measure shows that parties that shaped the design of electoral districts were more likely to benefit from electoral disproportionalities under the new PR rules. On average, these parties had about 1.4 percentage points more seats than votes than parties that did not influence the district design. In addition, the seat bonus increases to 2.2 percentage points in the specification with country FE. Hence, using different specifications, we find a statistically significant effect of membership in the designing coalition on electoral disproportionality. This finding provides additional evidence that parties use electoral district design to create partisan advantages.

	Disproportionality PR	
	Dispro. Lag	Country FE
Influence on District Design	1.42*	2.22*
	(0.64)	(1.10)
Disproportionality MR	0.17***	
	(0.04)	
Intercept	−0.33	−0.44
	(0.33)	(0.55)
Num. obs.	47	47

Country-level cluster-robust standard errors in parenthesis. $^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.

Table 7: Influence on Design and Disproportionality under PR

Conclusion

Sartori (1968, 273) once called electoral systems "the most specific manipulative instrument of politics." Yet while the adoption of PR has attracted considerable attention in the scholarly literature, existing research has overlooked the large differences among PR electoral systems in district magnitude both within and across countries. These differences have important implications for a range of political outcomes such as the effective proportionality of PR systems, the representation of urban interests, or the seat-share of left-wing parties. This paper sheds light on the causes of these differences among PR systems.

We have argued that parties' positions on district magnitude depend on the geographical distribution of their voters. More precisely, if voters are highly concentrated in certain areas, parties prefer small district magnitudes (in these areas) to maximize their number of seats in parliament. In contrast, if voters are geographically dispersed, parties prefer to increase district magnitude in order to reach the minimum threshold for turning their votes into seats. Importantly, the geographical distribution of voters varies within a country, which implies that parties might pursue different strategies in different regions. Of course, whether parties can turn their preferences into policies depends on their ability to influence the design of the new districts.

We have found empirical evidence for our theoretical expectations in an analysis of

PR reforms in Western European countries in the early 20th century. We have shown that the geographical distribution of voter bases and party influence in the design of electoral districts have a statistically significant and substantially important effect on district magnitude and that these differences cannot be explained by unobserved constant confounders such as historically grown subnational administrative structures. Moreover, parties that are able to shape the design of electoral districts also benefit from electoral disproportionalities under the new PR rules.

This paper has several important implications. First, it shows that districting is a key political process also in countries with PR electoral systems. So far, the literature on districting has primarily focused on MR systems. Whereas MR systems undoubtedly offer more potential for partisan districting, the design of electoral districts should not be neglected in PR systems, as it does have important implications for electoral, political, and economic outcomes (Kedar et al. 2016). Moreover, we argue that our approach also helps to understand district design in mixed systems where legislators and parties decide on different balances between MR and PR seats (Bawn 1993; Giannetti and Grofman 2011).

Second, the paper contributes to the debate on partisan biases of electoral systems (Iversen and Soskice 2006; Döring and Manow 2017; Höhmann and Tober 2018). The existing literature has often argued that MR disadvantages left parties, although the empirical evidence is not always conclusive. As we have shown, parties with concentrated voter bases are one of the main reasons for PR systems with a large number low magnitude districts, which indicates that also PR systems have the potential to be biased against the left (Monroe and Rose 2002).

Finally, this analysis re-emphasizes the importance of electoral geography, also under PR rules, for shaping electoral reforms and partisan strategies (Calvo 2009; Rodden 2010). Most notably, we have demonstrated that differences in the geographical distribution of voter bases can account for differences in party positions on district magnitude.

Acknowledgments

We thank Thomas Ehrhard, Ron de Jong, Jasper Loots, Klaus Petersen, and Christina Zuber for help with the data collection. We also thank Mirjam Habenicht and Christof Müller for their invaluable research assistance. Earlier versions of this paper were presented at the University of Konstanz, the University of St.Gallen, the 2020 annual conference of the Swiss Political Science Association, the 2021 annual conference of the European Political Science Association, and the 2021 annual conference of the American Political Science Association. We thank all participants, Lucas Leemann, Dominik Schraff, and three anonymous reviewers for the helpful comments. All remaining errors are the authors' responsibility.

References

Ahmed, Amel. 2013. *Democracy and the Politics of Electoral System Choice: Engineering Electoral Dominance.* Cambridge ; New York: Cambridge University Press.

Bawn, Kathleen. 1993. "The Logic of Institutional Preferences: German Electoral Law as a Social Choice Outcome." *American Journal of Political Science* 37 (4): 965.

Becher, Michael. 2016. "Endogenous Credible Commitment and Party Competition over Redistribution under Alternative Electoral Institutions." *American Journal of Political Science* 60 (3): 768–782.

Becher, Michael, and Irene Menéndez González. 2019. "Electoral Reform and Trade-Offs in Representation." *American Political Science Review* 113 (3): 694–709.

Benoit, Kenneth. 2004. "Models of Electoral System Change." *Electoral Studies* 23 (3): 363–389.

Bochsler, Daniel. 2019. "Duverger and the Territory: Explaining Deviations from the Two-Party-Competition-Law." *Journal of Elections, Public Opinion and Parties,* online first.

Boix, Carles. 2010. "Electoral Markets, Party Strategies, and Proportional Representation." *American Political Science Review* 104 (2): 404–413.

———. 1999. "Setting the Rules of the Game: The Choice of Electoral Systems in Advanced Democracies." *American Political Science Review* 93 (3): 609–624.

Bol, Damien. 2016. "Electoral Reform, Values and Party Self-Interest." *Party Politics* 22 (1): 93–104.

Bol, Damien, Jean-Benoit Pilet, and Pedro Riera. 2015. "The International Diffusion of Electoral Systems: The Spread of Mechanisms Tempering Proportional Representation across Europe." *European Journal of Political Research* 54 (2): 384–410.

Bormann, Nils-Christian, and Matt Golder. 2013. "Democratic Electoral Systems around the World, 1946–2011." *Electoral Studies* 32 (2): 360–369.

Brady, David, and Jongryn Mo. 1992. "Electoral Systems and Institutional Choice: A Case Study of the 1988 Korean Elections." *Comparative Political Studies* 24 (4): 405–429.

Calvo, Ernesto. 2009. "The Competitive Road to Proportional Representation: Partisan Biases and Electoral Regime Change under Increasing Party Competition." *World Politics* 61 (2): 254–295.

Calvo, Ernesto, and Juan Pablo Micozzi. 2005. "The Governor's Backyard: A Seat-Vote Model of Electoral Reforms for Subnational Multiparty Races." *Journal of Politics* 67 (4): 1050–1074.

Calvo, Ernesto, and Jonathan Rodden. 2015. "The Achilles Heel of Plurality Systems: Geography and Representation in Multiparty Democracies." *American Journal of Political Science* 59 (4): 789–805.

Cameron, A Colin, and Pravin K Trivedi. 1990. "Regression-Based Tests for Overdispersion in the Poisson Model." *Journal of Econometrics* 46 (3): 347–364.

Carey, John M, and Simon Hix. 2011. "The Electoral Sweet Spot: Low-magnitude Proportional Electoral Systems." *American Journal of Political Science* 55 (2): 383–397.

Chen, Jowei, and Jonathan Rodden. 2013. "Unintentional Gerrymandering: Political Geography and Electoral Bias in Legislatures." *Quarterly Journal of Political Science* 8 (3): 239–269.

Colomer, Josep M. 2005. "It's Parties That Choose Electoral Systems (or, Duverger's Laws Upside Down)." *Political Studies* 53 (1): 1–21.

———. 2007. "On the Origins of Electoral Systems and Political Parties: The Role of Elections in Multi-Member Districts." *Electoral Studies* 26 (2): 262–273.

Cox, Gary, Jon H. Fiva, and Daniel M. Smith. 2020. "Measuring the Competitiveness of Elections." *Political Analysis* 28 (2): 168–185.

Cox, Gary, Jon H Fiva, and Daniel M Smith. 2019. "Parties, Legislators, and the Origins of Proportional Representation." *Comparative Political Studies* 52 (1): 102–132.

Döring, Holger, and Philip Manow. 2017. "Is Proportional Representation More Favourable to the Left? Electoral Rules and Their Impact on Elections, Parliaments and the Formation of Cabinets." *British Journal of Political Science* 47 (1): 149–164.

Elklit, Jørgen. 1988. "Den Laveste Partiegoismes Allerbrutalste Fjaes?" In *Om Danmarks Historie 1900-1920,* edited by Hans Christian Johansen and J. Thomsen, 61–96. Odense: Odense Universitetsforlag.

Emmenegger, Patrick, and André Walter. 2021. "Disproportional Threat. Redistricting as an Alternative to Proportional Representation." *Journal of Politics* 83 (3): 917–933.

———. 2019. "When Dominant Parties Adopt PR. The Mysterious Case of Belgium." *European Political Science Review* 11 (4): 433–450.

Engstrom, Erik J. 2013. *Partisan Gerrymandering and the Construction of American Democracy.* Ann Arbor: University of Michigan Press.

Fiva, Jon H., and Daniel M. Smith. 2017. "Norwegian Parliamentary Elections, 1906–2013: Representation and Turnout across Four Electoral Systems." *West European Politics* 40 (6): 1373–1391.

Giannetti, Daniela, and Bernard Grofman, eds. 2011. *A Natural Experiment on Electoral Law Reform.* New York: Springer.

Grofman, Bernard. 2016. "Perspectives on the Comparative Study of Electoral Systems." *Annual Review of Political Science* 19 (1): 523–540.

Grofman, Bernard, and Arend Lijphart, eds. 2002. *The Evolution of Electoral and Party Systems in the Nordic Countries.* New York: Agathon Press.

Gruner, Erich. 1978. *Die Wahlen in den schweizerischen Nationalrat, 1848-1919. Wahlrecht, Wahlsystem, Wahlbeteiligung, Verhalten von Wählern und Parteien, Wahlthemen und Wahlkämpfe. Band 1.* Bern: Francke.

Höhmann, Daniel, and Tobias Tober. 2018. "Electoral Rules and Partisan Control of Government: A Replication Study." *The Journal of Politics* 80 (1): 342–347.

Hooghe, Marc, Bart Maddens, and Jo Noppe. 2006. "Why Parties Adapt: Electoral Reform, Party Finance and Party Strategy in Belgium." *Electoral Studies* 25 (2): 351–368.

Iversen, Torben, and David Soskice. 2006. "Electoral Institutions and the Politics of Coalitions: Why Some Democracies Redistribute More than Others." *American Political Science Review* 100 (2): 165–181.

Kedar, Orit, Liran Harsgor, and Raz A. Sheinerman. 2016. "Are Voters Equal under Proportional Representation?" *American Journal of Political Science* 60 (3): 676–691.

King, Gary, and Robert X Browning. 1987. "Democratic Representation and Partisan Bias in Congressional Elections." *American Political Science Review* 81 (4): 1251–1273.

Lachat, Romain. 2015. "Assessing the Mechanical and Psychological Effects of District Magnitude." *Journal of Elections, Public Opinion and Parties* 25 (3): 284–299.

Leemann, Lucas, and Isabela Mares. 2014. "The Adoption of Proportional Representation." *Journal of Politics* 76 (2): 461–478.

Linder, Wolf, Christian Bollinger, and Yvan Rielle. 2010. *Handbuch der eidgenössischen Volksabstimmungen 1848 bis 2007.* Bern/Stuttgart/Wien: Haupt.

Loots, Jasper. 2004. *Voor het volk, van het volk: van districtenstelsel naar evenredige vertegenwoordiging.* De natiestaat. Amsterdam: Wereldbibliotheek.

Lucardi, Adrián. 2019. "The Effect of District Magnitude on Electoral Outcomes: Evidence from Two Natural Experiments in Argentina." *British Journal of Political Science* 49 (2): 557–577.

Mackie, Thomas T, and Richard Rose. 1982. *The International Almanac of Electoral History.* London: MacMillan.

Marty, Thomas. 2013. "De l'espace Électoral à Son « Découpage » : Circonscriptions Uninominales et Circonscriptions de Listes Sous La Troisième République Française." *Norois,* no. 226, 91–106.

McGhee, Eric. 2020. "Partisan Gerrymandering and Political Science." *Annual Review of Political Science* 23 (1): 171–185.

Monroe, Burt L., and Amanda G. Rose. 2002. "Electoral Systems and Unimagined Consequences: Partisan Effects of Districted Proportional Representation." *American Journal of Political Science* 46 (1): 67–89.

Nohlen, Dieter, and Philip Stöver, eds. 2010. *Elections in Europe. A Data Handbook.* Baden-Baden: Nomos.

Noiret, Serge. 1997. "La Riforma Elettorale Del 1918-19." *Meridiana* 29:73–93.

Nunez, Lidia, and Kristof T.E. Jacobs. 2016. "Catalysts and Barriers: Explaining Electoral Reform in Western Europe." *European Journal of Political Research* 55 (3): 454–473.

Pilet, Jean-Benoit. 2007. "Strategies Under the Surface: The Determinants of Redistricting in Belgium." *Comparative European Politics* 5 (2): 205–225.

Pilet, Jean-Benoit, and Damien Bol. 2011. "Party Preferences and Electoral Reform: How Time in Government Affects the Likelihood of Supporting Electoral Change." *West European Politics* 34 (3): 568–586.

Pilet, Jean-Benoit, Alan Renwick, Lidia Nunez, Elwin Reimink, and Pablo Simón. 2016. "Database of Electoral Systems."

Renwick, Alan. 2010. *The Politics of Electoral Reform: Changing the Rules of Democracy.* Cambridge: Cambridge University Press.

Rodden, Jonathan. 2010. "The Geographic Distribution of Political Preferences." *Annual Review of Political Science* 13 (1): 321–340.

Särlvik, B. 2002. "Party and Electoral System in Sweden." In *The Evolution of Electoral and Party Systems in the Nordic Countries,* edited by Bernard Grofman and Arend Lijphart, 225–269. New York: Agathon Press.

Sartori, Giovanni. 1968. "Political Development and Political Engineering." In *Public Policy,* edited by John D Montgomery and Albert O Hirschmann, 17:261–298. Cambridge: Harvard University Press.

Schanbacher, Eberhard. 1982. *Parlamentarische Wahlen Und Wahlsystem in Der Weimarer Republik.* Düsseldorf: Droste.

Schröder, Valentin, and Philip Manow. 2020. "An Intra-Party Account of Electoral System Choice." *Political Science Research and Methods* 8 (2): 251–267.

Schuster, Karsten, Friedrich Pukelsheim, Mathias Drton, and Norman R. Draper. 2003. "Seat Biases of Apportionment Methods for Proportional Representation." *Electoral Studies* 22 (4): 651–676.

Ucakar, Karl. 1985. *Demokratie und Wahlrecht in Österreich. Zur Entwicklung von politischer Partizipation und staatlicher Legitimationspolitik.* Wien: Verlag für Gesellschaftskritik.

Walter, André, and Patrick Emmenegger. 2019. "Majority Protection? The Origins of Distorted Proportional Representation." *Electoral Studies* 59:64–77.