Electoral Reform and Trade-Offs in Representation

MICHAEL BECHER *Institute for Advanced Study in Toulouse*
IRENE MENÉNDEZ GONZÁLEZ *University of Mannheim*

*W*e examine the effect of electoral institutions on two important features of representation that are often studied separately: policy responsiveness and the quality of legislators. Theoretically, we show that while a proportional electoral system is better than a majoritarian one at representing popular preferences in some contexts, this advantage can come at the price of undermining the selection of good politicians. To empirically assess the relevance of this trade-off, we analyze an unusually controlled electoral reform in Switzerland early in the twentieth century. To account for endogeneity, we exploit variation in the intensive margin of the reform, which introduced proportional representation, based on administrative constraints and data on voter preferences. A difference-in-difference analysis finds that higher reform intensity increases the policy congruence between legislators and the electorate and reduces legislative effort. Contemporary evidence from the European Parliament supports this conclusion.

One of the most sustained and controversial debates in political science concerns the effects of electoral systems on political representation (Htun and Powell 2013). In a classical contribution, John Stuart Mill (1861, chap. 7) argues that electoral systems based on proportional representation (PR) perform better than majoritarian electoral systems on multiple dimensions of democratic governance. Apart from leading to a more proportional weight of minority groups in parliament, PR is also supposed to achieve two other crucial goals of democracy. First, a policy passed by parliament should usually not run against the wishes of a majority of the national electorate. Collective decision making requires choosing a single policy from a set of contested options, and recent research uses policy-based representation of the national median voter, henceforth called policy responsiveness, as one important criterion for evaluating electoral institutions (Cox 1997, 226; Powell and Vanberg 2000). Second, elections should help to select good politicians. Complementing the importance of electoral incentives, a large body of scholarship emphasizes that the quality of politicians is also crucial for representation (Besley 2006; Mansbridge 2009). Complete and binding contracts for legislators are unfeasible, and standard theories of accountability demonstrate that elections cannot prevent rent-seeking by purely extrinsically motivated politicians even if all citizens are informed, rational, and vote (Ferejohn 1986). More free-riding and more corruption occurs when legislators lack intrinsic motivation (or civic virtue) to do their job.

While it would be theoretically intriguing and extremely useful if, as Mill (1861) argues, one set of electoral rules promoted both policy representation and positive political selection, the large literature on the effects of electoral institutions of the past decades offers a contradictory and incomplete picture. It has produced impressive models and a wealth of data. Nonetheless, there remain deep disagreements as well as theoretical blind spots, and formidable empirical challenges limit scholars' ability to draw causal conclusions about the promise of electoral reform.

On the one hand, many theoretical accounts share the notion that the choice of electoral institutions requires trade-offs between different goals. In particular, PR is often thought to favor broad-based social representation at the expense of government accountability (Carey and Hix 2011; Persson and Tabellini 2003; Powell 2000), or collective at the expense of individual representation (Carey and Shugart 1995).

On the other hand, the claim that PR leads to more policy responsiveness to the national electorate is fiercely contested. While it is clear that PR reduces votes-seats disproportionality, canonical spatial models suggest that high policy responsiveness can also occur under majoritarian systems (Cox 1997, 225–37; Downs 1957). Recent cross-national studies of the ideological congruence between citizen and elected policymakers under alternative electoral institutions have produced mixed findings (Blais and Bodet 2006; Golder and Stramski 2010; Powell 2009; Powell and Vanberg 2000) and they are explicitly not designed to identify causal effects of electoral reform (Powell 2000, 43).

Moreover, we know fairly little about the effects of electoral rules on political selection. Despite the long-standing recognition that the quality of politicians

Michael Becher [iD], Assistant Professor in Political Science, Institute for Advanced Study in Toulouse and University Toulouse 1 Capitole, michael.becher@iast.fr.

Irene Menéndez González [iD], Assistant Professor in International Politics and Development, University of Mannheim, menendez@uni-mannheim.de.

matters, most theories of electoral institutions assume that politicians are perfectly exchangeable and their behavior is solely determined by electoral incentives. An emergent literature is addressing this topic (Beath et al. 2016; Galasso and Nannicini 2017; Myerson 1993; Shugart, Valdini, and Suominen 2005). While far from reaching a consensus, several theories are closer to the Millsian position that PR tends to select better politicians compared to its majoritarian alternatives.

In this paper, we jointly examine the effects of electoral institutions on policy responsiveness and political selection. While existing institutional theories tend to focus on one of these important dimensions of representation, we formalize a simple model to clarify how electoral institutions may influence both. In contrast to classical arguments and several recent theories, it highlights that, comparatively, PR is not necessarily good at supplying good politicians. At the same time, depending on electoral geography, it facilitates the election of assemblies that enact policies in line with the median voter. We provide historical and contemporary evidence consistent with this fundamental trade-off based on fine-grained data on electoral reforms and the behavior of members of parliament (MPs).

We study two real-world electoral reforms that allow us to test micro-level implications of the argument in an unusually controlled fashion. Our research design exploits the reforms' intensive margin, focusing on exogenously varying changes in the magnitude of electoral districts within the introduction of PR in a single legislative body. Electoral institutions themselves are political choices (Benoit 2007; Boix 1999; Leemann and Mares 2014). Hence, endogeneity, based on unobserved (by researchers) confounders or reverse causality, is a central empirical challenge. As electoral reforms are relatively rare, most research has relied on cross-national comparisons where finding credible sources of exogenous variation has proven frustratingly elusive. If they occur, moreover, reforms are often bundled with other major changes.

To overcome these well-known obstacles, our main case studies the introduction of PR in the Swiss canton of Zürich early in the twentieth century. This reform has several attractive features. First, it is not bundled with other institutional changes. While at the time many European countries debated whether to adopt PR, many reforms coincided with the expansion of voting rights, changes in the form of government, or revolution (Duverger 1954, 377).[1] Second, the reform is introduced by referendum against the incumbent parliamentary majority. This generates municipality-level data on mass support for institutional change, capturing a key confounder omitted in most previous work. Third, the intensive margin of the reform varies across districts based on pre-determined administrative constraints. Specifically, there is heterogeneity in the increase of district magnitude (the number of legislators elected in a district). This creates plausible treatment and control groups and offers the opportunity to conduct

a difference-in-difference analysis. Fourth, the institutional setting generates micro-level data on the congruence between legislators and voters, drawn from legislative and popular votes on the same policy. Previous research mainly uses left–right scales of voter ideology and party positions, which are measured on different scales and do not capture policy behavior (Powell and Vanberg 2000, 411). Or it studies fiscal policy and assumes that some spending categories better reflect mass preferences than others (Funk and Gathmann 2013; Persson and Tabellini 2003). To tap into politicians' quality understood as intrinsic motivation, we measure their legislative effort.

We find robust evidence that districts exposed to a larger dosage of the reform experienced a relative increase in the probability that MPs vote in line with the polity-wide median voter but suffered a relative decline in legislative participation and speech-making. The positive effect on policy responsiveness and the negative effect on the quality dimension are of comparable size, suggesting that the adoption of PR involved a significant trade-off. Moreover, we report results from an additional case showing that our argument is also relevant for contemporary debates about electoral system design and representation. Leveraging the introduction of PR for British members of the European Parliament, we find on a large scale that a higher intensity of the reform leads to lower legislative effort and higher shirking but a closer link between legislative votes and average citizen ideology.

Taken together, this paper communicates with several strands of scholarship on electoral institutions and representation. First, it contributes to the debate on whether electoral institutions matter for the substantive congruence between citizen preferences and policymakers. To surmount the lack of clear identification and measurement problems in cross-national studies highlighted in the literature, we focus on variation within major electoral reforms and provide credible evidence that PR can improve policy responsiveness, confirming a key advantage.

Second, our model helps to address an important conceptual blind spot and contributes to the nascent literature on constitutional design and political selection. In contrast to Mill (1861) and several recent contributions (Beath et al. 2016; Galasso and Nannicini 2017; Myerson 1993), our empirical analysis is consistent with the model's proposition that PR can reduce the quality of MPs. Altogether, reforms addressing the problem of biased policy responsiveness can come at the price of undermining the selection of good politicians, dashing the optimistic view painted by proponents of PR. Our model also identifies polity-level context conditions under which the trade-off is most likely to emerge.

Third, we provide a new empirical strategy to address the problem of endogenous electoral institutions. Researchers have turned to within-country variation in institutions to deal with this issue. For instance, studies examining economic policy, turnout, or legislators have exploited variation in the adoption of PR across cantons (Funk and Gathmann 2013), close elections in

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[1] Norway is another exception (Cox, Fiva, and Smith 2016).

mixed-member electoral systems (Gagliarducci, Nannicini, and Naticchioni 2011), or population thresholds for municipal-level electoral systems (Eggers 2015). Our strategy exploits both variation in reform intensity and a direct measure of voters' support for the reform. In that sense, our results are doubly robust to endogeneity concerns. The main methodological approach can also be applied to other electoral reforms and outcomes, like party systems or gender equality.

Finally, this article's focus is distinct from, and complementary to, personal vote theories of electoral rules, which highlight how electoral rules shape the trade-off between individual (local-level) and collective (party-based) representation. Most work in the voluminous literature focuses on constituency-oriented behavior (Carey and Shugart 1995; Stratmann and Baur 2002). Recent scholarship also examines attributes of candidates, especially local-level political experience and birthplace, that signal credibility as a local agent (Shugart, Valdini, and Suominen 2005). In contrast, the quality of politicians in our framework is not specifically local. This is reflected in our empirical measures, which capture general activities of MPs that are essential for parliament to fulfill its function but may even undermine efforts to build a personal vote (Høyland, Hobolt, and Hix 2017). Moreover, personal vote theories do not make clear predictions about policy responsiveness (as defined here).

THEORETICAL FRAMEWORK

Electoral institutions simultaneously influence the quality of MPs and the responsiveness of parliamentary decisions to the national electorate, and institutional design can entail a stark trade-off between these representational goals. Politicians in our framework are not exchangeable. As in Myerson (1993) and related work, they vary both in their ideology (or partisanship) and in their quality. While quality can have multiple interpretations, we emphasize the importance of intrinsic motivation to contribute to global parliamentary goods and refrain from corruption (e.g., "character" in Besley 2006, "internally motivated" in Mansbridge 2011, or "moral virtue" in Mill 1861). Complementing electoral incentives, the intrinsic motivation of politicians is important because essential functions of parliaments—deliberation, lawmaking, or effectively overseeing other branches of government—require collective efforts by MPs that are subject to free-riding problems and opportunities for shirking. Citizens cannot constantly monitor MPs and electoral rewards for individual contributions are usually low-powered.

As in standard spatial theories, there are disagreements between voters about policy (e.g., taxes or regulation). Additionally, voters have a shared interest in being represented by good politicians on a "valence" dimension. To voters, the quality of politicians matters for instrumental and non-instrumental reasons. It is an important input into the process of parliamentary representation as well as instrumental in shaping outcomes. For instance, input legitimacy and approval are higher when important collective decisions are taken

after debate and with the participation of more than a fraction of MPs; public policies, whatever their ideological content, should be efficient; politicians should not misuse public funds or accept bribes. All of this requires integrity and the motivation to work hard, and high-quality (good) politicians exhibit more of that than low-quality ones.[2]

To analyze potential trade-offs, we consider a society that consists of multiple groups of citizens (e.g., defined by class or ethnicity). For each group, there is a potential political party that can compete in the election by nominating candidates, drawing from a pool of politicians with heterogenous quality but the same party label. Our analytical focus is on comparing representation under two common electoral systems (Cox 1997). First, a majoritarian system (MR) where MPs are elected in single-member (or low-magnitude) districts using an electoral formula such as plurality rule (MR). Second, a PR system in which MPs are elected on party lists in larger (but not necessarily country-wide) districts.

Our theory highlights two related problems that can undermine political representation and how they are addressed under alternative electoral rules. First, electoral geography can undermine policy responsiveness. Under MR, the distribution of voter preferences in space can lead to biased seats-votes representation and biased policy outcomes (Calvo and Rodden 2015; Rodden 2010). While electoral competition in majoritarian systems entails strong centripetal incentives for parties to compete for the support of the median voter (Downs 1957), this logic applies most clearly to individual districts. In a multi-member legislature including faithful agents of the district median voters, the median party does not generally correspond to the national median voter (Morelli 2004). Historically, the concentration of left voters in cities and industrial areas that emerged during the industrial revolution meant that left parties won their core districts with many surplus votes that could not be transferred to affect marginal districts, putting them at a competitive disadvantage, even in the absence of malapportionment or gerrymandering, and this electoral map often persists (Rodden 2010). PR mitigates this problem by pooling votes for candidates of the same party in larger electoral districts. However, cross-national investigations have not settled whether PR, beyond mitigating seats-votes disproportionality, actually entails a stronger connection between policymakers and the national electorate (Golder and Stramski 2010; Lupu, Selios, and Warner 2017; Powell 2009). One reason for the mixed findings may be that these studies do not—and usually cannot—compare the performance of alternative electoral institutions for the same electoral geography.

Second, partisan conflict about policy undermines the selection of good politicians. While general, the adverse effects of partisan polarization can be more

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[2] Apart from local ties, quality thus defined is also distinct from other non-positional features, such as being a sports star or television celebrity.

consequential under PR. Political polarization is the separation of politics into different partisan camps (McCarty, Poole, and Rosenthal 2006, 3). This means that voters' political preferences are closely tied to a marker of their group, such as class, income, religion or ethnicity, and parties represent different groups. In the model, it is captured by the difference of policy preferences between groups. The strategic choices of politicians may leave voters with a hard choice between sacrificing either policy or quality. The underlying political problem is one of commitment and opportunism. Citizens would be better off if they could credibly commit to only supporting high-quality politicians, thereby inducing parties to nominate good politicians. When actually faced with a choice between a low-quality politician of their preferred partisan type and a high-quality politician of another party, this threat is not always credible. For cross-pressured voters, sacrificing quality is the lesser evil unless polarization is low or they are in no position to affect policy. In turn, this commitment problem generates bad incentives for parties to supply high-quality politicians. Parties become more reluctant to incur the cost of promoting high-quality candidates, and politicians with the power to influence nominations may block better candidates to advance their own careers. This logic does not imply that elections generally lead to the selection of low-quality politicians, as the potential entry of other parties can provide countervailing incentives, but this depends on the rules of the game.

Holding other things equal, PR may supply fewer good politicians. The reason is that the trade-off between policy and quality can apply to a larger number of voters, thus reducing parties' incentives to nominate high-quality politicians. Under MR, voters in the median district(s) are most susceptible to the quality-policy trade-off. For them, the cost of voting for the higher quality politician may be forsaking their preferred policy, by critically changing the partisan balance in the assembly. Under PR, a broader number of people, beyond a potentially small number of single-member districts, can use their votes to affect the distribution of policymaking power. This resulting commitment problem entails lower-powered incentives to nominate good politicians. They are the flip side of higher policy responsiveness.

The ability of voters to rank candidates of a party, through open-list PR, does not necessarily solve this problem because nominations to the list are strategic and suffer from the same incentives. Of course, if there is no policy disagreement in society and the quality of politicians is the only salient electoral issue, both sets of institutions can produce the same outcome as parties have undiluted incentives to compete on quality.

From existing work on electoral rules and political selection it is far from obvious why PR would perform worse in supplying good politicians. Mill (1861), for instance, suggests the opposite, arguing that lowering the barrier to entry for minority groups increases competition and thus the quality of politicians across the board. Capturing a similar intuition, the seminal model of Myerson (1993) highlights how PR increases the

selection of intrinsically motivated politicians (non-corrupt in his terminology) because it reduces the probability of a coordination failure among voters with shared policy preferences. In his model, voters have the choice between a high-quality and a low-quality party for each discrete policy position. Under MR, voters may face a coordination problem that leads them to support a corrupt party because supporting the non-corrupt alternative with the same position would be a wasted vote potentially helping the opposed party to win.

Our framework shares the premise that political competition shapes representation through political selection on a partisan and a quality dimension, but it highlights a different institutional effect and mechanisms. In contrast to Myerson (1993), we do not assume that voters always have a choice of good politicians for a given policy position. We analyze when parties will supply them, and conclude that the interplay of commitment problems and opportunism can affect selection differentially across electoral institutions, even if voters are well-informed and there is an equal pool of high-quality politicians.[3]

Formalization

There are three groups of voters, denoted by $i \in \{L, M, H\}$, with distinct ideal points x_L, x_M, x_H on a single policy dimension.[4] We normalize $x_L = 0$ and let $x_H/2 > x_M > 0$. The total size of the (voting) population is unity and voters are distributed across three equally sized districts, indexed by d. For each group i, there is a party consisting of a pool of politicians who share the group's ideal point, x_i, and vary in their quality, which we interpret as intrinsic motivation or integrity. The quality of a politician is represented by ω. It suffices to distinguish between bad or low-quality types ($\omega = 0$) and good or high-quality types ($\omega = 1$). For simplicity, we assume that each party includes a good politician and a bad politician in each district.[5] This means that parties can choose high-quality politicians, though they may not have incentives to do so.

The utility of a citizen i is represented by

$$V_i = u(|x^* - x_i|) + g\left(\sum_{\text{MP}=1}^{3} \omega_{\text{MP}}\right), \quad \textbf{(1)}$$

where $u(|x^* - x_i|)$ is a standard spatial utility function. Utility increases as the distance between the equilibrium policy x^* and the citizen's ideal point x_i declines and achieves its unique maximum at x_i. The equilibrium policy x^* is determined by the median legislator in

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[3] In other closely related work, the strategic balancing model of Beath et al. (2016) demonstrates that increasing the magnitude of electoral districts can improve both policy responsiveness to the median voter and the quality of politicians in a party-free setting. Galasso and Nannicini (2017) study how electoral rules shape the selection of good politicians in a two-party system with probabilistic voting.

[4] The model extends the multi-district framework of Morelli (2004) by adding a quality dimension.

[5] While group membership and quality may be correlated in the population, each group has high-quality people that may enter politics (Dal Bó et al. 2017).

a three-member parliament. The function $g = g\left(\sum_{MP=1}^{3} \omega_{MP}\right)$ captures payoffs generated by the quality of all elected MPs: g increases with each additional high-quality MP. Realistically, there is a minimal amount of policy conflict between citizens so that meaningful goal conflicts may exist. Operationally, this assumption means that voters of type i prefer a parliament that implements their ideal policy to a parliament that implements the ideal policy of the next closest group $j \neq i$ and includes one additional high-quality legislator.

As in related theories (Galasso and Nannicini 2017; Myerson 1993), we assume that party labels and politicians' quality are known to voters. While party labels are on the ballot, direct information about the quality of politicians is not. However, this does not mean that voters are invariably clueless. Politicians have a reputation, based on their pre-political career, track-record in previous political office and involvement in scandals.[6] For instance, the media widely reported on the fraudulent reimbursement of parliamentary expenses in Britain, Germany or the European Union, and studies find that voters respond to this information by voting against corrupt politicians or the party list they are running on (Eggers 2014; Rudolph and Däubler 2016).[7] The possibility that such information becomes salient shapes the incentives of parties to select good politicians ex-ante.[8]

Political parties do not select good politicians by default. While parties recognize the instrumental value of quality (voters like it), they do not fully internalize the societal benefits of selecting high-quality politicians. One reason is individual self-interest. Anticipating when they are able to exploit voters' trade-off between policy and quality, influential politicians may try to block the nomination of higher-quality competitors and get themselves elected instead (Besley et al. 2017). For party leaders or parties collectively, selecting high-quality politicians comes at a (potentially small) cost, which includes foregone rents and opportunity costs (Galasso and Nannicini 2011, 2017). In the text, we focus on the role of individual self-interest. In an alternative formulation, we focus on the selection problem of the party leadership, which allocates candidates to influence policy and win parliamentary office, and show that it leads to the same institutional effect (Online Appendix S1.2).

Individual politicians care about policy and office. A politician of partisan type i receives spatial utility $u(|x^* - x_i|)$. The benefit of office is captured by π. While running for office is costly, captured by c, the benefits of winning a seat are larger than the cost of campaigning,

$\pi/3 > c > 0$.[9] To highlight the role of private incentives in a simple way, let us assume that low-quality politicians have an advantage in the candidate selection stage within their party. They are gatekeepers. This means that if a low-quality politician declares her candidacy, the party's high-quality type in that district is not able to run. If the low-quality type does not run, the high-quality type may run as the party's candidate.[10] Note that this assumption does not imply that low-quality politicians generally have a higher chance of being elected than high-quality politicians. Because voters value quality as well a policy and are strategic, they are sometimes willing to vote for high-quality candidates from a party not representing their group, generating incentives for gatekeepers to allow high-quality politicians to enter.

Political competition consists of the interaction between candidacy decisions by politicians and vote choices by citizens. Electoral institutions define the formal rules of the game.

Majority Rule

Under MR, one MP is elected per electoral district d and the candidate with a plurality of votes wins. The timing of events is as follows. First, politicians simultaneously decide whether they want to run for office in their respective district d or not. A high-quality politician of an arbitrary partisan type in district d, denoted by i_d^1, only gets to run if the party's low-quality politician in the district, i_d^0, decides to stay out. Second, voters cast their ballot for one of the candidates in their district. Third, payoffs are realized based on x^* and g^* and the game ends.

Proportional Representation

Under PR, each party draws up a list of up to three candidates and seats are allocated proportionally to the votes received by (non-empty) lists. Similarly to many real-world systems, the mapping from votes to seats is calculated using a quota rule and the largest remainder method. A party that wins at least one-third (or multiple thereof) of the votes wins one seat (or multiple thereof). Any remaining seats are allocated to the party with the largest share of votes after subtracting one-third for any seat it has already obtained.

The sequence of events is as follows. First, parties simultaneously choose lists. As in the majoritarian system, low-quality politicians are gatekeepers in candidate selection within each party. In party with partisanship i, all low-quality types i_d^0 that declare their candidacy are put on the list, and their order is determined randomly. Remaining slots are filled by high-quality types i_d^1 if they declared their candidacy. Second, the election takes place and voters cast their ballot for

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[6] Directly observable to the party's electorate.

[7] Punishment is conditional on the partisan stakes, consistent with the trade-off faced by voters in our framework. Moreover, Online Appendix S.3.1 reports evidence that MPs' legislative behavior predicts reelection in multi-member districts.

[8] We only need a non-trivial probability that candidate quality is revealed before the election. Assuming that voters are less informed about candidates under PR does not alter our central hypothesis. This informational channel is complementary.

[9] Following Morelli (2004), this inequality is more stringent than needed but convenient to characterize politicians' behavior in the PR game, reducing ambiguity about who declares candidacy if a party expects to win at least one but less than three seats.

[10] For recent evidence, see Besley et al. (2017).

a party list. Third, payoffs are realized and the game ends.

Voting

Voting is strategic under both MR and PR and we allow voters to be strongly coordinated, potentially as the result of opinion polls, news media, social networks and political campaigns (Morelli 2004). Voters have induced preferences over the composition of parliament in terms of ideology and quality. It is natural to think of players as being able to communicate about possible electoral coalitions during the campaign period without being able to credibly commit to a particular voting or entry strategy. Hence we solve each game for perfectly coalition-proof Nash equilibria, which means that voting strategies and candidacy decisions are robust to credible deviations by any coalition of players (Bernheim, Peleg, and Whinston 1987).[11]

Electoral Geography

Motivated by evidence about the distribution of voter preferences, we consider an electoral geography where one group is inefficiently concentrated in cities or industrial areas (Rodden 2010). Suppose that the median voter in district $d = 1$ is of type L, the median voter in $d = 2$ is of type M and the median voter in $d = 3$ is of type H. At the same time, the median voter in the population at large is of type L. Technically, we also assume that the population share of group L minus one-third is larger than the population share of the smallest group. This ensures that PR in fact leads to fairly proportional results if all voters vote for their preferred partisan types.

Comparing Equilibrium Outcomes

Table 1 summarizes the equilibrium outcomes under the two alternative electoral systems, MR and PR, in terms of the equilibrium policy (x^*) and the endogenous quality of elected MPs (g^*). Given the unequal electoral geography where the majority group L is inefficiently concentrated in its core district(s), the equilibrium policy under MR corresponds to the ideal point of the median voter in the median district (x_M) rather than that of the median voter in the population (x_L) and two-thirds of all legislators are good types ($g = g(2)$). Under PR, the equilibrium policy corresponds to the ideal point of the median voter in the population (x_L). If political polarization, defined as the distance between ideal points x_M and x_L, is relatively high, only one-third of all legislators elected in the PR election are good types ($g = g(1)$).[12] In this situation, there is a clear institutional trade-off.

Compared to MR, PR leads to a closer representation of the electorate's policy preferences but performs less well in selecting high-quality politicians ($g(1) < g(2)$). If polarization is relatively low, both electoral systems produce the same quality of MPs ($g = g(2)$).

Proposition 1 summarizes the qualitative comparison of equilibrium outcomes across electoral systems that will be tested in the empirical part. (A proof is in Online Appendix S.1.) Given the electoral geography and polarized policy preferences, a clear-cut empirical implication is that replacing MR by PR should increase the policy congruence between politicians in parliament and the median voter in the population but reduce the average quality of MPs.

Proposition 1. *Assume the unequal electoral geography specified in the text. Compared to MR, equilibrium policy under PR is closer to the median voter in the population and, if political polarization is high, the average quality of elected politicians is strictly lower.*

Under MR, an equilibrium entails the election of a good L-type politician in district 1 (where L is the majority group), a good H-type politician in district 3 (where H is the median voter) and a bad M-type politician in district 2 (where M is the median). This parliament is denoted by $\{L_1^1, M_2^0, H_3^1\}$.[13] A politician's partisan type is denoted by $i \in \{L, M, H\}$, and her quality is indicated by superscript $\omega = 1$ (high), $\omega = 0$ (low). Equilibrium policy, $x^* = x_M$, corresponds to the median MP, who represents the median voter in the median district rather than the population median. The bad M_2^0-type in district 2 runs, blocking the entry of a good M_2^1-type. This occurs because M voters in the district cannot credibly commit to vote against her given that this would swing equilibrium policy to either x_L or x_H. Hence, M_2^0 exploits the stark trade-off between policy and quality faced by her co-partisans. The same commitment problem does not exist in the two other districts. As neither of these districts can unilaterally change policy in a favorable direction, voters will punish bad politicians of their partisan type (off the equilibrium path) and so only good types enter and win. Thus, quality is relatively high because voters in most districts can focus on the quality dimension of the politicians competing in the district without affecting the policy outcome in the legislature. While all voters could be made better off by adding another high-quality politician without changing policy, a coalitional deviation to achieve this Pareto improvement is not self-enforcing.[14]

The selection of legislators plays out differently under PR because a larger segment of voters confronts a policy-quality trade-off. In particular, L voters face a hard choice: Do they support a parliament that implements their preferred policy but consists of

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[11] There are multiple Nash equilibria. The refinement rules out equilibria based on a complete failure of coordination, as they are less plausible in a setting of institutionalized party competition.

[12] In a multi-party setting polarization can be defined in various ways (e.g., studies such as Alt and Dreyer Lassen (2006) use the range or standard deviation of party positions). What matters in equilibrium is the minimal distance of ideal points between groups, which simplifies to $x_M - x_L$. While polarization is continuous, best-responding behavior implies a cutoff.

[13] Outcome-equivalent parliament $\{M_1^1, M_2^0, M_3^1\}$ can also occur.

[14] Suppose L and M voters come to an agreement that district 1 elects M_1^1 to allow district 2 voters to vote against M_2^0 and support L_2^1 instead, thus inducing $x^* = x_M$ and $g(3)$. However, assuming M voters keep their side of the bargain, L voters in district 1 will be better off reneging and voting for L_1^0 to change policy to x_L.

TABLE 1. Equilibrium Outcomes Under Alternative Electoral Systems

	Majority rule	PR
Low polarization	$x = x_M, g = g(2)$	$x = x_L, g = g(2)$
High polarization	$x = x_M, g = g(2)$	$x = x_L, g = g(1)$

a majority of bad L candidates or do they support a parliament composed of more high-quality politicians from a different party? If policy disagreement is sufficiently high, gatekeepers are able to run bad types on the list without suffering a sufficient electoral penalty, and given their private incentives they prefer to do so. The resulting parliament is $\{L^0, L^0, K^1\}$, where the third seat is either claimed by a high-quality type of party M or H (and subscripts for districts are dropped). Compared to MR, a majority of voters faces the problem that voting based on the quality of politicians would adversely affect the policy outcome. This makes it more difficult to credibly commit to vote against "their" bad politicians.

As a result, given high polarization, the average quality of elected politicians is strictly lower under PR than MR. If polarization is low, voters' commitment problem is mitigated and quality improves under PR to the level achieved by MR. The corresponding equilibrium parliament is $\{L^0, L^1, K^1\}$.

This logic does not imply that PR always improves policy responsiveness or reduces quality compared to MR. The model helps to clarify that the institutional effect may depend on the geographical distribution and polarization of voter preferences.[15] Hence, the empirical tests of Proposition 1 presented below focus on polities where the argument suggests a trade-off is present.[16]

EVIDENCE FROM THE INTRODUCTION OF PR IN SWITZERLAND

To test the central implications of the model, we leverage an electoral reform introducing PR in the Swiss canton of Zürich in 1916. It provides an unusually controlled setting to study how variation on the *intensive margin* of a fundamental change of the electoral system affects political representation.

Historical Context

At the time, electoral reform was a salient political issue in many of Europe's young democracies. The contested question was whether to replace the existing majoritarian electoral system with a variant of PR (Ahmed 2013; Boix 1999). In federal Switzerland, electoral reform was also an important topic at the canton (i.e., state) level, and proportional representation was introduced there first (Funk and Gathmann 2013). Universal male suffrage was already established in the nineteenth century and cantons were in charge of most domestic policies.[17]

In a referendum held in December 1916, 53 percent of voters supported the adoption of PR for the cantonal parliament (*Kantonsrat*) of Zürich. Three months earlier a narrow majority of the incumbent MPs had voted against the reform. The legislative vote was superseded by the popular vote. Under the old majoritarian electoral system, MPs were elected using absolute majority voting in districts of varying magnitude, single-member as well as multi-member districts.[18] This system was common in Europe (Ahmed 2013, 65). The electoral reform put in place PR with several larger multi-member districts. Importantly, other political institutions were not affected by the reform. Voting rights, instruments of direct democracy, and parliamentary institutions, including term duration and the compensation of MPs, remained stable.

A multiparty system had already emerged under the old system (Gruner 1977, 66). Two bourgeois parties belonging to the liberal party family, the center-right Liberal Party (*Freisinn*) and the center-left Democratic Party, had dominated cantonal politics since the 1870s. They were confronted by the rising Social Democratic Party. The Farmers' Party was established in the wake of the electoral reform, with several politicians (including incumbent MPs) breaking off from the Liberals. Two small Christian conservative parties (one Catholic and one Protestant) also entered parliament under PR. After previous proposals to introduce PR had been defeated, the final push for electoral reform by referendum was supported uniformly by the Social Democrats, which expected to gain from a more proportional mapping from votes to seats (Kummer 1969). As shown in Online Appendix Figure S.2.1, support for electoral reform varied greatly across municipalities.

The reform took place in a context of electoral politics polarized by class antagonism and an uneven electoral geography, consistent with the two system-level

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[15] For instance, consider a different electoral geography and assume that the three groups are of equal size and each electoral district resembles the national distribution of voters. It follows that the policy outcome corresponds to the ideal point of group M in both electoral systems.

[16] Future work should test the relevance of these system-level context conditions. This requires a different, probably cross-national, research design.

[17] Zürich was the second most populated canton and it had the largest cantonal parliament (222 members in 1914). While several smaller cantons introduced PR before (Funk and Gathmann 2013, 1183), prior reforms do not generally share the same features. For instance, in Ticino, the first canton to switch to PR, the reform was imposed by the federal government in response to a civil war.

[18] A second round is held for seats without an absolute majority winner.

conditions highlighted by the model. Support for the left was heavily concentrated in industrialized cities and towns, whereas support for the bourgeois parties was more evenly spread. As a consequence, the Social Democrats suffered from an inefficient votes-to-seats ratio and were underrepresented in parliament (Gruner 1978, 242).[19] Hence, the introduction of PR was one of their central political demands. Reflecting a deepening class conflict leading up to World War I and into the interwar years, the Social Democrats and the bourgeois parties represented starkly different policy positions and ideologies, with a radicalized left challenging the existing political and social order (Ahmed 2013, 61, 200–5; Gruner 1977, 55). The large variation in referendum results across districts also indicates significant polarization of policy preferences in the electorate.[20]

Before and after the reform, candidates were chosen in district-level party meetings, where participation was limited to dues-paying party members. Consistent with the gatekeeping version of the model, this setting also provided party elites with formal and informal opportunities to shape nominations, such as setting the agenda and proposing candidates, and there is anecdotal evidence that elites dominated the meetings selecting candidates.[21] More systematically, some studies of this period have shown that collective decision-making in public meetings, compared to elections with secret ballots, can be more prone to elite capture (Hinnerich and Pettersson-Lidbom 2014).

The Reform's Intensive Margin

The reform had two main components. First, it changed the voting rule that defines how votes are translated into seats. Absolute majority rule was replaced by open-list PR.[22] Second, it increased the magnitude of electoral districts. The existing 56 electoral districts were aggregated to 18 larger districts. The result was an increase, on average, in the number of MPs elected in a district from 4 to 12. Importantly, the increase in district magnitude was not uniform but varied across districts based on administrative constraints rather than partisan politics. Given the same proportional electoral formula, a larger increase in district magnitude implies a larger dosage of electoral proportionality. Our

empirical strategy leverages this variation in the intensity of the reform using a difference-in-difference design.

To illustrate this within-reform variation, Table 2 depicts the mapping from electoral districts in the last pre-reform parliament (1914–17) to electoral districts in the first post-reform parliament (1917–20). The pre-reform electoral districts are nested within the larger post-reform electoral districts. Electoral districts were drawn to respect pre-existing community borders. The canton consisted of 187 municipalities (*Politische Gemeinden*) of varying size, which were grouped into 11 administrative districts (*Bezirke*). An electoral district is formed by several contiguous municipalities belonging to the same *Bezirk*.[23] In turn, the number of seats awarded to a district was a function of population size, mandated in the cantonal constitution.[24]

Historical documents and research indicate that electoral districts for the cantonal parliament were not drawn in a partisan manner (Gruner 1978, 541; Kummer 1969, 17). The outlines of the pre-reform districts were drawn before the emergence of the modern party system (Kummer 1969, 25). The consensual, largely non-political process of drawing districts at the cantonal level stands in contrast with the more partisan districting ("*Wahlkreisgeometrie*") at the national level (Gruner 1978; Kummer 1969). This is an important advantage of focusing on the cantonal level.

The reform aggregated electoral districts to the larger administrative districts (*Bezirke*). For instance, as illustrated in Table 2, districts 53–56 were combined to form a new district corresponding to the *Bezirk* of Dielsdorf. As a result, average district magnitude increased more than four times from 1.75 to 8. Similarly, districts 49–52 were merged to form a district corresponding to the *Bezirk* of Bülach, and district magnitude increased from 3 to 12. Some urban districts, however, experienced no change in magnitude because there were already quite large (e.g., Zürich-Unterstrass). The reform respected the constraint that each pre-existing *Bezirk* should be represented by (at least) one electoral district. Administrative borders constraining districting are the result of history, which we account for in the analysis using fixed effects, rather than contemporaneous political choices. They were defined by law in 1831 and changing them required majority support in a referendum, which made them remarkably stable. While parliament was divided on the overall merits of electoral reform, there was broad agreement on the question of electoral districts.[25]

Figure 1 summarizes the resulting variation in the reform's intensive margin, as captured by the ratio of post-reform district magnitude to average pre-reform district magnitude in the same unit. A ratio of 1 indicates no change and larger values indicate higher reform

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[19] With an average votes-to-seats ratio of 1.87 in last five pre-reform elections, comparable to British Labor's ratio of 1.8 in 1910–18.

[20] See Appendix Table S.2.3. As another indication of polarization, only two economic variables, industrial employment and foreign workers, predict 76% of the variation in left party support across districts.

[21] A newspaper report describes candidate selection in a district meeting of the Social Democrats: First, an incumbent MP gave an hour-long speech, then the meeting's president announced the list of candidates and the present rank-and-file members approved it "without discussion" [*Grütlianer* (Zürich), April 20, 1914, p. 2]. While attendance data are not generally available, another newspaper report implies that a meeting to nominate candidates for the bourgeois list in a competitive district assembled 70 members, which amounts to only 4.5% of their voters (*Grütlianer*, June 22, 1917, p. 3).

[22] Most voters (83%) voted a straight party list despite the option to rank candidates.

[23] The exception is pre-reform district 22, which combined adjacent municipalities from two different *Bezirke*, and was split in the reform at the *Bezirk* boundary, adding the largest part to new district 9.

[24] One MP for 1,800 citizens.

[25] On May 22, 1916, individual districts were agreed upon either unanimously or with supermajorities. Minutes from meetings of the Social Democratic parliamentary group also indicate that districts were not a salient issue (March 8 and March 22, 1916).

TABLE 2. Electoral Reform and District Magnitude in Canton of Zürich

	Majority rule (1914)			PR (1917)	
Electoral district	Adm. district (*Bezirk*)	Seats	Average seats in *Bezirk*	Electoral district	Seats
56 Niederhasli	Dielsdorf	2	1.75	18	8
55 Regensdorf	Dielsdorf	3		18	8
54 Schöfflisdorf	Dielsdorf	1		18	8
53 Stadel	Dielsdorf	1		18	8
52 Kloten-Basserdorf	Bülach	4	3	17	12
51 Embrach	Bülach	3		17	12
50 Bülach	Bülach	3		17	12
49 Eglisau	Bülach	2		17	12
⋮		⋮	⋮	⋮	⋮
6 Zürich-Unterstrass	Zürich	11	11	3	11
⋮		⋮	⋮	⋮	⋮
2 Zürich-Enge	Zürich	6	7.5	1	15
1 Zürich-Altstadt	Zürich	9		1	15

Notes: Based on Official Compilation of Laws (Offizielle Sammlung) of canton Zurich Vol. 30 (pp. 58–65 and pp. 422–428).

FIGURE 1. The Electoral Reform's Intensive Margin
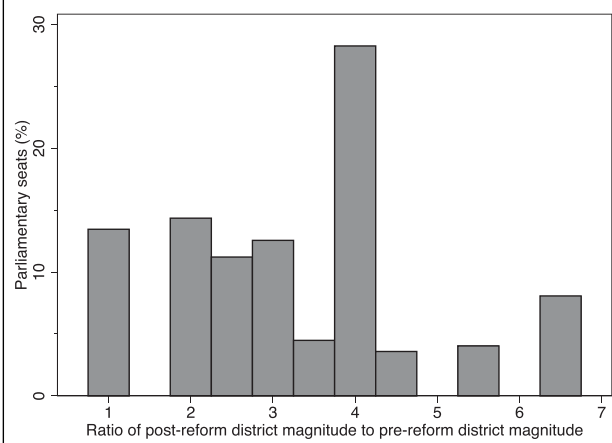
intensity. The variation ranges from no change up to a 6.6-fold increase of district magnitude.

It is instructive to note some differences between the electoral institutions analyzed in the theoretical model and their empirical counterparts, and explain why they do not alter the theoretical expectations. First, the model considers one-round elections in the majoritarian system, whereas the empirical case is based on absolute majority voting that may lead to a run-off. Adding a run-off stage to the model does not change the predictions. Run-offs do not usually occur in equilibrium in this framework, consistent with reality in this case.[26] Second, the

theoretical comparison is between single-member districts under MR and a polity-wide multimember district under PR. Empirically, district magnitude is heterogenous in each system. What matters is that the reform, on average, entailed a significant increase in district magnitude and magnitude never declined.[27] While the model has opted for parsimony and more generic institutional features, its predictions apply to this particular case.

Data and Measurement

We assembled an original data set that measures the legislative behavior and socio-demographic attributes of individual MPs in the canton and combines them with data on district characteristics and electoral institutions. It covers the last two parliaments elected before the reform (1911 and 1914) and the first post-reform parliament (elected in 1917). These three parliamentary terms belong to the same apportionment period based on the 1910 decennial federal census. This rules out population-based redistricting or other policy changes based on the census. Our main sources are parliamentary records, compilations of referendum results and the census. We also draw on newspapers to code party affiliations. Altogether, across all parliaments there are 723 MPs.[28]

Measuring Representation

We consider two distinct aspects of representation. The first measure captures the policy responsiveness of MPs compared to the preferences of the electorate on salient

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[26] In the 1914 election 99% of all seats were decided in the first round, indicating a high degree of electoral coordination even though in most districts there were more candidates than seats.

[27] Online Appendix S.1.3 formally illustrates a comparison between MR with multi-member districts and PR.

[28] Online Appendix S.2 provides descriptive statistics and sources for all variables.

issues. Following recent studies of contemporary Switzerland (Portmann, Stadelmann, and Eichenberger 2012), we exploit an institutional setting combining direct and representative democracy to measure whether an MP's vote on a law proposal in parliament is congruent with the popular vote on the same proposal in a referendum. The cantonal constitution mandates referendums on major laws, constitutional changes, and significant spending increases. In addition, an initiative referendum may put a topic on the agenda, based on the support of a minority of MPs or the collection of a sufficient number of signatures. This institutional setting provides an opportunity to observe the voting behavior of MPs and voters on the same policy proposals. We have compiled roll-call votes from the parliamentary records, available at the cantonal state archive, and matched them with the corresponding referendum results, retrieved from the canton's referendum database. Following the theoretical conception of policy representation benchmarked to the median voter in the population (Cox 1997, 226; Powell and Vanberg 2000), an MP's parliamentary vote is coded as congruent if it matches the cantonal majority in the corresponding referendum and is coded as dissonant otherwise (we also report results using alternative operationalizations).

This approach captures political actions (rather than non-binding campaign statements or survey responses) on concrete and salient policies and it measures politicians and voters on a comparable scale. One complication is that roll-call votes only exist for a subset of all cantonal referendums (15.6%) for two terms (1914–17 and 1917–20).[29] Online Appendix S.2 lists the matched votes and documents that referendums with corresponding roll-call votes are similar on observed features to those without roll-call votes.

Our second set of outcome variables taps into the willingness of MPs to contribute to activities that are collectively essential to make parliament work. Following our theoretical emphasis, regular legislative attendance is an important behavioral manifestation of quality related to intrinsic motivation. Høyland, Hobolt, and Hix (2017, 5) argue that participation is "a pivotal indicator of a legislator's 'valence' (for example, his or her quality, commitment or diligence)." It is a key component of the parliamentary production function (Fisman et al. 2015; Gagliarducci, Nannicini, and Naticchioni 2011). Absent MPs are not able to introduce, defend, criticize, or vote on policy proposals or interpellate the executive. In that sense, MPs' "participation in legislative activities is a prerequisite for political influence" (Høyland, Hobolt, and Hix 2017, 17). This is certainly relevant for this parliament because the speaking agenda was open (every MP had the right to speak at least once before debate could be closed), the number of standing committees was limited and the floor extensively debated and amended legislation coming from the ad-hoc committee dealing with each major law. In line with this, Online Appendix S.3.1 provides

evidence that MPs' attendance is a significant predictor of their reelection and contributions to parliamentary debates (as a robustness check, we directly use speeches as the dependent variable). Consistent with the notion of a public good, the parliamentary rules make attendance mandatory and penalize non-attendance, and any binding motion of parliament requires a quorum of at least one-half of all MPs. Party leaders also emphasize the importance of participation. For instance, in a meeting of Social Democratic MPs, documented in handwritten minutes, a party elder implores his colleagues to punctually attend the next parliamentary session because it will debate an important issue.[30] Not surprisingly, average attendance rates are high (0.86). We calculate each MP's attendance rate in a term from the parliamentary records.

District Characteristics

The analysis controls for characteristics of electoral districts that may vary over time as a function of changing district boundaries. From the 1910 census, we calculate the employment share in the industrial sector (capturing the left's mobilization potential), religious fractionalization, language fractionalization and the share of the foreign population in a given electoral district, using the pre-reform boundaries for the parliaments elected in 1911 and 1914 and the larger post-reform boundaries for the parliament elected in 1917. While the canton was dominantly (i.e., 75%) Protestant, the Christian-Social Party appealed to "diaspora Catholics" (Gruner 1977, 116). In industrial areas there was a relatively large number of foreign workers, mostly drawn from Germany, Italy, and Austria-Hungary. They did not have the right to vote but were organized by trade unions (Gruner 1977, 132). We calculate voter support for PR in the referendum, accounting for a variable omitted in most prior research.

MP Characteristics

MPs' characteristics include their age, occupation, information on other political offices, education, and party affiliation. They are derived from the biographical information in the parliamentary records.

Empirical Strategy

To estimate the effect of the introduction of PR on representation, our empirical strategy takes advantage of variation in the intensity of the reform across electoral districts. The basic difference-in-difference regression model takes the following form:

$$Y_{idt} = \theta(\text{Reform intensity})_{d_p,17-14} + \alpha_{d_p} + \lambda_t + X'_{dt}\beta + \epsilon_{idt}. \tag{2}$$

The outcome variable Y_{idt} is a measure of legislative behavior of MP i in electoral district d and parliamentary term t: (i) an indicator for whether the MP's vote on an issue is congruent with the majority in the

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[29] A roll-call takes place if such a request is supported by at least 30 MPs.

[30] Hermann Greulich on August 11, 1916.

popular vote, or (ii) parliamentary attendance in the term. The variable (Reform intensity)$_{dp,17-14}$ captures the heterogeneous nature of the electoral reform. It is zero in the two pre-reform parliaments elected under the majoritarian system in 1911 and 1914. In the first election held under PR in 1917, reform intensity in a post-reform electoral district d_p (nesting the smaller pre-reform districts) is measured as the ratio of the district magnitude in the post-reform district d_p to the average pre-reform district magnitude (in the 1914 election) in pre-reform districts nested in d_p (plotted in Figure 1). We take the natural log of this ratio as this normalizes no change in district magnitude to zero and is equivalent to analyzing the differences in the logged levels of district magnitude. It also captures declining marginal returns to increasing district magnitude.[31]

The specification includes fixed effects at the level of post-reform districts, α_{d_p}. They strip out the cross-sectional institutional variation and account for time-invariant unobservables, such as historical determinants of administrative borders, urbanization, or distance to the parliament. Hence, identification comes from the arguably exogenous change in district magnitude based on pre-determined administrative units. Indicators for the parliamentary term λ_t capture common shocks across all districts (the pre-reform term serves as the baseline). District controls discussed above are represented by X_{dt}. The analysis of legislative votes also includes a set of dummies for the different votes.

In this specification, θ captures the causal effect of electoral reform on the behavior of MPs as long as the difference-in-difference assumption holds, and we find evidence supporting it. The varying treatment intensity allows us to control for other potentially relevant changes in the political environment of legislators. Following prior research on the effects of political reform on legislative behavior (Fisman et al. 2015, 896), the baseline specification excludes MP characteristics, as political selection is part of the conjectured mechanism. Nonetheless, it is appropriate to control for characteristics of MPs to the extent that they capture fixed variation in the pool of candidates across parties (assumed away in the theoretical model). Hence, we also present results controlling for party affiliation, age, indicators for working-class occupations and farmers, membership in national parliament, and exit due to death (see Gagliarducci, Nannicini, and Naticchioni 2011; Høyland, Hobolt, and Hix 2017).

Standard errors for the regression parameters are clustered at the level of post-reform electoral districts. They accommodate heteroscedasticity and within-cluster correlation. In addition to asymptotic standard errors, we also use the resampling procedure proposed by Cameron, Gelbach, and Miller (2008) to avoid over-confident confidence intervals, as the number of clusters (18) is relatively small.

Results

Table 3 reports the estimated effect of reform intensity on how well elected politicians represent the electorate. In columns 1–3, the dependent variable is an indicator measuring whether there is congruence between the parliamentary vote of an individual MP and the popular majority in the referendum on the issue. All models include district characteristics and fixed effects for votes. Column 2 adds district fixed effects and column 3 adds MP characteristics. In all models, the estimates suggest that a higher intensity of the electoral reform leads to a larger increase in policy responsiveness by MPs to the cantonal electorate. The effect is substantively and statistically significant and changes little across specifications. Model 2 implies that going from zero to median reform intensity (1.1) increases the congruence of legislative and popular votes by approximately 21 percentage points on average, which corresponds to 0.43 standard deviations of the dependent variable.[32]

Column 4 reports results from an aggregate-level analysis of congruence conducted at the level of post-reform districts. The dependent variable for this analysis is an indicator (1 = yes, 0 = no) of whether a majority of MPs in the district is congruent with the popular majority on the binary policy question. This captures that policy responsiveness does not require that all MPs vote the same way. The statistical specification is the same as before except that we cannot control for individual MP characteristics. Clearly, higher reform intensity leads to a significantly higher probability of congruence (also see Online Appendix Table S.3.7).

Models 5–7 in Table 3 show the effect of reform intensity on attendance. For comparability, the analysis focuses on the pre-reform parliament and the post-reform parliament (for results including the 1911–14 parliament and pre-treatment trends, see Online Appendix Table S.3.6). The coefficient on reform intensity varies little across specifications and is statistically significant at the five percent level. Higher reform intensity entails a relative decline in attendance. Model 6 implies that going from zero to median reform intensity decreases parliamentary attendance by five percentage points on average, which corresponds to 0.41 standard deviations of attendance.

The magnitude of the effects of reform intensity on the two outcome variables is nearly identical, relative to the variation (in terms of standard deviation) of each outcome (see Figure 2). The direction and size of the effects are consistent with a central implication of our theory. A larger dosage of proportionality improves the

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[31] Equivalently, one may write (Reform intensity)$_{d_p,17-14} = \log\left(\frac{DM_{d_p,17}}{DM_{d_p,14}}\right)\lambda_{17}$ where λ_{17} is a dummy for the reform election. District fixed effects make it redundant to include the time-invariant component of the interaction.

[32] For the analysis of congruence, there are 1,108 potential observations if all MPs vote, excluding the non-voting president. We observe 898 votes as there are 17 abstentions, 189 cases of non-attendance and 4 cases where a vacant seat had not yet been filled. Controlling for MP characteristics, 34 cases are dropped due to missing data. For attendance, the analysis includes all MPs who serve in a parliament, including those who enter during the term to replace dropouts; this means that the number of observations per parliament is somewhat larger than the total number of seats (223 and 222, respectively).

TABLE 3. Effect of Electoral Reform on Political Representation

	Congruence MP-median voter				Parliamentary attendance		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Reform intensity	0.19	0.19	0.21	0.44	−0.042	−0.048	−0.057
	(0.057)	(0.058)	(0.065)	(0.142)	(0.019)	(0.019)	(0.015)
	[0.002]	[0.002]	[0.004]	[0.02]	[0.062]	[0.036]	[0.002]
District controls	✓	✓	✓	✓	✓	✓	✓
District FE		✓	✓	✓		✓	✓
MP characteristics			✓				✓
Vote FE	✓	✓	✓	✓	n/a	n/a	n/a
Observations	898	898	864	90	471	471	450

Notes: Dependent variable: congruence (models 1–3) is a dummy variable indicating whether an MP's parliamentary vote on an issue is congruent with the canton majority in the corresponding referendum (available for parliaments elected 1914 and 1917); model 4 is estimated at the level of post-reform districts, and the dependent variable is an indicator for whether a majority of MPs in the district votes with public opinion on each issue; parliamentary attendance (models 5–7) is an MP's average attendance rate in a given parliament (parliaments elected 1914 and 1917). Reform intensity is zero in the pre-reform parliaments and after the reform it measures the logged ratio of district magnitude in 1917 (the first election under PR) to the average district magnitude in 1914 (the last pre-reform election) at the level of post-reform districts. Estimation is by OLS. All models include a period dummy. Standard errors in parentheses are clustered at level of post-reform electoral districts. Brackets report *p*-values adjusted for clustering based on wild bootstrap. District controls: voter support for electoral reform (incl. second-order polynomial), language fractionalization, religious fractionalization, foreign population, employment share in industry. MP characteristics: age, worker, farmer, member of national parliament, exit due to death, party affiliation (Social Democrats, Farmer's Party, bourgeois parties are reference).

FIGURE 2. Standardized Effects of Reform Intensity
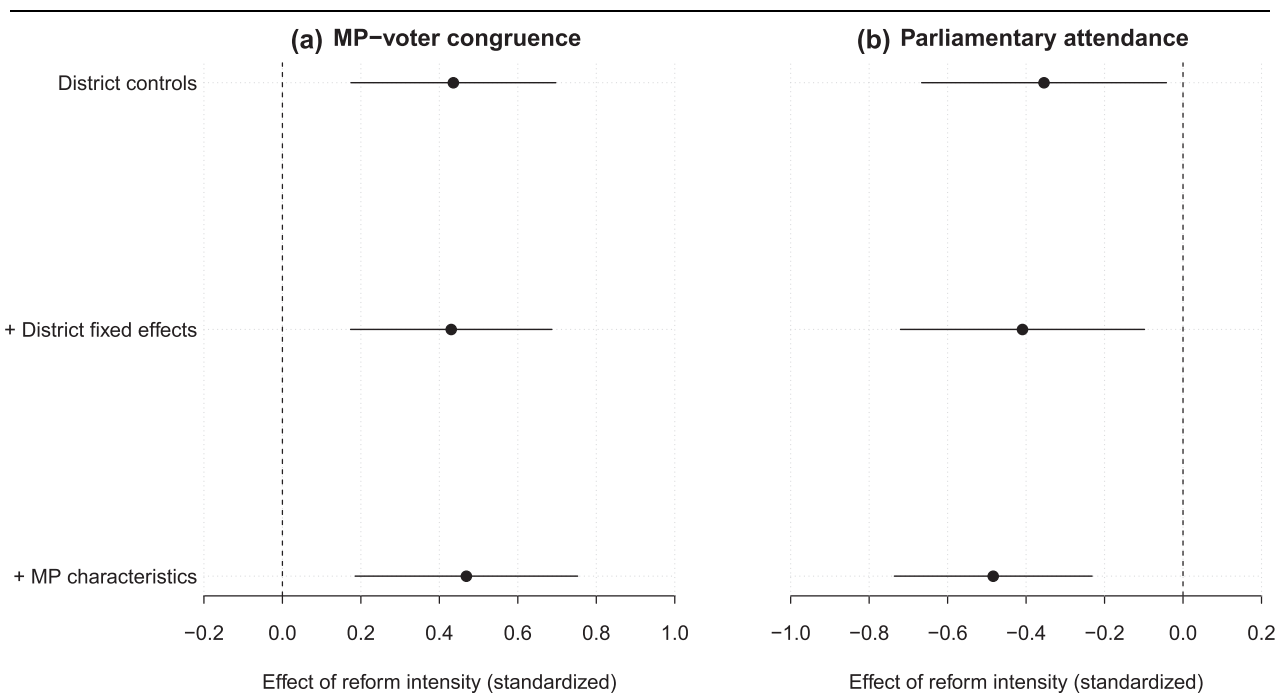
Note: The figure displays the effect of increasing reform intensity from zero to median reform intensity on (a) MP-median voter congruence and (b) parliamentary attendance, relative to the standard deviation of each dependent variable. It shows that the effects on the two outcome variables are of comparable magnitude. The underlying coefficient estimates are reported in Table 3. The horizontal bars indicate 95% confidence intervals based on clustered standard errors.

responsiveness of MPs to the electorate but it also decreases MPs' participation. The research design rules out that these effects are driven by district characteristics that are fixed in the short time span we consider, changes in the socio-economic composition of districts, including voter preferences concerning electoral reform, common shocks (e.g., World War I) or other political institutions.

Further sensitivity checks show that these results are robust to numerous alternative specifications (Table S.3.6). Moreover, using speeches and education as outcomes yields qualitatively similar results to attendance (Tables S.3.3 and S.3.4). The results are also robust to dropping the city of Zürich, which introduced PR for the municipal assembly in 1913 (Table S.3.8). While fixed effects capture this heterogeneity across units, exploring the heterogeneity of the effect shows that the capital does not drive the result. Evidence that the reform effect varies with pre-reform district magnitude, higher in more urban areas, is mixed (Table S.3.9).

What alternative explanations may account for the effects of the reform? One possibility is that the effect on attendance is purely mechanical, reflecting varying occupational bases of political recruitment across parties. The introduction of PR went hand in hand with a change in the party system (consistent with our theory), most noticeably an increase in the Social Democratic party group and the entry of the Farmer's Party. In particular, farmers face a seasonal work schedule that may make it costlier to attend parliament during harvest season. Thus, the reform intensity effect may reflect fixed differences in politicians across parties rather than strategic nominations. While plausible, we have largely ruled out this possibility by controlling for MPs' party affiliation (Table 3). Moreover, it is not the case that participation was lower among MPs from the Farmer's Party (Figure S.3.2). Relatedly, one may suspect that the two parties that gained most seats through the reform faced binding supply constraints and were not able to find enough good candidates. This seems unlikely, because the Social Democrats could draw on a large pool of politicians with local-level experience and the Farmer's Party was new in name but not in personnel (as other parties pointed out during the campaign). In line with this, the results are robust to controlling for MPs' previous local political experience or parliamentary seniority (Table S.3.10).[33]

The effects are not easily explained by seminal personal vote theories of electoral institutions (Carey and Shugart 1995). Participation, while a crucial input to lawmaking, is not generally seen as an electoral asset specific to local representation. It may actually hurt the ability to build a personal vote by reducing the time available for activities in the district (Høyland, Hobolt, and Hix 2017). Local political experience or birthplace have been used as measures of credible candidate ties to their district (Nemoto and Shugart 2013; Shugart, Valdini, and Suominen 2005). While we do not have data on birthplace, additional analyses find no statistically significant effect of the reform on the selection of MPs with local political experience (Table S.3.5). Emphasizing a trade-off between local and party-based representation, this line of theorizing also suggests that reform intensity may lead to more cohesive parties. However, party cohesion on its own does not necessarily lead to higher policy responsiveness to the median voter.

Finally, theories of electoral systems based on swing-voter models of electoral competition with exchangeable politicians do not provide a straightforward explanation either (Persson and Tabellini 2000, chap. 8). In contrast to our model, they do not imply that PR improves policy responsiveness to the median voter. Instead, policy should become more responsive to a weighted mean of citizen preferences, where weights are inversely proportional to groups' ideological biases, and all parties converge to this platform. In this framework, it is also not clear whether the legislative effort of individual politicians will be lower in PR. While electoral incentives for individual politicians to avoid shirking are highest in competitive seats in majoritarian systems, the incentives in non-competitive seats can be significantly lower than under PR, leaving the overall effect ambiguous.[34]

CONTEMPORARY EVIDENCE

Theoretically, our argument applies to historical as well as contemporary democracies. To empirically explore the external validity of our historical evidence, we provide some evidence from a recent reform of electoral institutions in the European Parliament. It confirms the existence of a significant institutional trade-off on a large scale.

The research design builds on our previous analysis in that it also exploits the intensive margin of introducing PR. We leverage the adoption of PR for European elections in the United Kingdom. For the first time in British history, the European Parliamentary Elections Act of 1999 introduced PR on a nation-wide basis, for the election of members of the European Parliament (MEPs). While the country-specific electoral rules for the European Parliament remained the same elsewhere, in Britain the reform replaced the traditional method of plurality voting in 84 single-member constituencies with closed-list proportional representation in larger multi-member districts drawn at the level of pre-existing regions (9 English regions, Scotland and Wales),[35] where the new districts contain the smaller old districts. This large-scale reform is characterized by considerable within-reform variation: electoral rules in other member countries were not affected and the dosage of the reform varies within Great Britain, ranging from an increase in district magnitude from 1 to 4 up to an increase from 1 to 11.[36]

Given these institutional features, we use a difference-in-difference approach to estimate the effect of reform intensity on the behavior of MEPs. We focus on the last parliament elected under the old rules (1994–99) and the first post-reform parliament (1999–2004). The study of Hix, Noury, and Roland (2007) enables us to

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[33] Online Appendix S.3.4 further explores the mechanisms.

[34] This argument has been applied to turnout (Cox, Fiva, and Smith 2016).

[35] The Single Transferable Vote system was retained for Northern Ireland.

[36] Previous research on the effects of electoral institutions on MEPs' performance does not leverage this reform (Fisman et al. 2015; Høyland, Hobolt, and Hix 2017).

TABLE 4. Evidence from an Electoral Reform in the European Parliament

	Attendance (1)	Shirking (2)	NOMINATE (3)
Reform intensity	−0.045 (0.012) [0.01]	0.028 (0.007) [0.01]	
Reform intensity × Mean citizen ideology			0.053 (0.014) [0.01]
Mean citizen ideology			0.321 (0.279) [0.60]
District FE	✓	✓	✓
Observations	1,302	1,302	1,302

Notes: Dependent variables: attendance (model 1) is an MEP's participation rate in roll-call votes during the parliamentary term; shirking (model 2) measures the fraction of parliamentary sittings in which an MEP signed the attendance register but cast zero roll-call votes; NOMINATE (model 3) is the first dimension legislative 'ideal point' scaled from roll-call votes by Hix, Noury, and Roland (2007). Estimation is by OLS. All models include a period dummy. Standard errors in parentheses are clustered at level of post-reform electoral districts. Brackets report *p*-values adjusted for clustering based on wild bootstrap. In the fourth parliament, MEPs from Austria, Finland, and Sweden are excluded as they are not covered by the election survey used to calculate citizen ideology (102 cases); MEPs who participated in less than 20 roll-call votes are also dropped because of missing ideal-point estimates (22 additional cases).

calculate two behavioral measures capturing MEPs' motivation and integrity, which helps to mitigate concerns about data limitations in the historical case. The first measure is an MEP's participation rate in roll-call votes. The second measure is the fraction of times during which an MEP signed the attendance register, which is linked to a substantial daily stipend (around 200 euros in 1994), but did not participate in a single roll-call vote that day. This more explicit form of rent-seeking behavior has at times drawn strong media scrutiny and is used in previous work as a measure of shirking (Fisman et al. 2015, 877).[37]

Measuring policy responsiveness is more difficult because there are no directly comparable data on mass policy preferences for most legislative votes. However, we can test whether the electoral reform affects the link between citizens' general political orientation, captured by left–right placements in representative surveys, and MEPs' general voting patterns in parliament, estimated from scaling models based on thousands of roll-call votes. For the latter, we use the first-dimension NOMINATE scores estimated by Hix, Noury, and Roland (2007), which corresponds to classical left–right issues and explains an "overwhelming proportion in the European Parliament" (Hix, Noury, and Roland 2007, 181). As popular ideology and legislative ideology are not measured on the same scale, we do not calculate a measure of congruence and instead use a relatively more flexible interactive statistical specification.

Table 4 presents the estimation results. Reform intensity is measured exactly as in our previous case: It is zero before the reform and throughout for all MEPs not elected in Great Britain. After the introduction of PR in Great Britain, reform intensity in the British

constituencies is the logged ratio of post-reform district magnitude to pre-reform district magnitude. All models include fixed effects for electoral districts, which capture heterogeneity across countries as well as, in multi-district countries like Britain, regions within a country. A dummy for the fifth parliament captures common shocks.

Columns 1 and 2 in Table 4 show that higher reform intensity leads to lower participation and higher shirking. The results are statistically and substantively relevant. For instance, model 2 suggests that going from zero to median reform intensity in Britain (2.1) increases shirking by 5.9 percentage points, a large effect given that shirking is not very common (the mean rate is 0.08). Strikingly, the coefficient estimate in the attendance model in the contemporary case is nearly identical to the estimate from our historical case. Model 3 turns to assessing the effect of the reform on policy responsiveness. The dependent variable is the first-dimension NOMINATE score (varying from left to right on a scale from −1 to 1) and the specification includes mean citizen ideology, which is measured on a left–right scale from 1 to 10 using the 1994 and 1999 European Election Surveys, and its multiplicative interaction with reform intensity. The interaction coefficient suggests that reform intensity significantly increases the rather loose link between citizen left–right ideology and legislative voting. Altogether, the contemporary evidence is remarkably consistent with the historical evidence from the more controlled Swiss case.[38]

CONCLUSION

Electoral institutions are a crucial feature of representative democracy. Based on a new theory and fine-

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[37] Descriptive statistics and sources for all variables are in Online Appendix S.4.

[38] Unfortunately, neither case allows us to examine long-run effects due to subsequent institutional change.

grained evidence from the intensive margin of two major electoral reforms, we have argued that making electoral systems more proportional can have conflicting effects on political representation. Improving the policy responsiveness of the legislature to the population at large can come at the cost of reducing the quality of politicians. In the context of an uneven electoral geography, adopting a form of PR may still make a majority of voters better off. But the benefit of the reform is smaller than suggested by pure spatial theories that abstract from the quality dimensions of representation. The theory also implies that rising political polarization increases the trade-off between policy responsiveness and quality required by different electoral institutions. Investigating this sobering possibility is a relevant task for future research.

SUPPLEMENTARY MATERIAL

To view supplementary material for this article, please visit https://doi.org/10.1017/S0003055419000145.

Replication materials can be found on Dataverse at: https://doi.org/10.7910/DVN/H1CCWM.

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