

How do Electoral Systems Affect Fiscal Policy? Evidence from State and Local Governments, 1890 to 2005

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Abstract

Using a new data set from 1890 to today, we estimate how the adoption of proportional representation affects policies in Swiss cantons. We show that proportional systems tilt spending toward public goods like education and welfare benefits but decrease spending for targeted transfers like roads and agricultural subsidies. However, we find little evidence that proportional representation increases the size of government. We also demonstrate that compositional changes of the legislature, i.e. party fragmentation and better representation of left-wing parties, are associated with more spending, while the direct electoral incentives of proportional rule appear to reduce government spending.

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1 Introduction

A central question in representative democracies is how to delegate decision-making power to political representatives. Electoral systems hereby play a crucial role because they shape the electoral incentives of politicians and the legislative environment in which public policies are made. Understanding the costs and benefits of electoral systems is of primary political interest. Several countries, for example, Canada have been debating the introduction of proportional representation. Both New Zealand and Italy have recently switched to a system of proportional representation.

Economic theory has shown that the two systems create distinct electoral incentives. A central prediction emerging from a large class of models is that plurality systems favor spending on goods that can be targeted geographically, while the proportional system fosters spending on broad transfers which benefit social groups.¹ How these different electoral incentives affect overall government spending is theoretically much less clear.

Electoral systems, however, not only differ in their electoral incentives but also in the legislative environment they create. In particular, plurality systems are known to foster stable majorities in the legislature (e.g. two-party systems). Proportional systems in contrast often result in politically fragmented legislatures and coalition governments. As demonstrated by Weingast, Shepsle and Johnston (1981) among others, political fragmentation often creates a ‘common-pool problem’ when projects benefit a particular constituency but are financed by the whole jurisdiction. As a consequence, logrolling among politicians yields bigger projects and ultimately more government spending.

In this article, we use data from state and local governments in Switzerland spanning more than a century to analyze how electoral systems affect government spending, . We also shed light on which mechanism, i.e. electoral incentives or political fragmentation drives these results.

¹Austen-Smith (2000); Lizzeri and Persico (2001); Milesi-Ferretti, Perotti and Rostagno (2002); Myerson (1993a) Persson and Tabellini (1999; 2000).

The Swiss setting has a number of attractive features. First, Switzerland’s federalist system created considerable variation in electoral rules for state legislatures. Some states (‘cantons’) use a proportional, others a plurality system to elect their parliament. Hence, our analysis is based on institutional variation at the sub-national level to carefully analyze the link between electoral system and public policies. Since all cantons share a common history, our approach reduces problems of unquantifiable historical and institutional differences inherent in cross-country studies.

Second, we investigate a historical milestone of constitutional reform in Western Europe, the switch from plurality rule to proportional representation. In 1890, all cantons, like all democratic countries around in the world, elected their state legislatures under a plurality system. Over the next 110 years, 23 of the 25 cantons in Switzerland switched to proportional representation. Many other countries like Germany, France, Belgium or Ireland followed. Today, only two cantons exclusively rely on plurality rule to elect their parliament. Hence, our setting provides a unique opportunity to identify the influence of proportional representation on public policies from geographical and temporal variation within the boundaries of a single country.

Third, we exploit rare exogenous variation in electoral rules across Swiss communities to better address the problem of policy endogeneity (Acemoglu, 2005; Aghion, Alesina and Trebbi, 2004). In particular, many cantons in Switzerland mandate proportional or plurality rule for electing local governments today. Since these mandates have typically been imposed many decades ago, they are plausibly unrelated to current local finances, local political factions or current social conditions in a community.

Our findings suggest that proportional representation has strong effects on the scope of government: it shifts spending away from geographically targeted transfers for roads and agricultural subsidies toward spending on education and welfare that benefit broad social groups. In particular, we find that a proportional system raises education expenditures by 12 percent, welfare expenditures by 30 percent, but also decreases road expenditures by 50 percent and agricultural

subsidies by 21 percent.

We find little evidence that proportional representation results in larger governments. It turns out that the absence of an effect on overall spending is driven by opposing forces. On the one hand, changes in the composition of the legislature after electoral reform increase spending. Specifically, the more fragmented legislature in a proportional system is associated with 2.6 percent more spending; the better representation of left-wing interests adds another 2.3 percent. Conditional on these compositional changes, the proportional rule shifts electoral incentives in the direction of lower spending by 6.5 percent.

Finally, the analysis of the 3,000 communities supports our canton level estimates. In particular, we exploit that many cantons mandate the electoral rule for local government elections. Using these canton mandates and an alternative matching approach, we demonstrate that spending is not systematically higher in communities with a proportional system.

We conduct a number of additional validity tests to bolster our paper's main findings. Specifically, we show that the relationship between proportional system and public spending remains unchanged if we control for other political and broader social reforms during that period, such as direct democratic participation rights, the adoption of direct elections for the executive or female suffrage. Further, there are few meaningful relationships between the adoption of proportional representation and the timing of other political and institutional reforms. We also show that attempts to reform the electoral system not ultimately leading to proportional representation have little effect on public spending. Finally, our basic results are unaffected if we account for the potential nonstationarity, serial correlation or unobserved trends in public spending using dynamic panel data estimators, first differencing, adjusted standard errors or canton-specific trends. Taken together, the results for canton and local governments suggest that it was the adoption of proportional representation itself that shifted the scope of government but did not increase its overall size.

2 Related literature

The two dominant electoral systems used in democracies today, plurality and proportional system, can be broadly characterized as follows: candidates in a plurality system are elected in a large number of voting districts (e.g. *single-member districts*). The seat is then awarded to the candidate with the highest share of votes in that district (*winner-takes-all* or *first-past-the-post system*). In a proportional system in turn, seats in the legislature are distributed in a small number of (or even a single) voting district and are assigned based on the share of votes for the candidate's party.²

2.1 Electoral Incentives and Legislative Organization

In models of the electoral system with two parties, candidates choose two policies: one with benefits for many voters ('broad good') and a second one which can be targeted to subsets of voters ('targetable good'). A central prediction is that candidates elected in a plurality system will spend more on the targetable good and less on the good with diffuse benefits than if they were elected in a proportional system (Lizzeri and Persico, 2001; Milesi-Ferretti, Perotti and Rostagno, 2002; Persson and Tabellini, 1999; 2000).³

This conclusion emerges whether the electoral system is defined by the electoral rule (Lizzeri and Persico, 2001) or the numbers of districts (Milesi-Ferretti, Perotti and Rostagno, 2002; Persson and Tabellini, 1999; 2000) in which representatives are elected.⁴ In the first case, candidates in

²Electoral systems may vary along other dimensions (e.g. whether voters choose individual candidates rather than party lists or can cast multiple votes for a single candidate), from which we abstract in this paper. See Taagepera and Shugart (1989), Lijphart (1994) and Cox (1997) for a thorough discussion of real-world electoral systems.

³In contrast, in a standard Downsian models with two parties and linear taxes, candidates elected under plurality and proportional rule will both choose the desired policy of the median voter. The two systems will also generate the same outcome if the two parties engage in pure redistribution (see Lindbeck and Weibull, 1987).

⁴Lizzeri and Persico (2001) derive this prediction in a model of electoral competition with binding promises and identical voters. Milesi-Ferretti et al. (2002) in contrast obtain this result in a model of post-election bargaining with heterogeneous voters. In their model, strategic voting behavior favors candidates with a taste for broad transfers in a proportional system, but those with a taste for local transfers in a majority system. Persson and Tabellini (1999; 2000) get the same result in a probabilistic voting model with heterogeneous voters. Here, candidates elected in many, small districts will try to target swing voters to get the necessary majority.

a plurality system maximize the probability of winning (i.e. 50 percent of the votes) while every vote (i.e. the margin of victory) matters in a proportional system. Since votes above the majority are discarded, candidates in a plurality system have stronger incentives to target spending to voters that secure their majority. If electoral systems are distinguished by the number of districts instead, a similar conclusion emerges. Candidates in a plurality system with many districts want to spend more in highly contested districts. In both cases, spending on goods that are targetable to pivotal voters is preferred over goods with diffuse benefits.

How electoral incentives affect overall spending in the two systems is less clear. First, total spending might be higher or lower in proportional systems depending on voter preferences over targetable spending relative to broad transfers (Lizzeri and Persico, 2001; Milesi-Ferretti, Perotti and Rostagno, 2002; Persson and Tabellini, 2000). Second, electoral competition which reduces wasteful spending might be more or less intense in a plurality system. On the one hand, competition among candidates is stronger in the highly contested districts because the return of winning is high in a plurality system (Persson and Tabellini, 1999; 2000). On the other hand, electoral competition is lower in ‘safe’ districts. Finally, plurality systems might also create barriers to entry in single-member districts because the chances of success for alternative candidates from the same party are low (Myerson, 1993a). Overall, the effect of the electoral system on the overall size of government is theoretically ambiguous.

The above models assume two-party competition and hence take the organization of the legislature as given. However, a large literature in political science has documented that proportional systems increase the number of parties and the political fragmentation in the legislature (Duverger, 1954; Rae, 1967; Lijphart, 1990; Persson, Roland and Tabellini, 2006; Taagepera and Shugart, 1989).⁵

⁵Standard spatial models do not yield sharp predictions. With two parties, the standard convergence result holds: both parties will choose the desired policy of the median voter. In an equilibrium with three parties, two parties are symmetrically located around the median, while the third party with the fewest votes is located at the median. Policies are chosen by a coalition between the small party and one of the large parties. Actual policies

Weingast, Shepsle and Johnson (1981) formally analyze the case where representatives are elected in their district, but spending decisions are financed by general taxation. Candidates then have an incentive to target spending toward their support base. Since the costs are borne by all taxpayers, this gives rise to a ‘common-pool problem’: each candidate favors more spending on projects that benefit their voters; but they have to pay only a fraction of the overall cost.⁶ Hence, spending increases as the pool of decision-makers over the budget gets larger (Austen-Smith, 2000; Bawn and Rosenbluth, 2006; Poterba and von Hagen, 1999).

The number of parties in the legislature can also influence the type of spending and representation of interests (Lizzeri and Persico, 2005). As the number of parties in the legislature increases, the support base of each party shrinks. If parties target to their voters, spending on targetable goods and services will increase. In addition, parties in a proportional system might target voters that would not be pivotal in a two-party system. If the demand for government is larger among these voters, overall spending should increase.⁷

In sum, our discussion yields the following predictions: first, governments in a proportional system provide more spending with diffuse benefits to society but spend less on targetable goods. Second, the effect on the size of government is theoretically ambiguous. Third, cantons with politically fragmented parliaments have larger governments. Finally, more parties in the legislature favor spending on targetable goods.

might then be above or below the desired policy of the median voter (e.g. Austen-Smith and Banks, 1988; Cox, 1987).

⁶A large public finance literature has stressed the importance of common-pool problems for delaying fiscal adjustment (see for example, Alesina and Perotti, 1995; Poterba und von Hagen, 1999).

⁷A second reason why we might expect a different representation of interests under proportional systems is strategic voting. Milesi-Ferretti, Perotti and Rostagno (2002) demonstrate that in a proportional system voters strategically elect candidates with a preference for social transfers rather than candidates with a taste for locally targetable goods.

2.2 Empirical Studies

The existing empirical literature on proportional representation is based on cross-country data and cross-sectional variation in electoral systems (Aidt, Duta and Loukoianova, 2006; Milesi-Ferretti, Perotti and Rostagno, 2002; Persson and Tabellini, 2003; 2004). They find that a proportional system increases social welfare spending. The results on the overall size of government are mixed and seem to depend on the specific country sample (Milesi-Ferretti, Perotti and Rostagno, 2002; Persson and Tabellini, 2003; 2004). Our study contributes in the following ways. First, we draw on the unique Swiss case to investigate the effects of proportional representation at the sub-national level. An analysis at the sub-national level is especially attractive because electoral systems typically vary along many dimensions across countries, which are difficult to characterize with existing data (but see Milesi-Ferretti, Perotti and Rostagno, 2002). Our study exploits the differential timing of constitutional reform across cantons to identify how electoral systems affect the size and scope of government. Second, we can employ exogenous variation at the local level to bolster our confidence in interpreting our canton estimates as causal. Finally, we explore a question that has not received much attention empirically but is important to advance economic theory: which theoretical mechanism, legislative fragmentation or electoral incentives, drives the observed reduced-form estimates?

We also contribute to the large literature on the link between political fragmentation and the size of government (Alesina and Perotti, 1995; Baqir, 2002; Bradbury and Crain, 2001; Chen and Maholtra, 2007; Gilligan and Matsusaka, 2001; Poterba and von Hagen, 1999). We first investigate whether proportional representation increases political fragmentation in the legislature.⁸ We then test whether political fragmentation is relevant in both plurality and proportional systems. Finally,

⁸We do not analyze the role of a fragmented executive here. One reason is that we do not know the party composition of the executive only its overall size. Further, we observe few changes in the size of the executive over time; all variation is thus absorbed by canton fixed effects. Finally, a canton's executive is directly elected over most of our study period; consequently, their position is independent of constitutional reforms affecting the legislature.

we provide evidence whether the rising political influence of left-wing parties is associated with more government. While this link has been demonstrated for the post-war period (see, for example, Blais, Blake and Dion, 1993; Pettersson-Lidbom, 2008; Tavares, 2004), we can study a much longer period -roughly since the working class became a relevant political force in Switzerland the late nineteenth century.

3 Historical Background⁹

Until the beginning of our sample period in 1890, all cantons in Switzerland, like parliaments around the world, had a plurality system in place.¹⁰ Between 1890 and 1992, twenty-three out of the twenty-five cantons switched to proportional representation.¹¹ The first column of table 1 shows the year when each canton first elected the legislature under the new rule. Today, only two cantons, *Appenzell-Innerrhode* and *Grisons*, still rely exclusively on plurality rule. A few cantons (see column (2) of table 1) use a mixed proportional system, which we coded as a proportional system. However, the results are not sensitive to this classification (see section 5.4). For example, *Uri* adopted the proportional system in 1992 in districts with more than two mandates, i.e. about three-quarters (or 47 out of 64) of its voting districts. How, then, did this large-scale constitutional reform come about and what were its political consequences?

⁹This section builds on Gruner (1977), Klöti (1901), Saripolos (1899) and Vatter (2002). Detailed discussions of the Swiss electoral system can be found in Garrone (1991), Giacometti (1941), Kölz (1987), Lutz and Strohmam (1998), Moser (1987) and Poledna (1988).

¹⁰A few cantons (for example, *Geneva*) exclusively relied on plurality rule where the candidate with the largest share of votes in each district is elected. Most cantons however rely on a mixture of majority and plurality rule. Hence, the absolute majority of votes (50 percent) is required in the first round, while in the second round only the relative majority among the remaining candidates is needed to win a seat.

¹¹The canton *Jura* was founded in 1978 and hence is excluded from the analysis.

3.1 Political Conflict and the Struggle for Electoral Reform

Switzerland's population has been religiously divided between Catholics and Protestants ever since the reformation. This ideological split led to several violent clashes, for example, the war in 1847 (*Sonderbundskrieg*) and the cultural conflict (*Kulturkampf*) of the 1870s.¹² In the political arena, the rift was mirrored in the long-lasting struggle between Conservative forces supported by the Catholic population and the liberal-radical movement backed by the Protestants. Only in a few cantons was one party able to maintain political dominance over a prolonged period of time. In many other cases, alternating majorities and more or less temporary coalitions between liberal and conservative groups were the rule rather than the exception.

The social changes following industrialization added a new dimension to the existing conflict. As in many other European countries, industrialization saw the rise of a sizeable working class, especially in the large urban centers. Though industrialization in Switzerland occurred early in the century, it was not until the second half of the nineteenth century that workers became politically organized. The social-democratic party which first emerged in 1850 building on earlier voluntary associations (*Grütlivereine*) was however often excluded from political power (Gruner, 1977; 1978). The workers' candidates were rarely able to secure the majority of votes for a mandate; and even if they did, they never achieved a majority of seats under the existing plurality system.

The dominant plurality system also came increasingly under scrutiny as ruling parties manipulated voting registers at a large scale to secure their often vulnerable political positions. Specifically, it was common practice not to count out-of-canton migrants as part of a canton's population, which lowered the number of representatives elected in rapidly growing districts, especially the urban centers.¹³ In this climate of political conflict and unstable majorities, the new system of

¹²While the conflict in 1847 largely took place between Catholic, conservative cantons (*Appenzell-Innerrhode*, *Appenzell-Outerrhode*, *Uri*, *Schwyz*, *Obwalden* and *Nidwalden*) and those with Radical-liberal governments, there were also violent conflicts between the two groups in *Fribourg*, *Lucerne*, *Valais* and *Zug* (Vatter, 2002). The cultural conflict of the 1870s between the Catholic church and the state involved the educational responsibilities and privileges of the Catholic church.

¹³Unlike present debates about plurality systems, gerrymandering, i.e. the manipulation of district boundaries

proportional representation was widely viewed in the contemporary discussion (see Klöti, 1901; Saripolos, 1899) as a means to accommodate the diverging political interests and generate a more stable political environment. In addition, proportional representation suggested a compromise in the acrimonious battle over the assignment of seats to voting districts.

Understanding the timing of canton-level electoral reform is important for evaluating the validity of this paper’s empirical strategy. Figure 1 provides a graphic representation of the spread of proportional representation across Switzerland. Many cantons that switched prior to 1919 (when proportional representation was adopted for federal elections) are located in the East (lighter shade), but so are the two cantons that still rely exclusively on plurality rule (dark color).

In the early adopting cantons, the electoral problems associated with the opposition of two, equally strong parties were an important motor for electoral reform. The first adopters of proportional representation nicely illustrate this point. In *Ticino* (adoption in 1891), plurality rule and fixed voting districts produced a more and more unequal distribution of seats, which led to violent clashes. The conflict escalated to the point where the federal government intervened and mandated proportional representation. In *Geneva* (adoption in 1892), changing majorities in each of the three districts generated unstable electoral outcomes which again resulted in violent clashes. In *Neuchatel* (adoption in 1895), plurality rule failed to generate a winning candidate even after multiple voting cycles.

Industrialization and the rise of left-wing parties played an important role in many cantons adopting between 1900 and 1945, especially in the large, urban centers like *Basle City*, *Zurich* or *Lucerne*. Here, electoral reform was often pushed on the political agenda by a coalition of new left-wing parties and existing minority parties, which hoped to improve their political position.

However, it might have been the specific balance of power among established parties rather than

by politicians was not an issue in the Swiss cantons at the time. The reason is that voting districts are tied to historical political units, especially communities and county boundaries (*Bezirke* or *Kreise*). Furthermore, number and boundaries of voting districts are typically fixed in the canton constitutions and hence, any changes require approval by the electorate in a referendum.

the mere political threat posed by left-wing parties that favored electoral reform in the early twentieth century (Lutz and Zila, 2007). After 1950, proportional representation was typically introduced when cantons abolished their communal meetings (*Landsgemeinden*) in favor of more representative forms of government.

These patterns suggest that any analysis of proportional representation needs to account for the importance of the working class and the degree of political conflict between the two major religions. While we control for population heterogeneity and the importance of the industrial sector in all our regressions below, these typically change gradually and are hence empirically distinguishable from a more abrupt constitutional reform.

3.2 Political Consequences of Electoral Reform

The adoption of proportional representation had immediate effects on the composition of canton parliaments. Parties dominant under plurality rule typically experienced a decline in their number of seats in parliament.¹⁴ For example, the seat share of the Radicals in *Solothurn* dropped from 85 percent to 62 percent in the first election under proportional rule in 1895.¹⁵ Instead, the number of parties with seats in the legislature increased from on average 3.5 to 4.3 parties in the new proportional system. This development was in part driven by the founding of new parties after electoral reform as existing parties split into several factions or previously unorganized groups founded a new political party.

Moreover, previously excluded or underrepresented groups now gained legislative representation

¹⁴In most cantons, the number of seats for each party is calculated according to the Hagenbach-Bischoff method. Hereby, the total number of valid votes are divided by the number of seats plus one in a given district and rounded to the next whole number. The party votes are then divided by this number to calculate the mandates for each party. If not all mandates are allocated in this first step, the second step divides the party votes by the number of allocated mandates plus one. The party with the largest ratio is then given another mandate.

¹⁵An alternative way to assess the change in political representation with the adoption of proportional representation would be to calculate the proportionality between number of votes and seats in the legislature. Unfortunately, data on vote shares of parties in canton parliaments are only available after the switch to proportional representation.

in proportion to their popular support. Left-wing parties immediately increased their political weight in many canton parliaments. On average, their share of seats rose from 7.1 percent under the old system to 19.7 percent under proportional system (t-statistic: 17.4). There are however large differences across cantons: while left-wing seats quadrupled in *Basle City* (from 7 percent to 28 percent) and other large urban centers like *Zurich* or *Lucerne*, they did not play an important role in rural cantons like *Nidwalden*, *Zug* or *Valais*. We next describe the data we use for our analysis of the policy consequences of the move to proportional representation.

4 Data and Empirical Strategy

4.1 Data

We assembled a new historical data set for all cantons in Switzerland between 1890 and 2000. For each canton, we have rich information on government expenditures and revenues, the electoral system and socio-demographic characteristics. The data are mainly compiled from *Historical Statistics of Switzerland* (Ritzmann-Blickenstorfer, 1996), multiple volumes of the *Statistical Yearbook of Switzerland* and the Swiss decennial Census. A detailed description of the data sources and construction of variables is provided in Appendix A and a separate web appendix is available from the authors. Table 2 shows summary statistics of all variables used in the empirical analysis.

We characterize the electoral system by examining the past and current canton constitutions and all relevant electoral laws. We complemented and cross-checked this information with both canton archives (personal communication) and secondary sources (Lutz and Strohmam, 1998; Klöti, 1901; Schoop, 1987; Société d’histoire et d’archéologie du canton de Neuchâtel, 1989; Wicki, 2006). The institutional measure for the electoral rule in canton parliaments is a binary indicator, which takes a value of one if a canton has a proportional or mixed proportional rule, and zero if

plurality rule is in place.¹⁶ When a canton switches from plurality rule to proportional representation, the indicator is zero until the first election took place under the new rule. It is one in the year of the first election under proportional representation and all years thereafter.

Our main outcome variables are the log of canton expenditures and revenues per capita in a given year. Both are available annually over the whole sample period. To analyze whether proportional representation increases the provision of spending for large segments of the population, we collected information on expenditures for education and welfare. The cantons bear the sole responsibility for secondary education which is largely provided publicly. Spending on welfare includes social assistance to the poor and social security payments. Our measure of welfare spending contains strong elements of insurance against poverty and provisions for old age which benefit a large share of the population. Data for data for welfare are available since 1930, data for education expenditures since 1890.

To test whether spending in plurality systems is targeted toward geographically concentrated constituencies, we compiled data on expenditures for roads and subsidies to agriculture. Spending on canton roads can be easily targeted geographically while agricultural activities are highly concentrated in specific areas. Agricultural subsidies are available since 1930 and expenditures for roads since 1925. Education and welfare expenditures are measured per capita, while expenditures for roads and agricultural subsidies are expressed per 1,000 inhabitants.¹⁷ All expenditure and revenue variables are deflated to Swiss Francs at 2000 prices. Information on the electoral rule is only available in election years while expenditures and revenues are recorded annually. For non-election years, we assigned the electoral rule used in the last parliamentary election. With this annual panel, we can evaluate the effect of the electoral system on government spending in

¹⁶Note that our estimates should be interpreted as the combined effect of electoral rule and district magnitude since cantons using proportional rule also have a smaller number of voting districts.

¹⁷Our observed spending categories do not sum to total spending as several areas of public spending (administration, law enforcement, public transport or water and sewer services) were not reported in the early decades of our data.

both election and non-election years.

We complement our panel with a rich set of controls for the social, demographic and economic conditions in each canton. In particular, we collected information on the age structure of the population, population size and the share of population living in cities above 10,000 inhabitants. We have information on the importance of industrialization calculated as the percentage of the workforce that is employed in manufacturing and agriculture. We control for population heterogeneity by calculating Herfindahl indices for three religions (Protestant, Catholic and Jewish) and three linguistic groups (French, Italian and German-speaking). Our fragmentation measure, calculated as one minus the Herfindahl index, is closer to zero if one group dominates and approaches one the groups are equal in size.¹⁸ Table 2 shows that both religious and linguistic heterogeneity can be substantial ranging from zero to 0.76 and 0.87 respectively. We also collected detailed information of a canton’s political system from the constitutions: the size of parliament, electoral cycle, introduction of women’s suffrage, direct democratic participation rights and whether the president of the executive is elected directly by voters.

4.2 Empirical Strategy

Exploiting the rich geographic and temporal variation in the adoption of proportional representation after 1890, we use a difference-in-difference approach to estimate its effect on public spending. More specifically, for canton c in year t , we estimate models of the form:

$$Y_{ct} = \alpha_c + \gamma_t + \beta Prop_{ct} + \delta' X_{ct} + u_{ct} \tag{1}$$

¹⁸For example, if the shares of the three groups are 0.3, 0.3 and 0.4, then the Herfindahl index is 0.34 and our measure of fragmentation 0.66. If their shares are 0.1, 0.1 and 0.8 instead, the Herfindahl index is 0.66 and the measure of fragmentation 0.34.

where Y_{ct} denotes the log of annual expenditures per capita in a specific policy area. The variable $Prop_{ct}$ represents the electoral system. The variable is a binary indicator equal to zero as long as the legislature is elected according to plurality rule. The indicator switches to one in the first year parliamentary elections were held according to proportional rule and all years thereafter. The parameter of interest in equation (1) is β .

Our specifications also include canton (α_c) and year (γ_t) fixed effects. Year fixed effects absorb common shocks like the two World Wars or economic depression. Canton fixed effects are important since there are strong, persistent differences between German-speaking and French- or Italian-speaking cantons. For example, our detailed study of canton constitutions revealed that some cantons allow their citizens to recall the government, while others do not. These institutional differences are both highly persistent over time and will also influence politicians' spending behavior.

Since Swiss cantons might differ along other dimensions, we further include a number of time-varying controls X_{ct} in our baseline specifications. To control for differences in the demand for government services, we include the age structure of the population and the size of the urban population. Population size is included to allow for economies of scale in the provision of public services. We add the log of federal subsidies to adjust for differences in the resources available to cantons. Finally, we control for the size of the industrial sector and population heterogeneity with respect to language and religion.¹⁹

One control variable that is not available in our data set is canton income (or wages). We use several variables to control for differences in wealth in our empirical analysis: the percentage of the population owning a car, the number of doctors per capita and the infant mortality rate. The three variables alone explain 43 percent of the variation in canton income between 1965 and 2000

¹⁹One concern might be that proportional representation itself affects population heterogeneity through selective migration. In that case, our specification would capture only the effect of proportional representation net of its impact on population heterogeneity. Empirically however, we do not find that proportional representation is associated with changes in population heterogeneity or internal migration in the decades after adoption.

when data became available. Once we include our other control variables and canton and year fixed effects, we can account for 93 percent of the variation in canton income. Hence, the absence of a direct income measure is not a major limitation of our study.

In our econometric framework, only the timing of adopting proportional representation is assumed to be exogenous. Fixed differences across states and common shocks in government spending and other factors that vary non-linearly over time are all purged from the estimate of β . Only deviations from average canton spending that coincide precisely with the timing of proportional representation are captured by this parameter. The validity of our identifying assumption is explored in detail in section 5.4 and corroborated by exogenous variation in electoral rules at the local level in section 6.

5 Canton-level Results

5.1 Broad Services and Targeted Transfers

This and the next section provide direct evidence on how public spending changed with the adoption of the proportional rule. Section 5.3 investigates whether the results are driven by direct electoral incentives or rather compositional changes in the legislature following adoption. The final section assesses the validity of our empirical strategy.

We first investigate whether politicians shift to spending with diffuse benefits after electoral reform. The left-hand side of table 3 shows the results for education and welfare spending. The first specification (odd columns) is closest to previous cross-country studies: it includes the proportional variable, our set of canton controls and year effects. The second specification (even columns) also includes canton fixed effects to absorb permanent differences across cantons. The results show that proportional systems spend more on goods with broad constituencies: cantons adopting proportional representation spend 10 percent more on education and 33 percent more on welfare.

The control variables have largely the expected sign. More subsidies from the federal level have a positive effect on education and welfare spending. Urbanization is associated with more welfare spending but also less education spending. The latter possibly reflects economies of scale in the provision of schools in densely populated areas. The coefficient on log population is strongly negative in the fixed effects specification suggesting that there are substantial economies of scale in the supply of education. With respect to ethnic and religious fragmentation, we find conflicting results: linguistic fractionalization seems to reduce spending on education, roads and agricultural subsidies (Alesina, Baqir and Easterley, 1999). Religious fractionalization, in contrast, is associated with more spending on those same goods. One explanation could be that language groups differ in their preferences for public services much more than religious groups.

We next test whether spending on geographically concentrated goods declines after the adoption of proportional representation. The dependent variables are now expenditures for roads and agricultural subsidies. The control variables are the same as before. The right-hand side of table 3 shows that expenditures for roads are 53 percent lower while agricultural subsidies are 28 percent lower if parliaments are elected under proportional rule.

In sum, our estimates show that the adoption of proportional rule shifted the scope of public spending away from transfers toward spending for broad social groups. All coefficients for the proportional rule are highly statistically significant at the one percent level. Our results corroborate previous findings from cross-country data that countries with a proportional system have more social spending than countries with a plurality system (Milesi-Ferretti, Perotti and Rostagno, 2002; Persson and Tabellini, 2003; 2004).

While our estimated coefficients seem large, the effects are actually substantially smaller than found in cross-country studies. For example, Persson and Tabellini (2003) report that social security and welfare spending (measured relative to GDP per capita) are 2 to 3 percent higher in countries with proportional system. Our estimate of 33 percent higher welfare spending in cantons

with proportional rule is equivalent to a 1 percent higher spending on welfare plus social security (in terms of GDP per capita in 2000). The next section explores how proportional representation affects the overall size of government.

5.2 Size of Government

As discussed above, the effect of proportional rule on the overall size of government is theoretically ambiguous. We estimate the same model in (1) where the dependent variable is now the log of total expenditures or total revenues per capita. Again, the first specification includes year fixed effects and canton characteristics, while the second specification also includes canton fixed effects.

The results are reported in table 4. Column (1) shows that cantons switching to proportional representation have 4 percent higher expenditures than cantons with a plurality rule in place. The same pattern emerges on the revenue side where cantons with proportional rule have 2.8 percent higher expenditures though the coefficient is not statistically significant.

Once we rely on within canton variation (column (2)), we find that proportional representation is not associated with any change in expenditures.²⁰ Proportional rule does however, lower government revenues by 2.8 percent. The coefficient is only statistically significant at the 10 percent level. The fact that politicians in a proportional system do not spend more but at the same time have less revenues available suggests that parliaments elected under the proportional rule are somewhat more likely to run deficits.

The control variables in both the expenditure and revenue regressions have largely the expected signs. Federal subsidies, an important source of revenues, are again associated with higher spending. Population size (in logs) lowers expenditures which suggest economies of scale. Interestingly, linguistic and religious fragmentation is associated with lower expenditures and revenues in Swiss

²⁰Taagepera and Shugart (1989) argue that election results under proportional rule with very small district magnitudes ($\frac{\text{seats}}{\text{districts}} \leq 6$) yield seat shares close to those obtained under plurality rule. In our data however, the vast majority of canton-year observations (85 percent) have a district magnitude of six or higher under proportional representation.

cantons once we include canton fixed effects.

Our results on total spending differ from most of the previous findings based on cross-country data: Persson and Tabellini (2003; 2004) and Milesi-Ferretti, Perotti and Rostagno (2002) report positive results for their sample of OECD countries while Aidt et al. (2005) find negative results for Western Europe. We next investigate the theoretical mechanisms behind our reduced-form results.

5.3 Mechanism

We first examine how proportional representation changed political fragmentation and the left-wing representation in the legislature. We measure fragmentation in two ways: by simply counting the number of parties with seats in the legislature; alternatively, we calculate a fragmentation measure as one minus the Herfindahl index of concentration. The index varies from zero to one with larger values indicating a more fragmented party structure. We have the seat distribution for six individual parties; the remaining parties are collapsed into a single category ('other'). Hence, our measure actually underestimates the true degree of fragmentation.

The strength of left-wing parties is calculated as the share of seats held by the Social Democrats. Estimates based on all left-wing parties, which includes seats held by the Communist party, are very similar and not reported here. As controls, we include in our regressions population heterogeneity, the share of urbanization and population size measured in logs.

The results are presented in table 5. Odd columns report results with year fixed effects, while even columns add canton fixed effects. In both specifications, we find that proportional representation has strong effects on the organization of parliament: it increases the number of parties by 0.6 or about 6/10 of a standard deviation and party fragmentation by 0.14 or more than one standard deviation. Finally left-wing parties increase their share of seats by 6 percent or 1/2 of a standard deviation under proportional representation.

In a second step, we add controls for party fragmentation and share of left-wing parties as our controls in the expenditure regressions. Both changes are expected to increase spending. The coefficient on the indicator for proportional representation then identifies the relationship between electoral incentives and spending decisions net of compositional changes in the legislature. Results are shown in table 6. The first column reports estimates for the size of government. The baseline specification at the top reruns the basic specification from table 3 for the subsample of years and cantons for which we have valid party information. The coefficient is not statistically significant and very similar to the one estimated on the full sample. The bottom part of the table show the results when we include the number of parties, our measure of party fragmentation and the share of left-wing parties to our variable for the electoral rule.

The results clearly indicate that left-wing parties and party fragmentation (though not the raw number of parties) increase spending. To assess their relative magnitude, we use the estimates in column (1) and the changes in legislative organization that occurred with the adoption of proportional representation. Accordingly, left-wing parties is associated with 2.3 percent ($0.043 \cdot 0.526$) more spending immediately after adoption while party fragmentation contributes another 2.6 percent ($0.088 \cdot 0.301$).²¹

Conditional on compositional changes in the legislature, the direct effect of the proportional rule is to lower spending by 6.5 percent. This result is consistent with barriers to entry limiting the electoral competition in a plurality system. An alternative interpretation is that the median voter in Switzerland valued spending for education and welfare, which rose under proportional rule, relatively little and spending on targeted subsidies relatively more. While we cannot distinguish between these interpretations, we think that uncovering this negative relationship is of interest in its own right.

²¹If we base our calculation on the mean difference in political fragmentation and left-wing representation across the two electoral systems instead, left-wing parties increase spending by 6.8 percent ($0.129 \cdot 0.526$) and party fragmentation by 4.3 percent ($0.142 \cdot 0.301$).

The same specification is shown for the different expenditure categories in columns (2) to (5). More parties in the legislature increase targeted spending, especially agricultural subsidies. This result is consistent with the view that the support base of each party shrinks as the number of parties increases, which encourages targeted spending to satisfy party supporters (Lizzeri and Persico, 2005). Left-wing parties also increase spending on education and welfare, as might be expected given the historical situation of the workers' movement. More surprisingly, left-wing parties are also associated with higher agricultural subsidies, possibly because left-wing parties also draw support from farm workers.

5.4 Robustness Tests

An important concern with our empirical strategy is that the adoption of proportional representation is possibly endogenous or occurred simultaneously with other political events that are correlated with fiscal policy. This section presents a number of informal validity tests and robustness checks to investigate, but fail to corroborate these concerns.

First, if the paper's results were due to unobserved canton-level social or political liberalization over time, we should observe detectable changes in spending during reform attempts that did not ultimately result in proportional representation. For our placebo experiment, we use the years of failed initiatives or parliamentary petitions in favor of proportional rule as our independent variable rather than the year of actual constitutional reform. Table 7 shows that failed reform attempts are, with one exception, not associated with expenditure changes.

Second, we test whether the timing of adoption is related to social and economic conditions (population size, population heterogeneity, employment and age structure, labor force participation, federal subsidies) or other democratic reforms (direct election of executive, adoption of direct democratic participation rights, founding of social-democratic party in the canton) at the beginning of our study period in 1890. Table A1 in the appendix shows few associations; only

religious fractionalization and the law referendum are associated with an earlier electoral reform. Since we control for population heterogeneity in all regressions and test for the influence of the law referendum below, this does not affect our conclusions.

Third, we check whether the demand for democratization or other political changes, rather than the adoption of proportional representation per se, drive our results. Table 8 reports the coefficients on the proportional rule variable. The first specification controls for the number of years the executive has been directly elected by the citizens and direct democratic participation rights (provisions for the law referendum, budget referendum and the signature requirement for the voter initiative). An important political change over our sample period was the extension of voting rights to women (row (2)). Alternatively, broader changes in social values might affect both electoral reform and the demand for government. Row (3) therefore includes the share of divorcees and the share of protestants as proxies to the baseline. In row (4), we control for the size of the legislature and executive as well as the electoral cycle. The results show that controlling for other political, institutional or broad social changes has little effect on our estimates.

Fourth, one might wonder whether our results are driven by unobservable canton trends or exceptional political conditions just prior to the electoral reform. For example, a year of intense political conflict between two major parties might result in lower overall spending. However, one could also imagine the opposite pattern if the ruling party try to appease smaller parties by targeting spending to their supporters. To test for the influence of these prior canton-specific effects, we add dummies for the first, first three and first five years to the baseline specification. Hence, the coefficient on the proportional variable is now identified net of spending decisions up to five years prior to the actual electoral reform. Row (5) shows that the results remain unchanged. To control for unobservable canton-specific differences that vary linearly over time, we add canton-specific trends to the specification in row (6). The results for the individual expenditure categories remain unchanged while the effect on overall spending is positive though only significant at the

ten percent level. One potential interpretation is that spending in non-adopting cantons followed a steeper upward trend than adopting cantons. The trend for total spending, however, must be driven by spending in an area other than education, welfare, roads or agriculture.

Fifth, we take into account the potential dynamics in our data. Persistent shocks to our spending variables, e.g. during the economic depression or the two World Wars, might be an omitted factor that is correlated with the decision to adopt proportional representation and spending. To address this issue, we add the lagged dependent variable as an additional control. While dynamic panel specifications with fixed effects are typically biased, the bias should be small in our case because the number of time periods ($T=110$ years) is large relative to the number of cross-sectional units ($N=25$ cantons). The result (row (7)) shows that the estimates are qualitatively similar though the coefficients are smaller. An alternative way to control for the persistence in public spending is to estimate equation (1) in first differences. Though the first difference estimates are substantially weaker, they remain qualitatively similar (row (8)). If total and individual spending categories exhibit the same type of nonstationarity, spending shares will eliminate the bias (row (9)). The results for spending shares in education, welfare, roads and agricultural subsidies are again remarkably similar to the baseline.

Sixth, if spending is highly persistent, the standard errors can be downward biased (see Bertrand et al., 2004). In view of our relative small number of cantons, we implement the before-after estimator. We regress spending net of all control variables on the dummy for proportional representation for the sample of cantons that adopted the new electoral system. While the standard errors are somewhat larger than in the baseline, the statistical significance of our estimates is not affected (row (10)).

Finally, we assess the robustness of our results to alternative specifications of the spending and electoral variables. Row (11) restricts the sample to election years which does not alter our conclusions. We also checked whether our results change if we exclude cantons with a mixed

proportional system (row 12). The last specification uses the level of expenditures as the dependent variable. For all expenditure categories, we find the same pattern as for the log specification (row (13)).²² With a few exceptions, the paper’s main findings are robust across our validity checks and alternative specifications.

6 Evidence from Local Governments

A remaining concern with our empirical strategy is that omitted time-varying unobservables might affect both public spending and the decision to adopt proportional representation. In this section, we employ exogenous variation in electoral systems across Swiss communities to corroborate our findings at the canton level.

6.1 Electoral Systems and Data at the Local Level

The roughly 3,000 communities in Switzerland enjoy substantial fiscal autonomy. A local income tax provides an independent source of revenues, and communities make important political decisions in the areas of primary schooling, welfare and local services (fire, police etc.). The typical community in Switzerland has two levels of local government: the executive and legislative. The executive (often called *Gemeinde-* or *Stadtrat*) is the most important political body. It has on average six members and is directly elected from the electorate.²³ Only about 20 percent of communities have a parliament as their legislative body; all others rely on community meetings of its

²²One might argue that selective migration of previously underrepresented groups (e.g. the working class) into cantons with proportional representation changes the composition of the electorate and possibly the demand for government services. To test this hypothesis, we run a regression where the dependent variable is share of people born in the same canton as their current residence coded from census data 1888 to 2000. The main independent variable is the years since proportional representation was adopted in that canton and additional controls. If selective outmigration is important, the coefficient on the years since adoption would be negative. The results are not statistically significant except for one case where the coefficient is actually positive, not negative. If anything, there is less outmigration from cantons that adopted proportional representation earlier. Selective outmigration cannot therefore explain our results on the scope and size of government.

²³Only in *Neuchatel*, the executive is elected by local parliaments.

citizens instead. To avoid a highly selected sample, we study the influence of the electoral rule for both the legislative and executive.²⁴ The effect of proportional rule on fiscal policy should be qualitatively similar for the two political bodies (for example, Persson and Tabellini, 2000; 2004).

We rely on two empirical strategies: first, several cantons mandate the electoral rule for elections at the local level. Since the rules are set at the canton level, they can be plausibly considered exogenous from the perspective of the individual community. We then compare the size of government in communities located in cantons mandating proportional representation to communities in cantons with mandatory plurality system. Our second empirical strategy compares communities in cantons that can choose their electoral system. Using a matching estimator, we compare spending in communities with plurality rule to those with proportional rule. Since the matching is done for communities within the same canton; we control for all unobservable differences across cantons.

We base our analysis on a survey of each community's head administrator in four different years (1988, 1994, 1998 and 2005).²⁵ The survey asked detailed information on the political structure of local governments; the response rate in each wave was over 75 percent. As our measure of local spending, we use the number of administrative personnel per capita. Administrative spending captures genuine differences in the size of government because the provision of public goods and services require a bureaucracy for administration. Further, wasteful spending or rents for local politicians are often associated with more bureaucracy. Finally, administrative expenditures are highly correlated (0.8) with the overall size of government at the canton level.

We code mandates from each canton's constitution, any additional laws on local affairs and information in Ladner (1991). We construct binary indicators equal to one if a canton requires a proportional rule and zero if majority rule is mandated; the measures are calculated separately

²⁴A second reason to include the executive is that we only have information on the electoral rule for the legislative in 1988. Though we contacted all communities with a parliament by email to request information on their electoral system after 1988, the response rate was only around 30 percent.

²⁵We are very grateful to Professor Ladner from the University of Berne for making the data available to us. Details of the survey, questionnaires and data are available at <http://www.andreasladner.ch/gemeindeforschung/>. An in-depth description of the data can be found in Ladner (1991) and Ladner et al. (2000).

for the executive and legislative. Since electoral rules and mandates rarely change over time, our estimates rely on variation across communities for identification.²⁶

To control for observable community characteristics, we match our survey to information from the 1980, 1990 and 2000 Swiss census. The Census provides information on the size of the community, its age structure, the employment rate, the fraction employed in agriculture or industry, the share of protestants and whether the community is located in the Alps. We used linear interpolation to create annual observations and kept the observations from the survey years for the analysis. Table 9 reports summary statistics of our local data.

6.2 Results from Mandates and Matching

We first compare spending in communities that are subject to canton mandates. Specifically, we compare the size of local administration in communities with mandated proportional rule to communities with mandated plurality rule. Sixteen cantons mandate plurality rule for the executive, while two cantons mandate proportional representation. We cannot perform a similar analysis for the legislative since no canton mandates plurality rule.

Since mandates are imposed at the canton level, they are exogenous from the perspective of the individual community. Furthermore, mandates have been in place for a long time ago and rarely change over time. *Ticino* and *Zug*, for example, mandate proportional representation at the local level since 1891 and 1894. Hence, canton mandates are not influenced by current local finances or socio-economic conditions correlated with local public finances.

We estimate a regression model similar to (1) where the dependent variable is administrative personnel per capita in a community (in logs).²⁷ To control for observable differences, we include

²⁶Between 1988 and 2005, two cantons abolished their mandate for majority rule (*Appenzell-Innerrhode* in 1996 and *Lucerne* in 2004). In the two cases, the canton mandate is one before the change and zero thereafter.

²⁷We choose the log specification to be consistent with our canton estimates. In the raw data, the number of administrators is zero for about 5 percent of the sample (N=431). The zeros seem to be actual zeros only in the small number of communities with a population below 200. In larger communities, the zeros are likely to be missing values. For the log specification, we dropped communities with no reported administrator. We find,

year dummies, the fraction of children under 15, detailed controls for population size, the share of protestants, the fraction of nonemployed and employees in agriculture or mining. We also add the dominant language of the canton and whether the community is located in the Alps to adjust for time-invariant cultural and geographic heterogeneity. Standard errors are clustered at the canton level.

Our benchmark estimates the regression for communities in cantons that do not mandate the electoral rule (*Berne, Fribourg, Solothurn, Basle County, Grisons, Thurgau, Valais and Jura*). The results are shown in table 10. The main independent variable is the electoral rule for the legislative (column (1)) and for the executive (column (2)) For legislative and executive, we find no statistically significant correlation between the electoral rule and the size of the local administration. The result confirms our earlier intuition that the electoral rule should have similar effects irrespective of the political body. Furthermore, the estimates are consistent with our result for the size of government at the canton level.

Next, we estimate the same regression for communities with mandated electoral rule for the executive. The main independent variable is a binary indicator equal to one if the community has mandated proportional rule to elect its executive and zero if plurality rule is mandated. Column (3) shows that communities with mandated proportional rule do not have more local administration than communities with mandated plurality rule.²⁸

Cantons mandating proportional rule might differ from cantons mandating plurality rule along some unobservable dimension. While the communities in the two types of cantons are similar along socio-demographic characteristics (for example, population size or employment), they differ along some political dimensions (for example, the size of the executive or whether the community

however, similar results if we reestimate the relationship in levels.

²⁸The results in table 8 remain unchanged if we add controls for a local parliament or additional demographic variables to the specification. Results are similar if we drop the two cantons that abolished their mandates; they are also unchanged if we exclude cities with more than 30,000 inhabitants, which tend to have more than one voting district. Results are available upon request.

has a parliament).

Our second empirical uses the sample of communities that can choose their electoral rule. We use propensity score matching to compare the size of local administration between communities with similar observable characteristics but different electoral rules. Note that we can now add canton fixed effects to eliminate unobservable heterogeneity across cantons. Hence, the matching estimator compares communities with different electoral rules located within the same canton.

In a first step, we estimate a logit model of the determinants of choosing proportional representation. The independent variables are the same as those used in the regressions above. The results of the logit model and the implied treatment on the treated effects are reported in table 11. For both the legislative (column (1)) and executive (column (2)), we find no evidence that communities with proportional rule have more local administration than their matched counterparts.

In sum, the evidence from local governments using mandates and matching confirms the findings at the canton level: proportional representation does not generate bigger governments.

7 Conclusion

Using variation in the adoption of proportional representation across cantons and mandated electoral rules for local governments in Switzerland, this article demonstrates that electoral systems have important implications for fiscal policy. Under proportional rule, politicians required the support of broader segments of the population. Accordingly, public spending shifted away from targeted subsidies to narrow groups and encouraged spending on more diffuse services like education and welfare.

Our findings do however not support concerns that proportional rule results in larger governments. Across a variety of methods and levels of government, we find little evidence that proportional representation increases overall spending. We also show that compositional changes

in the legislature, in particular increasing political fragmentation and left-wing representation, increase public spending in both electoral systems. Conditional on these compositional changes, proportional systems actually seem to shift electoral incentives in the direction of less spending.

Though pioneering, Swiss cantons were by no means the only political units that adopted the new electoral system. On the contrary, many states in Europe and elsewhere switched to proportional representation after 1890. The first country to adopt it at the national level was Belgium in 1899; Germany followed in 1918, Ireland in 1919 and France in 1945. While Switzerland has, for example, a much stronger direct democratic tradition than other democracies, the effects of proportional representation remain unchanged even conditional on provisions for initiatives and referendums. We therefore believe that our findings provide valuable insights for other countries with proportional representation.

Certain features of the Swiss electoral system might however work against larger governments in a proportional system. Most importantly, voters in Switzerland are able to accumulate votes for a single candidate, which strengthens accountability of politicians. Furthermore, most cantons allow citizens to select individual candidates on a list rather than choose between whole party lists.²⁹ Since open lists tie the election outcome of individual candidates closer to their performance, this could foster accountability and reduce overspending. An electoral reform that restricts voters to party lists and single, non-transferable votes might be associated with a larger government. The Swiss case however clearly demonstrates that it is not proportional rule per se that promotes a bigger government.

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²⁹Voters can actually combine candidates from different party lists (‘panachage’).

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A Canton-Level Data

This appendix describes the data sources and construction of variables for the 25 Swiss cantons. We drop the canton Jura in our analysis, which was founded only in 1978. Our main outcome variables for the size of government are canton expenditures and revenues. Both are taken from the annual publication 'Statistisches Jahrbuch der Schweiz' for 1890 to 1950 and from 'Öffentliche Finanzen der Schweiz' for 1950 to 2000. All expenditure and revenue categories are expressed per capita and deflated to 2000 Swiss Francs using the annual consumer price index reported in Schuppli and Studer (2004). Government expenditures and revenues are interpolated for two years with missing observations (1967 and 1968).

Expenditures for education are available for the years 1890, 1892, 1893, 1895-1898, 1901-1905, 1909, 1910-1912, 1916, 1920, 1928, 1930, 1934, 1938, 1946 and annually since 1950. The information was taken from ‘Statistisches Jahrbuch der Schweiz’ and Hofferbert (1976). To measure transfer payments, we use welfare expenditures which combines social assistance to the poor and social security payments. The data come from ‘Statistisches Jahrbuch der Schweiz’ prior to 1950 and from ‘Öffentliche Finanzen der Schweiz’ after 1950. Welfare spending is available since 1930 (in particular, we have data for the years 1930, 1934, 1938, 1942, 1946 and annually since 1950). Agricultural subsidies are taken from ‘Historical Statistics of Switzerland’ and available since 1930 (1930, 1934, 1938, 1946). Data after 1950 are taken from ‘Öffentliche Finanzen der Schweiz’ but missing for 1968 to 1974. Expenditures on roads are taken from ‘Historical Statistics of Switzerland’ and available since 1925 (data was available for the years 1925-1927, 1929, 1933, 1936, 1939, 1942, 1944, 1946, 1949, 1952, 1954, 1956, 1958, 1961, 1963-1965, 1967, 1968 and annually since 1970. Missing values are interpolated).

Our measure of electoral system is calculated from Lutz and Strohmann (1998), which report the year proportional representation was adopted in each canton. Our measure of proportional representation is a binary indicator equal to zero in all years when the parliament is elected according to majority rule. The indicator turns one in the year the parliament is first elected under proportional representation and remains one thereafter.

The number of parliamentary seats for the major parties is available from the ‘Statistisches Jahrbuch der Schweiz’ since 1930. Additional information was supplemented by historical accounts on individual cantons (Thurgau: Schoop, 1987; Neuchatel: Société, 1989; Basle County: Blum 1980; Aargau: Wicki, 2006; Berne: Junker, 1996; Basle City: Lüthi, 1962), inquiries at the canton archives and data kindly provided by Professor Andreas Ladner. We have data for six parties and a residual category ‘other parties’. We calculate a measure of party fragmentation based on the information in the seven categories as one minus the Herfindahl index. Note that the aggregated category ‘other’ results in an underestimation of the actual number of parties and party fragmentation in the legislature. Party information is available for the following time periods: Aargau (1917-2000), Berne (1922-2000), Basle County (1908-2000), Basle City (1890-2000), Fribourg (1916-2000), Geneva (1892-2000), Glarus (1920-2000), Grisons (1919-2000), Lucerne (1891-2000), Neuchatel (1889-2000), Nidwalden (1943-2000), Obwalden (1966-2000), Saint Gallen (1912), Schaffhouse (1892-2000), Schwyz (1900-2000), Thurgau (1917-2000), Ticino (1923-2000), Uri (1932-2000), Vaud (1933-2000), Valais (1921-2000), Zug (1890-2000) and Zurich (1917-2000).

To adjust for differences in the political system, we also constructed measures of direct democracy and the electoral cycle for each canton. Our first variable for direct democracy is a binary indicator equal to one if a canton has a mandatory budget referendum in place and zero otherwise. The data is taken from Trechsel and Serdült (1999) who systematically collected information for cantons without a town-meeting from 1970 to 1996. For canton with town meetings and the period from 1890 to 1970, we collected data using old canton laws and constitutions supplemented by information from the canton archives (*Staatsarchive*). Our second measure is also a binary

indicator equal to one if a canton mandates new laws to be approved by the electorate (mandatory law referendum) and zero otherwise. Finally, we also control for the voter initiative which is today allowed in all cantons. Our measure for the voter initiative is calculated as the signatures required for launching an initiative in percentage of the eligible population. In cantons where the voter initiative was adopted after 1890 (the beginning of our sample period), we set the signature requirement to 15 percent, which is about twice the maximum observed in the data.

Most of our other control variables are taken from the decennial Census as reported in ‘Historical Statistics of Switzerland’, Hofferbert (1976) and ‘Statistisches Jahrbuch der Schweiz’; the data are available for 1888, 1900, 1910, 1920, 1930, 1941, 1950, 1960, 1970, 1980, 1990 and 2000. The population in each canton is taken from ‘Statistisches Jahrbuch der Schweiz’ and available annually since 1888.

Population density is measured as the log of the number of people (in 1,000) and is taken from the decennial Census. Urban population is measured as the percentage of the population living in cities above 10,000 inhabitants. The data is taken from ‘Historical Statistics of Switzerland’ and ‘Statistisches Jahrbuch der Schweiz’ and available for 1890, 1894, 1898, 1903, for each decade between 1910 and 1960 as well as 1962, 1969, 1974, 1979, 1984, 1990 and 2000. The information on the population in different age groups (below 20, between 20 and 64 and above 65), the number of foreigners, percentage born in the same canton and religious affiliation is from the decennial Census. All three variables are expressed as percentage of the total population. Religious affiliation is calculated as the share of the population that is Protestant as opposed to Catholics and other religions.

We also constructed two indices for religious and linguistic fractionalization. Both are based on Herfindahl indices calculated as $1 - \sum_{i=1}^n s_i^2$ where s_i are the shares of group i in the population and n denotes the total number of (religious or linguistic) groups. The groups considered were Protestants, Catholics and Jews (religious fractionalization) and French, Italian and German (linguistic fractionalization) respectively.

Foreign denotes the percentage of the population that is not a Swiss citizen in a given canton. The importance of divorce is from the decennial Census and calculated as the fraction of the population above 20 that is divorced. We collected several labor market indicators to control for differences in economic activity across cantons. The total number employed and employment in the first (agriculture) and second (manufacturing) sector are from the decennial Census. The distribution across sectors is calculated as percentage of total employment.

To control for income differences across cantons, we use car ownership, calculated as number of cars per population. The data is from ‘Historical Statistics of Switzerland’ and ‘Statistisches Jahrbuch der Schweiz’. The variable is zero before the first cars emerged in 1910 and positive thereafter. Data on cars owned is available for 1914, 1917, 1923, 1929, 1934, 1939, 1945, 1947, 1950, 1954, 1958, 1962, 1966, 1970, 1975, 1978, 1982, 1986 and annually since 1990.

Federal subsidies are revenues for cantons comprised of subsidies by the federal state for roads, education, welfare, agriculture and other areas. They are obtained from ‘Historical Statistics of

Switzerland' prior to 1955 and from 'Öffentliche Finanzen der Schweiz' thereafter. The data are available for 1893, annually between 1915 and 1926, 1928, 1930, 1931, 1933, 1935-1937, 1940, 1942, 1943, 1945, 1946, 1949 and annually since 1953, but missing between 1968 and 1977. All missing years were again obtained by linear interpolation.

Table 1: Electoral Systems of Swiss Cantons in 1998

	Year PR Adopted	Mixed System	Seats in Parliament
<u>Adopted prior to 1919:</u>			
Ticino (TI)	1891		90
Geneva (GE)	1892		100
Zug (ZG)	1894	X	80
Neuchatel (NE)	1895		115
Solothurn (SO)	1896		144
Schwyz (SZ)	1900	X	100
Basle City (BS)	1905	X	130
Lucerne (LU)	1911		170
St. Gallen (SG)	1912		180
Zurich (ZH)	1917		180
<u>Adopted 1920-1950:</u>			
Basle County (BL)	1920		90
Glarus (GL)	1920		80
Thurgau (TG)	1920		130
Aargau (AG)	1921		200
Fribourg (FR)	1921		130
Valais (VS)	1921		130
Berne (BE)	1922		200
Vaud (VD)	1949/1962		180
<u>Adopted 1950-2000:</u>			
Schaffhouse (SH)	1952	X	80
Nidwalden (NW)	1982		60
Obwalden (OW)	1986		55
Uri (UR)	1992	X	64
<u>Not Adopted:</u>			
Appenzell Outerrhode (AR)	N/A	X	65
Appenzell Innerrhode (AI)	N/A		46
Grisons (GR)	N/A		120

Notes: The table shows the main institutions of each canton's electoral system and its evolution over time. The first column shows the first year the canton parliament was elected under the new proportional rule. *Vaud* had a mixed electoral system between 1949 and 1962 before adopting a pure proportional system in 1962. *Appenzell-Outerrhode* allows its districts to adopt proportional representation since 1997 but only one (Herisau) out of six has chosen to do so. *Appenzell-Innerrhode* and *Grisons* still have a majoritarian system in place.

Source: Lutz and Strohmann (1998)

Table 2: Summary Statistics of Canton-Level Data, 1890-2000

	Observations	Mean	Std. Dev	Min	Max
<u>Electoral and Party System</u>					
Electoral Rule (1= Proportional/Mixed)	2775	0.62	0.49	0	1
% Social Democratic Party	2038	17.74	10.99	0	48.46
Number of Parties	2038	4.47	1.06	2	7
Party Fragmentation Index	2038	0.65	0.12	0.23	0.82
<u>Fiscal Policy Variables (log per capita)</u>					
Expenditures	2775	7.16	1.26	4.42	9.85
Revenues	2775	7.14	1.27	4.52	9.91
Education	2775	5.25	1.57	0.82	8.44
Welfare	1775	5.60	1.03	1.07	8.16
Roads (per 1,000 inhabitants)	1900	5.59	1.11	0.05	9.30
Agriculture (per 1,000 inhabitants)	1775	4.80	1.18	0.41	7.55
Federal Subsidies (per 1,000 inhabitants)	2700	5.34	1.17	2.32	8.74
<u>Control Variables</u>					
Age 0 to 19 (in %)	2775	33.79	6.79	15.71	45.78
Age 20 to 39 (in %)	2775	29.98	2.55	23.14	39.21
Age 40 to 64 (in %)	2775	26.79	3.47	17.84	36.48
Age 65 and older (in %)	2775	9.44	3.56	3.75	21.03
Population (log)	2775	11.64	1.10	9.45	14.02
Urban Population (in %)	2775	25.62	25.58	0	100
Employed in Agriculture (in %)	2775	20.28	13.89	0.22	74.37
Employed in Manufacturing (in %)	2775	43.56	11.34	13.80	71.46
Car Ownership (in %)	2775	12.27	16.69	0	59.20
Doctors per capita (per 1,000)	2775	0.89	0.48	0.05	3.76
Infant Mortality Rate (per 100,000 births)	2774	60.28	100.45	0.00	960.33
Linguistic Fractionalization Index	2754	0.21	0.17	0	0.76
Religious Fractionalization Index	2770	0.35	0.18	0	0.87
Foreigners (in %)	2775	11.34	7.71	1.52	40.66
Protestants (in %)	2775	0.40	0.29	0.01	1.00
Divorced (in %)	2775	2.05	1.92	0	9.64
Mandatory Budget Referendum	2775	0.62	0.49	0	1
Signature Requirement Initiative	2775	2.43	1.82	0.003	8.5
Law Referendum	2746	0.62	0.49	0	1
Size of Parliament	2483	119.55	49.75	32	257
President of Executive Directly Elected?	2775	0.24	0.43	0	1
Electoral Cycle (in years)	2032	3.83	0.67	2	6

Notes: The unit of observation is a canton-year pair. Spending and revenues are deflated to 2000 Swiss Francs. Expenditures for agriculture and roads as well as federal subsidies are per 1,000 inhabitants, all other expenditure and revenue categories are per capita. Total expenditures, revenues and education spending are available for 1890-2000, road expenditures since 1925, welfare and agricultural spending since 1930. Urban population reflects the share living in cities above 10,000 people. Linguistic and religious fractionalization are calculated as one minus the Herfindahl index. A larger value indicates a more fragmented population structure. The infant mortality rate is the number of children dying before the age of 1 among 100,000 births. The number of doctors is measured per 1,000 inhabitants. The variables for law referendum and budget referendum are binary indicator equal to one if they are mandatory and zero otherwise. The voter initiative is measured as the signature requirement in percentage of the eligible population.

Table 3: Proportional Representation and the Scope of Government

	Education		Welfare		Roads		Agriculture	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Proportional Representation	0.174 (0.026)***	0.101 (0.022)***	0.201 (0.039)***	0.331 (0.051)***	-0.237 (0.045)***	-0.528 (0.067)***	-0.392 (0.050)***	-0.275 (0.058)***
Population Size (log)	0.068 (0.011)***	-0.111 (0.063)*	-0.13 (0.015)***	0.249 (0.149)*	-0.062 (0.021)***	0.244 (0.153)	0.124 (0.022)***	-1.041 (0.140)***
% Urban Population	0.005 (0.001)***	-0.002 (0.001)*	0.002 (0.001)**	0.005 (0.002)**	-0.013 (0.001)***	-0.004 (0.002)**	-0.011 (0.001)***	0 (0.001)
Federal Subsidies (log)	0.052 (0.020)***	0.134 (0.014)***	0.124 (0.030)***	0.101 (0.028)***	0.328 (0.032)***	0.134 (0.033)***	0.407 (0.044)***	0.36 (0.036)***
% Employed in Agriculture	-0.004 (0.003)*	-0.007 (0.003)***	-0.008 (0.004)*	-0.04 (0.005)***	-0.041 (0.004)***	-0.002 (0.005)	0.041 (0.004)***	0.028 (0.004)***
% Employed in Industry	0.007 (0.002)***	0.005 (0.003)**	-0.009 (0.003)***	-0.004 (0.005)	-0.004 (0.003)	0.033 (0.006)***	0.033 (0.004)***	0.01 (0.005)**
Car Ownership (in %)	0.019 (0.003)***	0.004 (0.003)	0.019 (0.004)***	0.02 (0.005)***	0.032 (0.006)***	0.031 (0.006)***	0.007 (0.007)	0.047 (0.006)***
Doctors per capita	0.039 (0.038)	-0.073 (0.036)**	0.221 (0.060)***	0.297 (0.069)***	0.198 (0.060)***	-0.143 (0.073)*	-0.572 (0.082)***	-0.36 (0.081)***
Infant Mortality Rate (per 100,000)	0.001 (0.000)***	0.0001 (0.000)***	0.003 (0.001)***	0.001 (0.001)***	0.001 (0.001)	0.004 (0.000)***	0.003 (0.001)***	0.004 (0.001)***
Linguistic Fractionalization	0.828 (0.065)***	-0.721 (0.157)***	-0.177 (0.088)**	-0.253 (0.236)	0.979 (0.102)***	-1.258 (0.283)***	1.123 (0.118)***	-2.591 (0.269)***
Religious Fractionalization	0.289 (0.081)***	0.375 (0.135)***	0.133 (0.105)	-0.379 (0.253)	-0.729 (0.119)***	1.3 (0.244)***	-0.911 (0.134)***	1.301 (0.247)***
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canton Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes
Observations	2690	2690	1774	1774	1899	1899	1774	1774
R-squared	0.94	0.97	0.86	0.92	0.83	0.9	0.82	0.93

Notes: The dependent variable is the log of real per capita spending on the categories shown in the first row (all expressed in Swiss Franks at 2000 prices). Expenditures for roads are available since 1925, those for welfare and agriculture since 1930. The variable proportional representation is a binary indicator equal of 1, if a canton has a proportional or mixed proportional system, and 0 in the case of a majoritarian system. Population is measured in logs, while urban population is calculated as the percentage of people living in cities with more than 10,000 inhabitants. Federal subsidies are the monetary transfers from the federal level measured in logs. Car ownership is the percentage of the population that owns a car while the number of doctors is measured per 1,000 inhabitants. The infant mortality rate is the number of children dying before the age of 1 among 100,000 births. Linguistic and religious fractionalization are measured as Herfindahl indices based on 3 groups respectively. All specifications include year fixed effects and controls for the age structure of the population, even columns also control for canton fixed effects. * p<0.1, ** p<0.05 and *** p<0.01. Robust standard errors are reported in parentheses.

Table 4: Proportional Representation and the Size of Government

	Expenditures		Revenues	
	(1)	(2)	(3)	(4)
Proportional Representation	0.04 (0.017)**	0.01 (0.016)	0.028 (0.017)	-0.028 (0.016)*
Population Size (log)	-0.149 (0.008)***	-0.036 (0.045)	-0.143 (0.008)***	0.014 (0.048)
% Urban Population	0.003 (0.000)***	0.002 (0.001)***	0.003 (0.000)***	0.002 (0.001)***
Federal Subsidies (log)	0.092 (0.013)***	0.129 (0.010)***	0.081 (0.013)***	0.113 (0.010)***
% Employed in Agriculture	-0.023 (0.002)***	-0.006 (0.002)***	-0.025 (0.002)***	-0.009 (0.002)***
% Employed in Industry	-0.015 (0.001)***	0.002 (0.002)	-0.015 (0.001)***	0.001 (0.002)
Car Ownership (in %)	0.026 (0.002)***	0.015 (0.002)***	0.025 (0.002)***	0.015 (0.002)***
Doctors per capita	0.021 (0.030)	0.171 (0.028)***	0.035 (0.032)	0.221 (0.031)***
Infant Mortality Rate (per 100,000)	0.002 (0.000)***	0.001 (0.000)***	0.002 (0.000)***	0.001 (0.000)***
Linguistic Fractionalization	0.389 (0.041)***	-0.419 (0.099)***	0.3 (0.049)***	-0.743 (0.111)***
Religious Fractionalization	0.218 (0.049)***	-0.257 (0.085)***	0.15 (0.053)***	-0.263 (0.087)***
Year Fixed Effects	Yes	Yes	Yes	Yes
Canton Fixed Effects	No	Yes	No	Yes
Observations	2690	2690	2690	2690
R-squared	0.96	0.98	0.95	0.98

Notes: The dependent variable is the log per capita expenditures in columns (1) and (2) and log per capita revenues in columns (3) and (4) both measured in Swiss Franks at 2000 prices. The variable 'proportional representation' equals one if a Canton has a proportional or mixed proportional electoral system in place and zero otherwise. Population size is calculated as the log of a canton's population, while the urban population measures the percentage people living in cities with more than 10,000 inhabitants. All specifications include year fixed effects and controls for the age structure of the population, even columns also control for canton fixed effects. * p<0.1, ** p<0.05 and *** p<0.01. Robust standard errors in parentheses. See also notes to previous table.

Table 5: Does PR Affect Political Representation and Fragmentation?

	Number of Parties		Party Fragmentation		Left-Wing Party	
	(1)	(2)	(3)	(4)	(5)	(6)
Proportional Representation	0.05 (0.049)	0.587 (0.066) ^{***}	0.081 (0.007) ^{***}	0.137 (0.010) ^{***}	0.066 (0.005) ^{***}	0.056 (0.007) ^{***}
Population Size (log)	0.637 (0.143) ^{***}	-0.611 (0.230) ^{***}	0.013 (0.002) ^{***}	0.007 (0.011)	0.018 (0.002) ^{***}	-0.046 (0.013) ^{***}
% Urban Population	0.001 (0.002)	-0.01 (0.003) ^{***}	0.001 (0.000) ^{***}	0.001 (0.000) ^{***}	0.001 (0.000) ^{***}	0.001 (0.000) ^{***}
Linguistic Fractionalization Index	-0.522 (0.115) ^{***}	-1.17 (0.334) ^{***}	-0.061 (0.014) ^{***}	-0.117 (0.030) ^{***}	-0.149 (0.012) ^{***}	-0.21 (0.027) ^{***}
Religious Fractionalization Index	2.375 (0.137) ^{***}	-0.994 (0.313) ^{***}	0.403 (0.013) ^{***}	-0.083 (0.036) ^{**}	0.231 (0.012) ^{***}	-0.007 (0.027)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Canton Fixed Effects	No	Yes	No	Yes	No	Yes
Observations	1963	1963	1963	1963	1963	1963
R Squared	0.46	0.75	0.65	0.83	0.53	0.83
Dependent Variable:						
Mean	4.48	4.48	0.655	0.655	0.177	0.177
Standard Deviation	(1.050)	(1.050)	(0.117)	(0.117)	(0.109)	(0.109)

Notes: The table reports regression estimates where the dependent variable is the number of parties in canton parliaments (columns (1) and (2)), one minus the Herfindahl index of party fragmentation in canton parliaments (columns (3) and (4)) and the percentage of seats held by the socialist or social democratic party in canton parliaments (columns (5) and (6)). The main independent variable is an indicator equal to one if the canton has adopted proportional representation and zero otherwise. All specifications include year fixed effects, even columns also control for canton fixed effects. Robust standard errors are reported in parentheses. * p<0.10, ** p<0.05 and *** p<0.01.

Table 6: Direct and Indirect Effects of Proportional Representation

	Size (1)	Education (2)	Welfare (3)	Roads (4)	Agriculture (5)
Baseline: Proportional Representation	-0.008 (0.019)	0.036 (0.026)	0.37 (0.043)***	-0.495 (0.056)***	-0.327 (0.050)***
Proportional Representation	-0.065 (0.019)***	0.095 (0.030)***	0.266 (0.047)***	-0.451 (0.061)***	-0.375 (0.054)***
Number of Parties	-0.009 (0.008)	0.091 (0.013)***	-0.037 (0.015)**	0.038 (0.019)*	0.065 (0.018)***
Party Fragmentation	0.301 (0.080)***	-1.023 (0.149)***	0.838 (0.169)***	-0.384 (0.217)*	-0.058 (0.197)
% Left-Wing Parties	0.526 (0.082)***	0.973 (0.141)***	0.544 (0.201)***	-0.388 (0.259)	0.894 (0.235)***
Canton Controls	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Canton Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	1953	1953	1568	1654	1568
R Squared	0.98	0.98	0.94	0.91	0.93

Notes: The table reports regression results where the dependent variables are the log per capita expenditures in the category specified at the top of the table. All specifications include year and canton fixed effects as well as all time-varying control variables of the baseline estimates reported in Table 4. The top row reestimates the baseline for the subset of observations for which we have information on party seats in canton parliaments. The lower part of the table adds the number of parties, party fragmentation (as measured by 1 minus the Herfindahl index) and the percentage of seats held by the socialist or social democratic party. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$ and *** $p < 0.01$.

Table 7: Effect of Failed Attempts to Reform Electoral System on Public Spending

	Initiatives to Adopt PR		Parliamentary Petitions	
	Estimate	Std. Error	Estimate	Std. Error
	(1)	(2)	(3)	(4)
Total expenditures per capita (in logs)	-0.124	(0.081)	-0.136	(0.087)*
Total revenues per capita (in logs)	-0.108	(0.073)	-0.084	(0.065)
Education expenditures per capita (in logs)	-0.05	(0.055)	-0.147	(0.104)
Welfare expenditures per capita (in logs)	-0.225	(0.152)	-0.059	(0.224)
Expenditures for roads per 1,000 (in logs)	-0.019	(0.112)	0.08	(0.192)
Expenditures for Agricultural Subsidies per 1,000 (in logs)	0.271	(0.178)	-0.304	(0.412)

Notes: The dependent variable is the log of per capita expenditures defined in the first column. The main independent variable are dummy variables whether there was an ultimately unsuccessful constitutional initiative (first specification) or a parliamentary petition (second specification) to consider proportional representation. Overall, we have information on 21 initiatives and 19 parliamentary petitions. All regressions include canton and year fixed effects as well as the same controls as in the baseline (log population, age structure, urban population, federal subsidies, employment in economic sectors, direct democracy, population heterogeneity). Robust standard errors are reported in parentheses. * p<0.1, ** p<0.05 and *** p<0.001.

Table 8: Specification Checks

	<u>Size</u> (1)	<u>Education</u> (2)	<u>Welfare</u> (3)	<u>Roads</u> (4)	<u>Agriculture</u> (5)
(1) Democratization	0.011 (0.017)	0.076 (0.023)***	0.362 (0.048)***	-0.517 (0.069)***	-0.305 (0.060)***
(2) Women's Suffrage	0.003 (0.016)	0.097 (0.021)***	0.311 (0.050)***	-0.472 (0.066)***	-0.227 (0.055)***
(3) Ideological Shifts	-0.017 (0.019)	0.148 (0.022)***	0.351 (0.053)***	-0.517 (0.070)***	-0.242 (0.055)***
(4) Other Political Changes	0.012 (0.021)	0.022 (0.028)	0.312 (0.052)***	-0.548 (0.065)***	-0.247 (0.058)***
(5) Dummy out Years before PR	0.024 (0.016)	0.143 (0.022)***	0.353 (0.048)***	-0.499 (0.056)***	-0.246 (0.051)***
(6) Canton-specific time trends	0.040 (0.024)*	0.219 (0.024)***	0.504 (0.060)***	-0.421 (0.085)***	-0.217 (0.058)***
(7) Lagged Dependent Variable	-0.004 (0.006)	0.008 (0.009)	0.056 (0.019)***	-0.136 (0.061)**	-0.06 (0.018)***
(8) First Differences	-0.008 (0.008)	0.017 (0.008)**	0.018 (0.017)	-0.046 (0.043)	-0.034 (0.016)**
(9) Spending Share		0.01 (0.002)***	0.040 (0.005)***	-0.074 (0.010)***	-0.017 (0.004)***
(10) Serial Correlation in Spending	0.003 (0.008)	0.032 (0.011)***	0.079 (0.022)***	-0.122 (0.025)***	-0.065 (0.023)***
(11) Election Years Only	0.05 (0.034)	0.121 (0.048)**	0.211 (0.110)*	-0.616 (0.124)***	-0.27 (0.138)*
(12) Drop Cantons with Mixed Proportional System	-0.065 (0.077)	0.167 (0.023)***	0.113 (0.056)**	-0.718 (0.128)***	-0.258 (0.054)***
(13) Expenditure Level	-221.378 (70.228)***	37.902 (15.298)**	37.055 (24.028)	-688.685 (96.410)***	-64.291 (12.245)***
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Canton Fixed Effects	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variables are the log expenditures in the category shown in the heading. All specifications include year and canton fixed effects and the same controls as in table 3. The coefficients reported are for the binary indicator of proportional representation. Row (1) adds controls for the mandatory budget referendum, law referendum, voter initiative and the number of years since the executive is directly elected by the voters while row (2) adds the year when suffrage was extended to women. Row (3) adds the share of divorced and protestants; row (4) includes controls for the electoral cycle and sizes of executive and legislative. Row (5) includes dummies for one year, up to three years and up to five years prior to electoral reform, while row (6) adds canton-specific trends. Row (7) includes a lagged dependent variable while row (8) estimates the spending relationship in first differences and row (9) uses the spending share as the dependent variable. Row (10) implements the before-after estimator proposed by Bertrand et al. (2004) to account for serial correlation. Row (11) restricts the sample to election years while row (12) drops canton-year observations with a mixed proportional systems. Row (13) uses the level of expenditures as the dependent variable. * p<0.1, ** p<0.05 and *** p<0.01. Robust standard errors are in parentheses.

Table 9: Summary Statistics Local Data

	Observations	Mean	Std. Dev.
<u>Political System</u>			
Executive Elected by Plurality Rule	5081	0.72	0.45
Mandated Electoral Rule for Executive	5081	0.53	0.50
Size of Executive (log)	5056	1.77	0.29
Community has Parliament	5852	0.19	0.40
Legislative Elected by Proportional Rule	778	0.77	0.42
Mandated Electoral Rule for Legislative	1134	0.14	0.35
Size of Local Parliament (log)	670	3.42	0.49
<u>Size of Government</u>			
Administrative Personnel	5852	0.86	5.65
Administrative Personnel (log)	5852	-1.03	1.00
Budget Deficit?	3761	0.31	0.46
<u>Control Variables</u>			
Population	5852	2491	7771
Nonemployed (%)	5852	35.91	13.89
Children under 15 (%)	5852	20.58	9.11
Population 65 and Above (%)	5852	31.16	32.43
Employed in Primary Sector (%)	5852	7.42	10.22
Employed in Secondary Sector (%)	5852	36.51	37.00
Protestants (%)	5852	42.47	29.73
Canton Language French or Italian	5852	0.45	0.50
Community Located in the Alps	5805	0.31	0.46

Notes: The table shows means, standard deviations and extreme values for our sample of local communities in 1988, 1994, 1998 and 2005. The size of the executive and parliament (if any) is expressed in logs. Administrative personnel represents the size of the administration per 100 inhabitants (both in levels and logs). Information on whether the community ran a budget deficit is not available in 1988. The percentage of nonemployed and employed in primary sector are measured in terms of the labor force while the percentage of children and protestants in terms of the total population.

Table 10: Canton Mandates and the Size of Local Administration

	Communities that Adopted Electoral Rule		Communities with Mandates
	Legislative (1)	Executive (2)	Executive (3)
Proportional Rule	0.017 (0.096)	-0.038 (0.042)	0.058 (0.072)
Log Population	-0.177 (0.060) ^{***}	-0.485 (0.024) ^{***}	-0.756 (0.062) ^{***}
Canton Language French or Italian	-0.255 (0.105) ^{**}	-0.06 (0.052)	-0.120 (0.035) ^{***}
% Protestants	0.004 (0.002) [*]	0.001 (0.001)	0.003 (0.001) ^{***}
% Children under 15	-0.077 (0.017) ^{***}	-0.017 (0.004) ^{***}	-0.020 (0.005) ^{***}
% Nonemployed	-0.043 (0.012) ^{***}	-0.009 (0.003) ^{***}	-0.007 (0.004) [*]
% Employed in Primary Sector	0 (0.007)	0.006 (0.003) ^{**}	-0.001 (0.002)
Community Located in the Alps	0.193 (0.107) [*]	-0.025 (0.040)	-0.030 (0.051)
Population Size Dummies	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Observations	620	2381	2679
R Squared	0.17	0.37	0.31

Notes: The table reports regression results where the dependent variable is the log of administrative personnel per capita. The main independent variable is whether a community has a proportional electoral system in place. The sample in the first two columns is restricted to communities that choose their electoral system for the legislative (1) or executive (2). The sample in columns (3) is restricted to communities where the canton mandates the electoral rule for the executive. All specifications include year effects. See the previous table for a description of the control variables. Robust standard errors that allow for clustering at the canton level are reported in parentheses.

Table 11: Propensity Score Matching

	Communities that Adopted Electoral Rule	
	Legislative (1)	Executive (2)
Log Population	0.979 (0.162) ^{***}	1.189 (0.069) ^{***}
Canton Language French or Italian	1.721 (0.367) ^{***}	7.568 (0.656) ^{***}
% Protestants	-0.015 (0.007) [*]	-0.006 (0.004)
% Children under 15	-0.068 (0.046)	-0.011 (0.013)
% Nonemployed	0.085 (0.027) ^{***}	0.027 (0.012) ^{**}
% Employed in Primary Sector	-0.054 (0.027) ^{**}	-0.017 (0.009) [*]
Community Located in the Alps	0.651 (0.370) ^{**}	-1.529 (0.229) ^{***}
Year Fixed Effects	Yes	Yes
Canton Fixed Effects	No	Yes
Observations	621	2,679
R Squared	0.21	0.43
Log-likelihood	-270.88	-917.92
<u>Treatment on the Treated (ATT)</u>		
Nearest Neighbor Matching	0.106 (0.127)	-0.05 (0.100)
Biweight Kernel Matching	0.124 (0.162)	-0.049 (0.098)
Communities with Common Support		
_Treated	436	1,008
_Untreated	177	1,340

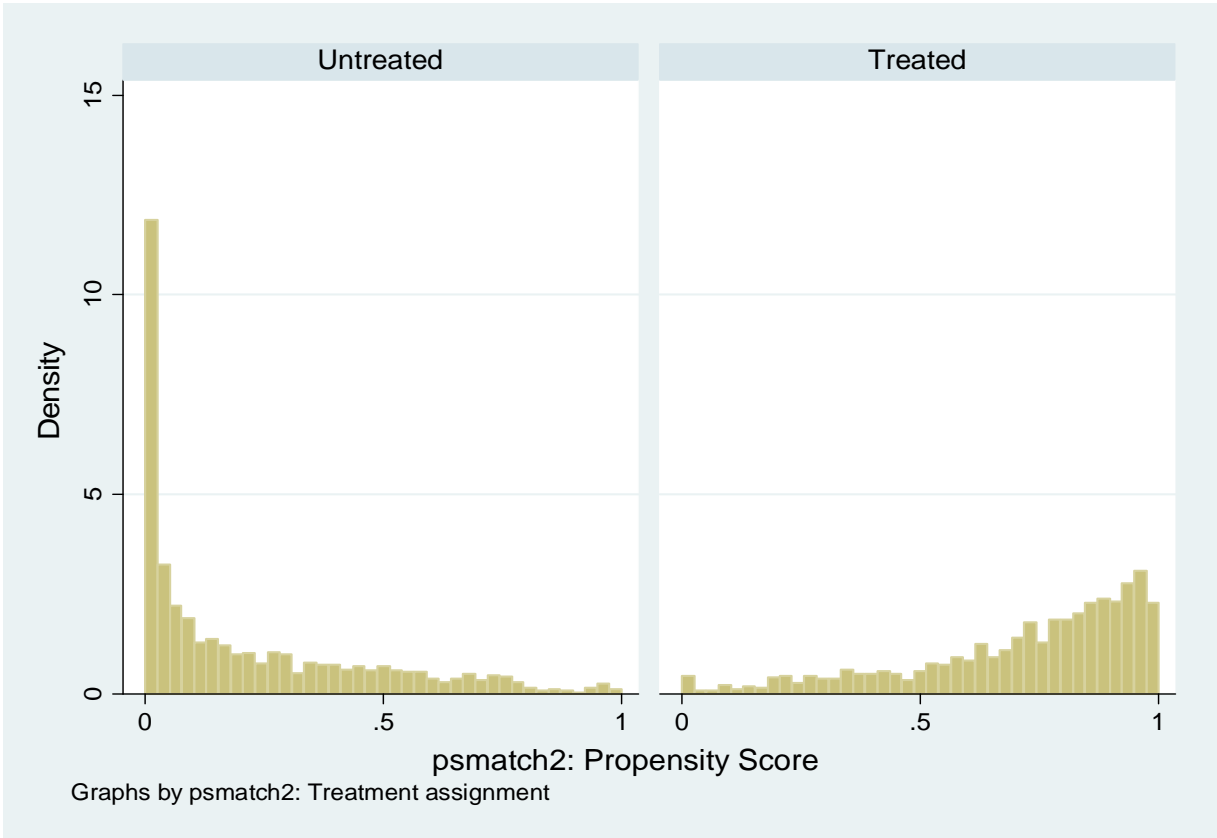
Notes: The table the coefficient from a logit regression where the dependent variable is a binary indicator equal to one if the community elects the parliament (column (1)) or executive (column (2)) according to proportional rule and zero otherwise. All specifications include year and canton fixed effects. The matching procedure uses both the method of nearest neighbors and kernel matching using a biweight kernel. We impose common support on the propensity score and also trim 2 percent of the observations with the highest/lowest values of the predicted propensity score. The average treatment on the treated effect for both matching method is reported at the bottom together with the number of observations in the treated and untreated group. Standard errors reported in parentheses are not adjusted for the first stage estimation of the propensity score. * p<0.1, ** p<0.05 and *** p<0.01.

Table A1: Correlates with Adoption of PR

	<u>Proportional Representation</u>	
	<u>Estimate</u>	<u>Std.Error</u>
Year since Executive Elected	-0.212	(0.272)
Year Social Democratic Party Founded	1.083	(0.947)
Year Law Initiative Adopted	-0.38	(0.345)
Year Mandatory Law Referendum Adopted	-0.073	(0.033)**
Year Budget Referendum Adopted	-0.258	(0.180)
Federal Subsidies per capita (in logs), 1890	-0.272	(0.282)
Canton Population, 1890	0.000	0.000
Population Aged 0-19 Years (in %), 1890	3.445	(2.506)
Population Aged 20-39 Years (in %), 1890	-4.74	(2.804)
Population Aged 40-64 Years (in %), 1890	0.855	(4.875)
Population Aged over 65 Years (in %), 1890	11.074	(7.183)
Employed Agriculture (in %), 1890	0.498	(0.426)
Employed in Industry (in %), 1890	-0.456	(0.496)
Labor Force Participation (in %), 1890	-1.757	(1.091)
Urban Population (in %), 1890	-0.272	(0.282)
Linguistic Fractionalization Index, 1890	-46.197	(58.939)
Religious Fractionalization Index, 1890	-83.204	(42.124)*
Car Ownership (in %), 1914	-71.87	(42.480)

Notes: The table reports estimates from bivariate regressions where the dependent variables are the year when proportional representation was introduced. All demographic variables are for 1890 except for car ownership, which is first available in 1914. The linguistic and religious fractionalization measures are based on Herfindahl indices for three groups respectively. * p<0.1, ** p<0.05 and *** p<0.01.

Figure A1: Support of Estimated Propensity Score by Treatment Status



Notes: The figure shows the estimated propensity score for communities that chose majoritarian rule ('untreated') and for communities that chose proportional rule ('treated'). The matching estimator calculated in table 9 then imposes common support among the two groups.