HOW DO ELECTORAL SYSTEMS AFFECT FISCAL POLICY? EVIDENCE FROM CANTONAL PARLIAMENTS, 1890-2000

Patricia Funk
Universitat Pompeu Fabra

Christina Gathmann
University of Heidelberg

Abstract
Using a new data set on Swiss cantons since 1890, we analyze how the adoption of proportional representation affects fiscal policy. In line with economic theory, we show that proportional systems shift spending toward broad goods (like education and welfare benefits) but decrease spending on geographically targetable goods (like roads). We find little evidence that proportional representation increases the overall size of government. An analysis of the underlying theoretical mechanisms reveals that proportional representation increases electoral turnout, left-wing representation and political fragmentation. These changes in political representation explain a substantial share of the rise in education spending, but a small share of the rise in welfare spending or the decline in road expenditures. (JEL: H4, H11, I38)

1. Introduction

A central feature of representative democracies is the delegation of decision-making power to political representatives. Electoral systems play hereby an important role because they shape both electoral incentives and the political environment in which public policies are made. Economic theory shows that plurality systems encourage politicians to represent the interests of their local district, while politicians in a proportional system seek the support of broad

The editor in charge of this paper was Fabrizio Zilibotti.

Acknowledgments: We thank our three anonymous referees and the editor for helpful comments that substantially improved the paper. We are grateful to Toke Aidt, Tim Besley, Ann Carlos, Latika Chaudhary, Axel Dreher, Lars Feld, Bob Hall, Eckhard Janeba, Peter Lindert, John Matsusaka, Jan Schnellenbach, Erik Snowberg, Guido Tabellini, Susan Wolcott and seminar participants at the AEA meeting, World Congress of the Cliometrics Society, Hoover Institution, EEA Meeting, Silvaplana Workshop of Political Economy, University of Alicante, Bonn, Heidelberg, Mannheim, Zurich, EconomiX - Paris and Universitat de Barcelona for many helpful suggestions. We also thank the employees of canton archives for answering our questions. Patricia Funk gratefully acknowledges financial support from the SEJ2007-6340/ECON grant of the Spanish National Science Foundation. Patricia Funk is a Ramon y Cajal Research Fellow.

E-mail: patricia.funk@upf.edu (Funk); christina.gathmann@awi.uni-heidelberg.de (Gathmann)

social groups instead (Austen-Smith, 2000; Lizzeri and Persico, 2001; Milesi-Ferretti et al., 2002; Myerson, 1993; Persson and Tabellini, 2003). A central prediction emerging from these models is that plurality systems favor spending on goods that can be targeted locally, and proportional systems favor spending on goods with broad benefits. How these differences in electoral incentives affect the overall size of government is theoretically less clear.

While the theory of electoral systems is by now well developed, the empirical literature on electoral systems faces a number of challenges: electoral systems mostly vary across countries, and constitutional reforms are by design a rare event. The existing studies have therefore relied on cross-country data (Aidt et al., 2006; Milesi-Ferretti et al., 2002; Persson and Tabellini, 2003). Yet, countries differ along many dimensions, some observable, others unobservable which make the identification of causal effects difficult (Acemoglu, 2005).

We use the differential timing of electoral reform in states within a single country (Switzerland) to study the fiscal consequences of proportional representation. In 1890, all states ('cantons'), like all democratic countries around the world, elected their state legislatures under a plurality system. Over the next 110 years, 23 of the 25 cantons in Switzerland adopted a proportional system. Today, only two cantons exclusively rely on plurality rule to elect their parliament. Since all cantons share a common history, our setting reduces problems of unquantifiable historical and institutional differences inherent in cross-country studies.[1]

Our findings suggest that proportional representation has important implications for the composition of government spending: it shifts spending away from geographically targeted transfers for roads (minus 29%) toward spending on education (plus 10%) and welfare (plus 22%) that benefit broad social groups. In contrast, we find little evidence that proportional representation increases total government spending or revenues.[2]

We further present new evidence on the theoretical mechanisms underlying these reduced-form estimates. The adoption of proportional rule affects electoral incentives as well as political representation in the legislature. Political scientists have long argued that proportional systems increase political fragmentation (Duverger, 1954; Rae, 1967; Lijphart, 1994), the presentation of left-wing parties (Sassoon, 1998; Iversen and Soskice, 2006) and possibly voter turnout (Blais and Carty, 1990; Lijphart, 1997).

We find that electoral turnout increases by 16 percentage points in a proportional system. Similarly, left-wing parties gain more political influence; their seat share increases by 6.6 percentage points in legislatures elected by

1. In a complementary paper, Gagliarducci et al. (2011) test for the accountability of politicians elected under different electoral rules in Italy's mixed proportional system.

2. The existing cross-country evidence reports much stronger effects for welfare spending. The correlation with total spending is less conclusive and seems to depend on the specific country sample.

proportional rule. We also find that legislatures in a proportional system are more politically fragmented: the number of parties increases by 0.66, the size of the legislature by 6 seats and our index of party fragmentation by 20%. The observed changes in political representation have fiscal consequences as well: the stronger presence of left-wing parties raises total spending as well as education and welfare spending. Political fragmentation in turn has little effect on total spending, but increases both education and welfare spending. Overall, the compositional changes account for at most 40% of the total fiscal policy effects. The remaining effect might be attributed to changes in electoral incentives affecting all legislators in a proportional system.

An important concern with our empirical strategy is that unobservable shocks may be correlated with public spending and electoral reform. We present a number of informal validity tests that investigate, but generally fail to confirm these concerns. First, we show that controlling for voter preferences (derived from voting behavior in federal initiatives and referendums since 1890) does not affect our results. Second, we construct a falsification test based on attempts to reform the electoral system that were ultimately unsuccessful. The effects are insignificant with two exceptions (for revenues, there is a marginally significant effect; for welfare spending, the effect goes in the opposite direction than expected). Third, we analyze whether left-wing representation may account for electoral reform. The data clearly show that the rise of left-wing parties is a consequence rather than an underlying cause of electoral reform. Fourth, we show that the relationship between proportional system and public spending is robust to controls for population fractionalization and other determinants of electoral reform. Fifth, we find similar results if we use more flexible models to control for unobserved heterogeneity like a lagged dependent variable, canton-specific decade dummies or a sample restricted to twenty years before and after electoral reform. Together, these robustness tests suggest that our estimates identify the causal effect of proportional systems on government spending.

2. Theoretical Considerations

The two prominent electoral systems 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. 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 a single) voting districts and assigned based on the vote share for the candidate's party.[3]

3. Electoral systems may also vary along other, more subtle dimensions. See Taagepera and Shugart (1989), Lijphart (1994) and Cox (1997) for a detailed discussion of real-world electoral systems.

Building on this basic distinction between electoral systems, economists have analyzed the electoral incentives of politicians when candidates choose two different policies: one policy benefits many voters ('broad good') while the other one can be targeted to subsets of voters ('targetable good'). A central prediction emerging from these models is that candidates elected in a plurality system spend more on the targetable good and less on the good with broad benefits (Lizzeri and Persico, 2001; Milesi-Ferretti et al., 2002; Persson and Tabellini, 2003).

This prediction holds irrespective of whether the electoral system is defined by the electoral rule (Lizzeri and Persico, 2001) or the numbers of districts in which representatives are elected (Milesi-Ferretti et al., 2002; Persson and Tabellini, 2003). Candidates elected under majority rule, for example, have stronger incentives to target spending to those citizens that secure a majority of votes; votes above the majority in contrast are discarded. Under proportional rule, candidates value all votes because each vote counts for the party's seat share.[4]

How these electoral incentives affect total spending is theoretically less clear. First, total spending might be higher or lower in proportional systems depending on voter preferences over targetable relative to broad goods (Lizzeri and Persico, 2001; Milesi-Ferretti et al., 2002). If the median voter values targetable goods, total spending will be higher in a proportional system.[5] Furthermore, electoral competition, often thought to reduce wasteful spending, might be more or less intense in a plurality system. Electoral competition is stronger in contested districts where the return of winning is high (Persson and Tabellini, 2003); however, electoral competition might be lower in 'safe' districts.[6] How proportional representation affects the size of government is therefore an open empirical question.

Economic models of electoral systems typically assume two-party competition taking the structure of the legislature as given. Yet, a large literature in political science has documented that electoral reform changes the composition of the legislature as well: proportional representation is thought to increase political fragmentation in the legislature (Duverger, 1954; Rae, 1967; Lijphart, 1994; Taagepera and Shugart, 1989; Weingast et al., 1981), left-wing

4. A similar conclusion emerges when electoral systems are distinguished by their district size. Candidates elected under plurality system are elected in many small districts. To win the majority, candidates want to target spending to highly contested districts.

5. Since proportional representation encourages spending on broad transfers, the sum of spending on broad and targetable goods in a proportional systems typically exceeds spending on targetable goods in a plurality system.

6. Plurality systems might also impose barriers to entry for candidates from the same party as the incumbent because the chances for winning against the incumbent in a single-member district are low (Myerson, 1993).

representation (Sassoon, 1998) and electoral turnout (Blais and Carty, 1990; Lijphart, 1997).

These changes may influence fiscal policy through several channels. Higher voter turnout could shift the position of the median voter which might increase or reduce the demand for government. In response, parties in a proportional system are more likely to target voters that would not be pivotal in a two-party system (Lizzeri and Persico, 2005).[7] Increased left-wing representation in turn should increase spending if left-wing supporters prefer more government (Iversen and Soskice, 2006).

Finally, political fragmentation (e.g. in the form of a higher number of legislators) might create a 'common-pool problem' because representatives wish to spend money on their local clientele but finance it out of general taxation (see Weingast et al., 1981). The larger the pool of decision-makers over the budget, so the argument, the more public money is spent. Does the common-pool problem also apply to proportional systems? In a proportional system, governments are often coalitions between multiple parties whereas single-party governments prevail in plurality system in contrast (see also Austen-Smith, 2000; Bawn and Rosenbluth, 2006). However, party discipline in a proportional system might keep the number of actual decision-makers low compared to the large number of politicians representing their local district in a plurality system. It is therefore not obvious whether higher political fragmentation in a proportional system also translates into a larger number of actual decision-makers thus inflating the public budget. Below, we will investigate the contribution of each theoretical factor to public spending changes after electoral reform.

3. The Move to Proportional Representation in Switzerland[8]

Before 1890, all cantons in Switzerland had a plurality system in place. As in most countries at the time, representatives were elected in multi-member districts and citizens had as many votes as there were seats in the district. In most cantons, candidates had to obtain an absolute majority of votes in the first round; in the second round, the relative majority sufficed.[9]

7. Alternatively, voters in a proportional system might actually strategically elect candidates with a preference for broad transfers rather than candidates with a taste for locally targetable goods (see Milesi-Ferretti et al., 2002).

8. This section builds on Gruner (1977), Klöti (1901) and Saripolos (1899). Detailed discussions of the Swiss electoral system can also be found in Garrone (1991) and Lutz and Strohmann (1998).

9. A few cantons like *Zurich* had up to three polls where an absolute majority was required in the first two and the relative majority sufficed in the third round.

Between 1890 and 1992, twenty-three out of the twenty-five cantons switched to proportional representation.[10] The first column of Table 1 shows the year when each canton first elected the legislature under the new rule. In 2000, only two cantons, *Appenzell-Innerrhode* and *Grisons*, still rely exclusively on plurality rule. A few cantons use a mixed proportional system (marked in column (2) of Table 1) where majority rule is used in electoral districts with one or two seats and proportional rule in electoral districts with more than two seats.[11] For our main analysis, we combine pure and mixed proportional rule into a single indicator but provide a separate analysis in the robustness section.

Three channels were used to adopt a proportional system in the Swiss cantons. In *Ticino*, proportional representation was imposed by federal mandate. A long-lasting political conflict between the two leading parties ended in violent clashes on the streets in 1890. The conflict escalated to the point where the federal government, fearing a civil war, intervened and mandated proportional representation in *Ticino*. All other cantons adopted proportional representation voluntarily. A second channel for electoral reform were voter initiatives. Here, citizens could collect signatures to decide about a proposed electoral reform at the ballot box. In eleven cantons, such a proposal was successful. Following the approval by the electorate, the parliament would then work out and pass the necessary laws to implement the new electoral system. The third channel for reform was a parliamentary petition initiated by one or several representatives. If the parliament approved the petition, a parliamentary commission would work out a proposal. If the proposal then passed in parliament, a referendum would be held to obtain the approval of the voters (because all changes to the constitution require a referendum). Regardless of the adoption channel, parliamentary elections in all cantons were held within two years after proportional representation was formally adopted.

Understanding the political and socio-economic determinants of electoral reform is important for evaluating the validity of our empirical strategy. One argument discussed in the literature is that proportional representation has long been a demand of emerging left-wing parties (e.g. Rokkan, 1967). Like in many European countries, Switzerland saw the rise of a sizable working class following industrialization, especially in the large urban centers.[12] Rather than the political threat by left-wing parties, another potential factor might have been the balance of power among established parties (see Boix, 1999; Lutz and Zila, 2009). A more fragmented party structure, so the argument, would favor

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

11. The latest adopter *Uri*, for instance, adopted proportional rule in 1992 for about three-quarters (or 47 out of 64) of its voting districts.

12. Industrialization in Switzerland began early in the nineteenth century, but it was not until the second half of the nineteenth century that workers became politically organized. The Social-Democratic party, for example, only emerged around 1850 building on earlier voluntary associations (the so-called *Grütlivereine*, for example).

electoral reform as smaller parties would likely gain from (and hence support) proportional representation. A third factor facilitating electoral reform might have been the fractionalization of the population along religious, cultural or ethnic lines (see Rokkan, 1967). Fractionalization is substantial in Switzerland, which is culturally divided into three main language groups and religiously divided between Catholics and Protestants.[13]

To shed some light on the actual determinants of reform in the cantons, we estimate a linear probability model of the probability of adoption.[14] For Switzerland, we find support for two of the three factors discussed above: rising religious fractionalization increases the likelihood of electoral reform. Adoption is less likely with a dominant established party (so the concentration of seats among established parties is high). Not surprisingly, adoption is also less likely if the barriers for a voter initiative are high (see Table A.1).

In contrast, the strength of left-wing parties prior to electoral reform plays no role for adoption in the Swiss cantons. Online Figure A.1 instead suggests that the rise of left-wing parties was a consequence of electoral reform rather than its underlying cause. We also cannot predict adoption based on past spending or spending growth which reduces concerns of reverse causality. Finally, there is no clear geographic pattern of adoption (see Figure 1). 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 (darker shade).

13. Additional factors discussed in the literature include the size of a country (Boix, 1999), the local organization of economic interests (Cusack, Iversen and Soskice, 2010) or the level of income inequality (Ticchi and Vindigni, 2010). In our analysis, canton size will be absorbed by canton fixed effects. Unfortunately, data on income inequality and the relationship between workers and employers are not available over our time period to test these hypotheses.

14. All control variables are lagged two years to account for the time lag between the adoption decision and the first election under the new system. Religious and linguistic heterogeneity are measured as one minus the Herfindahl of concentration for 3 groups respectively (German, French and Italian as well as Protestants, Catholics and Jews). The measure varies from zero to one with a larger value indicating a more fragmented population. Both indices show substantial fractionalization ranging from zero to 0.76 and 0.87 respectively (see online Table A.1). Voter support for different parties are taken from their seat share in federal elections because these data are complete and constitute a better measure of the actual "threat" to established parties. We find however, similar results if we use actual seats in cantonal governments (see online Figure A.1 for the effect of left-wing parties).

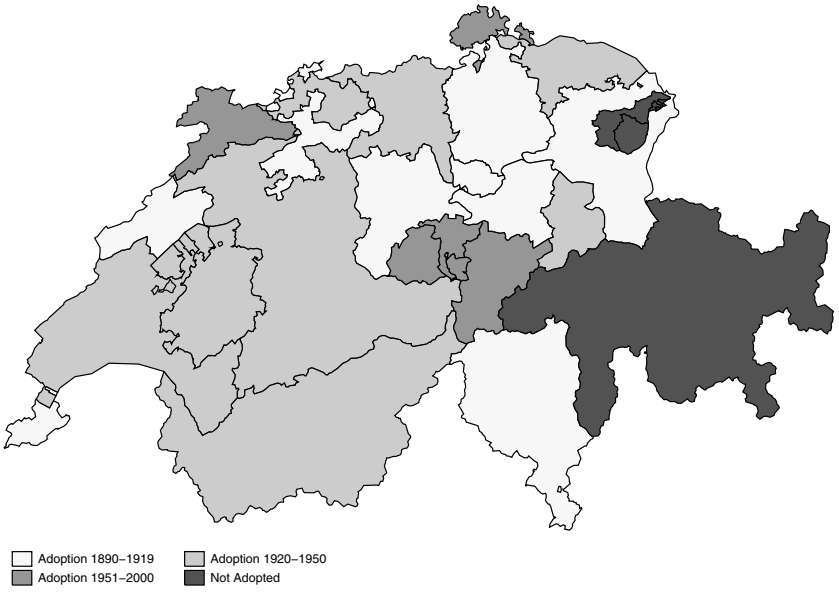

FIGURE 1. Adoption of Proportional Representation, 1890–2000.

4. Data and Empirical Strategy

4.1. Data

To analyze the consequences of electoral reform, we assemble a rich new data set for all Swiss cantons from 1890 to 2000. For each canton, we collect information on government expenditures and revenues, the electoral system and socio-economic characteristics. Spending and socio-economic data are compiled from the *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 is provided in the data appendix.

We extract information on the electoral system and other political institutions by examining all past and current canton constitutions and relevant electoral laws. We complement and cross-check this information with canton archives (personal communication) and secondary sources (for example, Lutz and Strohmann, 1998; Klöti, 1901). 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. 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 canton expenditures and revenues per capita (in logs) available annually over the entire period. To investigate shifts in spending for broad social groups, we collect information on education and welfare spending. Education in Switzerland is predominantly publicly provided. The cantons bear the sole responsibility for secondary education and share responsibilities with local governments for primary education (see online Table A.2). Education spending then benefits all families with children and, in the presence of positive spillovers, even the population as a whole. Welfare spending combines expenditures for social security (one pillar of the Swiss pension system) and social assistance to the poor. Our measure of welfare spending thus combines insurance against poverty and financial security for old age; both, but especially the last one, benefit a large share of the population. Data on welfare are available for a few cantons since 1890 and for all cantons since 1910; education expenditures are available for all years since 1890.

To test shifts in spending targeted to geographic constituencies, we collect data on expenditures for roads and subsidies to agriculture. Spending on canton roads are easy to target geographically, while agricultural activities are highly concentrated in certain regions. Road expenditures are available in 1910 and annually since 1925. Data for agricultural subsidies are available for two cantons since 1890, for all cantons in 1910 and annually since 1930. The incomplete data coverage implies that the effects of proportional representation on targeted spending are identified from a smaller set of reforms (because we do not impute missing data).

Education and welfare expenditures are measured per capita, while expenditures for roads and agricultural subsidies are expressed per 1,000 inhabitants.[15] All expenditures and revenues are deflated to Swiss Francs in 2000. To match the annual spending data to the electoral rule in election years, we assign the electoral rule of the last parliamentary election for non-election years. This procedure yields an annual panel to evaluate the consequences of proportional representation in election and non-election years.

From the canton constitutions, we collect additional information about the political system: the size of the legislature and the executive (both measured in absolute numbers), whether the canton had adopted female suffrage and the strength of a canton's direct democracy (whether the canton has a mandatory budget referendum or a mandatory law referendum in place; and the signature requirement for the voter initiative which is available in all cantons).[16]

15. Our four spending categories do not sum to total expenditures as data on other spending categories (e.g. spending on administration, law enforcement, public transport or water and sewer services) are not available prior to 1930.

16. The signature requirement is measured in terms of the eligible population. If a canton has not yet adopted the voter initiative, we assign a signature requirement of 100% for years prior to adoption.

To study the underlying theoretical mechanisms, we add information on the number of parties, the seat shares of the six largest parties in canton parliaments and all available data on turnout in cantonal elections. Because many representatives had weak or no pary ties under plurality rule, information on party seats before and after electoral reform is only available for fifteen cantons. Information on electoral turnout is only available for four cantons before electoral reform (see the online appendix for details on data coverage).

We complement the panel with socio-economic characteristics (like the age structure, population size, linguistic and religious composition and the share of workers in agriculture and manufacturing) from the decennial Census. Data for years between census years are interpolated. Online Table A.1 shows summary statistics of all variables used in the empirical analysis.

4.2. Empirical Strategy

Exploiting the 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

$$Y_{ct} = \beta PR_{ct} + \delta' X_{ct} + \gamma_t + \alpha_c + \theta_c * time_t + u_{ct} \quad (1)$$

where Y_{ct} denotes the log of annual expenditures per capita in a specific policy area. As noted above, the variable PR_{ct} is a binary indicator equal to zero as long as the legislature is elected according to plurality rule. The indicator switches to one when the parliament is first elected according to proportional rule, and all years thereafter. The parameter of interest in equation (1) is β.

Our specifications include canton (α_c) and year (γ_t) fixed effects. Year fixed effects absorb common shocks such as the two World Wars or economic depression. Canton fixed effects are important because there are strong, persistent differences between German-speaking and French- or Italian-speaking cantons. For example, some cantons allow their citizens to recall the government, while others do not. These institutional differences are highly persistent, and we expect them to influence politicians' spending behavior. Because Swiss cantons differ along other dimensions as well, we include a number of time-varying variables X_{ct}. We add the age structure of the population to control for differences in the demand for government services. Population size is included to allow for economies of scale in the provision of public services. Federal subsidies adjusts for differences in revenues available to cantons. We further control for the degree of industrialization and other political institutions (like direct democratic voting rights, female suffrage or the direct election of the executive).

One variable that is not available in our data set is canton income (or wages). We use several variables to adjust for differences in income: the percentage of the population owning a car, the number of physicians per 1,000 population

and the infant mortality rate. These three variables alone explain 43% of the variation in canton income which is available since 1965. Once we include our other controls and canton and year fixed effects, we can account for 94% of the variation in canton income. The absence of a direct income measure is therefore not a major limitation of our study.

To control for any remaining unobserved heterogeneity, we include canton-specific linear trends. The parameter of interest β is then identified from differential trend breaks in public spending that coincide with the timing of adoption of proportional representation. Alternatively, we include even more flexible canton-specific decade dummies centered around the reform date.[17] Here, β identifies the short-run effect of proportional representation in the five years prior and after electoral reform. We further probe the validity of our identifying assumption in Section 6. All specifications report standard errors clustered at the canton level to adjust for serial correlation (Bertrand et al., 2004).

5. Estimation Results

5.1. Broad Services and Targeted Transfers

Table 2 shows the effect of proportional representation on spending for broad goods (education and welfare). The dependent variables are measured in logs and all specifications include the proportional indicator, year and canton dummies and our time-varying canton characteristics. Odd columns controls for canton-specific linear trends, while even columns includes canton-specific decade dummies centered around the reform date.

We find strong evidence that proportional systems spend more on goods with broad constituencies: after adoption, cantons spend 21% more on education (column (1)) and 42% more on welfare (column (3)). The short-run effect (identified from the centered canton-specific decade dummies) is still a 10% increase in education spending in the five years after relative to the five years prior to the reform. For welfare spending, the short-run effect is a 22% increase though the estimate is no longer statistically significant.

We next investigate whether spending on geographically targeted goods declines after the adoption of proportional representation. The dependent variables are now the log of expenditures for roads and agricultural subsidies,

17. We construct the centered decade dummies as follows: the first decade dummy is 1 if proportional rule has been adopted between $t-5$ and $t+5$ years where t is the year when the first election occurred under proportional rule; the dummy is zero otherwise. The second decade dummy is 1 when adoption was $t-6$ to $t-15$ and zero otherwise; the third dummy is equal to one when adoption will be between $t+6$ and $t+15$ years and zero otherwise; and so on.

while the specification and control variables are the same as before. The right-hand side of Table 2 shows that expenditures for roads are indeed 29% lower with canton-specific decade dummies (indicating the short-run impact). The results for agricultural subsidies are not as clear-cut. In both specifications, the coefficient has a negative sign as expected. However, the estimates are not statistically significant at conventional levels, possibly because data coverage is less complete.

The control variables have the expected sign though most are not statistically significant. More subsidies from the federal government have a positive effect on spending. The coefficient on log population is typically negative suggesting substantial economies of scale in the supply of education, welfare and agricultural subsidies. A larger industrial sector in turn is associated with higher spending for education and roads.

To compare our results to previous cross-country studies, we calculate spending changes in terms of GDP per capita. Electoral reform in the Swiss cantons increased expenditures for social security and social assistance by 0.7%-1.3% and education spending by 0.4%-0.6%.[18] While sizeable, the increase in welfare spending is substantially smaller than those reported in cross-country studies (Persson and Tabellini (2003), for example, report 2% to 3% higher welfare spending). Overall, our results confirm the theoretical predictions that proportional systems shift spending: politicians elected under proportional rule are less likely to target their local clientele but instead seek the support of broad social groups.

5.2. Size of Government

As noted above, economic theory does not provide a clear-cut prediction how proportional representation affects the overall size of government. To evaluate this relationship empirically, we estimate the same model in (1) where the dependent variables are now the log of total expenditures or total revenues per capita.

Table 3 shows that proportional representation does not affect total government spending (columns (1) and (2)) or revenues (columns (3) and (4)).[19] The coefficients are typically positive though close to zero in the

18. Average canton GDP per capita in 2000 is 45,730 Swiss Francs and average spending on social assistance and social security, for instance, is 1,394 Swiss Francs per capita. Hence, 0.42*1,394/45,730 = 1.3% (with canton linear trends) and 0.22*1,394/45,730=0.7% (with canton decade dummies) for welfare spending.

19. Similarly, we find no effect on total spending in the roughly 3,000 Swiss communities as well. Many cantons mandate in their constitution which electoral rule is used to select local governments. These mandates have been imposed many decades ago and rarely change over time; therefore, they can be considered exogenous from the perspective of the individual community. We find no significant spending differences between communities with mandated

specification with canton-specific decade dummies - and none of the estimates are statistically significant.[20]

As before, the control variables in the expenditure and revenue regressions have largely the expected signs. Federal subsidies, for example, increase canton spending, while a directly elected executive is associated with lower canton spending.

Our estimates for total spending differ from previous cross-country findings: while Persson and Tabellini (2003) and Milesi-Ferretti et al. (2002) report positive coefficients for their sample of OECD countries, Aidt et al. (2005) typically find negative correlations for Western Europe. The evidence from Swiss cantons suggests instead that proportional representation had little effect on the overall size of government.

5.3. Political Fragmentation, Left-Wing Representation and Turnout

We next examine the role individual theoretical mechanisms play for the observed spending changes. As noted above, theory suggests that proportional rule not only shifts electoral incentives but the political representation in the legislature as well.

To quantify how changes in political representation after electoral reform affect fiscal policy, we use a two-step approach. In a first step, we show how proportional rule changes the representation of left-wing parties, political fragmentation in the legislature and electoral turnout. In the second step, we then investigate the relationship between each mechanism and spending changes in a proportional system.

Left-wing representation is measured as the share of seats held by the Social Democrats.[21] Political fragmentation is measured by the number of legislators, the number of parties with seats in the legislature and by party fragmentation. This last measure is based on the seat distribution of six parties; the remaining, smaller parties are collapsed into a single category ('other'). Hence, our data will underestimate the actual degree of party fragmentation. Party fragmentation is then calculated as one minus the Herfindahl index of concentration; it varies from zero to one, with larger values indicating a more fragmented party structure. Finally, electoral turnout refers to voter participation in cantonal elections (measured in percent of the eligible population). Note that data on

proportional rule and those with mandated plurality rule. The results are available from the authors upon request.

20. The lack of statistical significance cannot be explained by data quality because we have annual information on total spending and revenues for all cantons since 1890.

21. Estimates based on all left-wing parties, which includes seats held by the Communist party, are similar and not reported here.

party seat shares and electoral turnout are available for a subset of years only (see Data Section 4.1 and online Table A.1).

The results of the first step are shown in Table 4. Proportional representation increases electoral turnout by 16.7 percentage points (around one standard deviation) and the seat share of left-wing parties by 6.6 percentage points (or 3/5 of a standard deviation). [22] Furthermore, a proportional system results in a more fragmented legislature: it increases the size of parliament by 6.1 legislators (1/8 of a standard deviation), the number of parties represented in parliament by 0.66 (2/3 of a standard deviation) and party fragmentation by 0.11 or 20% (equivalent to one standard deviation). As expected, the short-run effects shown in even columns are typically smaller but show the same pattern.

Our second step analyzes how political representation is related to spending. Thus, we estimate regressions of expenditures on the individual mechanisms (and all our control variables) restricting the sample to the post-reform period. These estimates are less well identified than our main results, but we still think they are informative.

To calculate the contribution of each mechanism to the reduced-form spending changes, we multiply the coefficient from the first stage (how does proportional representation affect each mechanism) with the coefficient in the second stage (how each mechanism is related to spending in the post-reform period). The estimates and resulting spending changes are shown in online Table A.3.

Better left-wing representation is associated with an increase in total spending of 1.2%. The effect of political fragmentation is less clear-cut: while a larger legislature increases spending by 0.6%, the larger number of parties actually works in the opposite direction. Better left-wing representation also increases public spending on education by 4.5%, while party fragmentation adds another 3.5%. For welfare spending, we find that left-wing representation increases spending by 4% while party fragmentation adds another 9.7%.

Together, these mechanisms can explain 40% of the overall effect for education spending (see bottom of online Table A.3). Changes in political representation also contribute 21% to the total effect on welfare spending and 16% to the effect on road spending. Changes in political representation have little effect on agricultural spending; if anything, they tend to increase agricultural spending rather than reduce it. Given these observed compositional changes, we may speculate that electoral incentives (which are unobserved) may account for the rest. In sum, a proportional system shifts spending for broad goods mostly because all representatives have a stronger incentive to target large social groups; the contribution of compositional changes in the legislature to spending changes is less pronounced (ranging from 20-40%).

22. Online Figure A.2 confirms that turnout increased immediately after electoral reform in the cantons for which we have data both before and after electoral reform.

Likewise, changes in electoral incentives of all representatives seem to play a dominant role for shifts in targeted spending.[23]

6. Robustness Analysis

Natural concerns with this paper's empirical strategy include potential biases arising from possibly endogenous electoral reform, differential pretrends, changes in voter preferences or other political institutions accounting for electoral reform and spending shifts. This section presents a range of informal validity and robustness checks that investigate these concerns.

First, we analyze whether political liberalization rather than the actual adoption of proportional representation per se can explain our results. If political liberalization played a role, we should observe spending shifts also in response to attempts that did not ultimately led to electoral reform. Electoral reform was often a long-lasting struggle lasting several years or even decades. Online Table A.4 suggests that many cantons required multiple attempts (both parliamentary petitions or voter initiatives) before proportional representation was adopted. Based on data collected from historical accounts, we build a 'falsification test' based on reform attempts (after 1880) that were ultimately unsuccessful.

To facilitate the comparison with our main results, we first reestimate our baseline for the 16 cantons with information on failed reform attempts (shown in online Table A.4). Table 5 then estimates the same model as before where our main independent variables are now an indicator for a failed voter initiative (columns (3) and (4)) or a parliamentary petition (columns (5) and (6)). Overall, voter initiatives and failed parliamentary petitions are not associated with spending changes. There are two exceptions: a voter initiative seems to reduce revenues though the coefficient is only marginally statistically significant ($p < 0.1$). Parliamentary petitions in turn are associated with less welfare spending which is the opposite of what we would expect to happen with the adoption of proportional rule.

Second, we analyze whether our results are driven by exceptional political conditions or trend breaks just prior to electoral reform. Yet, it is important to keep in mind that proportional representation is usually adopted 1 to 2 years before the first election takes place under proportional rule (defined by our indicator variable). Ruling politicians who were elected under plurality rule might then adjust their policy platform anticipating the electoral reform (or

23. While turnout data is less complete, we investigated whether turnout contributes to the spending shifts after electoral reform. The results (available upon request) suggest that higher turnout under proportional representation increases total spending (1%), but actually reduces both education spending (by 2%) and welfare spending (by 8%). Voter turnout is thus unlikely to explain the observed increase in broad spending in a proportional system.

the threat thereof). In that case, we could observe spending adjustments even prior to the first election under the new electoral system.

To test for pretrends, we add dummies for 4 to 6 years, 1 to 3 years prior to proportional representation as well as 0 to 4 years, 5 to 9 years and more than 10 years after electoral reform. Online Table A.5 shows no pretrend or trend break with adoption for total spending and revenues. If anything, the coefficients show a decline in revenues after electoral reform (though the coefficients are just marginally significant). For the individual spending categories, we generally find no evidence for pretrends. The only exception is a positive trend for education spending 1-3 years prior to electoral reform. One explanation is that ruling politicians (still elected in a plurality system) might adjust their platform to prevent future electoral competition or to improve their electoral position for the elections under the new system. Since proportional representation is adopted up to two years prior to the first election under the new electoral system (which our indicator reflects), anticipatory changes in policy platforms would show up as pretrends. In many cantons, left-wing parties challenged the dominance of the established parties and Section 5.3. showed that stronger left-wing representation in the legislature is associated with substantially higher spending on public education in a proportional system. Hence, it seems plausible that established parties increased education spending to attract votes from voters that would otherwise support left-wing parties.

In contrast to the pre-reform period, we find statistically significant trend breaks after the adoption of proportional rule for all spending categories except total spending ($p < 0.1$ for revenues and welfare spending, $p < 0.01$ for education, road and agricultural spending).

Third, we check whether other omitted factors might explain both electoral reform and spending changes. Voters might develop a taste for education spending, for instance, and push for electoral reform anticipating that proportional representation would encourage investments in public education. Public education seemed to have played a minor role in the historical accounts of the reform debates. However, the political debates might just disguise a struggle over public resources. To construct a measure of voter preferences in each canton, we use data on voting behavior in all 460 federal ballots (both referendums and initiatives) held between 1890 and 2000.[24] For each ballot, we observe the share of each canton's electorate supporting the ballot. Using factor analysis of all votes, we identify three dimensions (factors) that are correlated with spending at the canton level (see Funk and Gathmann, 2011 for details). The first row in Table 6 adds the factor loadings for each canton as preference measures to our baseline. Effects on education and welfare spending remain positive; the coefficient on road expenditures continues to be negative but is no

24. Federal ballots cover a broad range of questions involving social policy (unemployment insurance, progressive taxation), environmental policy, foreign policy and federal expenditures.

longer statistically significant. There is now a statistically significant negative effect also for agricultural subsidies.

We check whether other socio-economic or political determinants of electoral reform may account for the observed spending changes. Our analysis of electoral reform in Table A.1 shows that religious fractionalization and political fragmentation among established parties favored electoral reform. To control for population fractionalization, we calculate Herfindahl indices for three religions (Protestant, Catholic and Jewish) and three linguistic groups (French, Italian and German-speaking). The fractionalization measure, calculated as one minus the Herfindahl index, is closer to zero if one group dominates and approaches one if the groups are of equal size. Row (2) shows similar results than in the baseline. We include the seat share of the largest nonleft party to control for political fractionalization which has little effects on our estimates (row (3)). To reduce the impact of exceptional political conditions just prior to (or shortly after) electoral reform, we exclude the two years immediately preceding (and following) the change in electoral systems. Row (4) shows few effects on our estimates.

Fourth, our baseline analyzes electoral reforms over more than a century. To focus the empirical analysis to the reform period, we limit the sample to the twenty years before and after the actual electoral reform in each canton. The results in row (5) of Table 6 are weaker but still show a positive effect for education and welfare spending and a negative effect on agricultural spending. The coefficient on welfare is no longer statistically significant, however. As before, we find little effect on total spending. An alternative way to control for unobserved nonlinear shocks to cantons is to include canton-specific decade dummies.[25] This specification allows cantons to be differentially affected by the two World Wars but also demands a lot of the data. Not surprisingly, the results are statistically weaker, but the main pattern in the coefficients remains the same: a positive (albeit insignificant) effect on education, a positive effect on welfare and negative effects for roads and agricultural subsidies (row (6)).

Fifth, spending adjustments might require time to materialize after reform. To account for sluggish adjustments in the dependent variable, we include a lagged dependent variable. While specifications with lagged dependent variable and fixed effects are biased, this 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 coefficient on proportional rule can then be interpreted as the short-run effect on spending (while our baseline identifies the long-run effect). The results shown in row (7) reveal a similar pattern than before: welfare spending increase, while roads and agricultural

25. Separate dummy variables for each decade (1900-1909 or 1910-1919, for example) and canton are added to the baseline. This specification requires a lot of the data because the parameter of interest is only identified from spending shifts in the decade of adoption.

subsidies decrease with no effect on total spending. The effect on education spending is however now zero.

Finally, we assess the robustness of our results to alternative specifications of the electoral variable. Instead of using a binary indicator, we define a variable indicating the number of years since the first election was held under proportional representation. The variable is zero if a majority system is in place. Row (8) shows that proportional representation reduces spending on roads and agricultural subsidies. The coefficient on welfare spending is positive as expected but no longer statistically significant while the coefficient on education is actually negative.

The last specification distinguishes between cantons with a pure proportional system and the six cantons with a mixed proportional system. Cantons with a mixed system use plurality rule to elect representatives in districts with one or two parliamentary seats (while elections in districts with three or more seats use proportional rule). We add an indicator for having a mixed proportional system in place (in addition to our binary indicator for any proportional system). We expect that spending changes should be weaker in a mixed system than in a pure proportional system. Therefore, we expect the coefficients on the mixed and proportional system to have opposite signs. The results (in row (9)) show this pattern for total spending, education and road spending (but no effect for welfare and agricultural spending). However, the coefficients on the mixed system are only statistically significant for education and road spending. By and large, mixed proportional systems lie (as expected) somewhere between a pure majority and a pure proportional system, with lower spending for education and higher spending for roads than in a pure proportional system.

In sum, the robustness checks confirm that it is indeed the adoption of proportional representation that shifts spending from targetable goods to broad goods. While the coefficients for education, welfare and roads have the same sign across most alternative specifications, they lose statistical significance in some cases. For agricultural subsidies, where our data coverage is less complete, we find few statistically significant results though the coefficients always point in the right direction. None of our alternative tests finds any effect for the size of government: the coefficients in Table 6 are sometimes positive and sometimes negative or zero.

7. Conclusion

Using variation in the adoption of proportional representation across cantons in Switzerland, this article demonstrates that electoral systems have important implications for fiscal policy. In a proportional system, politicians seek the support of broader segments of the population. We show that public spending shifts away from targeted subsidies for narrow groups and encourages spending

on broad services like education and welfare. In contrast, we find little evidence that proportional representation increases the overall size of government.

We present novel evidence for the theoretical mechanism underlying these results. Proportional elections benefit left-wing parties, which increase total spending and investments in education and welfare expenditures. Overall, changes in political representation account for at most 40% of the adjustments in public spending. Hence, changes in electoral incentives seem to be the dominant factor for the observed fiscal policy effects.

Certain features of the Swiss electoral system might help to explain why we find no effects of proportional representation on the size of government. For instance, voters in Switzerland are able to accumulate votes for a single candidate, which strengthens accountability of politicians. Furthermore, most cantons allow citizens to combine candidates from different party lists ('panachage') rather than choose between closed party lists. Panachage is likely to foster accountability and reduce overspending because open lists tie the election outcome of individual candidates closer to their performance. Electoral reform that restricts voters to party lists and single, non-transferable votes might generate different outcomes. The evidence presented in this article shows however, that it is not proportional rule per se that promotes bigger governments.

Appendix: Data

Table A1: Determinants of the Adoption Decision

	Demographics		Demographics Plus		Past Spending		Δ Spending	Left-Wing		Upward Trend	Pol. Conflict, Direct Democracy		Include All	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
% Left-Wing Parties								0.003	0.000	0.335			0.003	0.001
								[0.002]	[0.002]	[0.242]			[0.002]	[0.002]
Concentration Established Parties											-0.254*	-0.363**	-0.254*	-0.351**
											[0.148]	[0.142]	[0.147]	[0.139]
Number of Parties											0.008	-0.026**	0.012	-0.025**
											[0.021]	[0.011]	[0.021]	[0.011]
Signature Requirement Initiative (%)											-0.006***	-0.005***	-0.006***	-0.005***
											[0.001]	[0.002]	[0.001]	[0.002]
Population Size (log)	0.385	1.147*	0.444	1.380***	0.387	1.199**	0.385	0.402	1.242**	0.385	0.300	1.013*	0.301	1.108**
	[0.307]	[0.571]	[0.308]	[0.454]	[0.307]	[0.571]	[0.307]	[0.318]	[0.574]	[0.307]	[0.328]	[0.502]	[0.341]	[0.508]
Federal Subsidies (log)	-0.027	0.017	-0.019	0.027	-0.018	-0.003	-0.027	-0.031	0.017	-0.027	-0.045	0.012	-0.050	0.011
	[0.058]	[0.047]	[0.057]	[0.042]	[0.061]	[0.051]	[0.058]	[0.056]	[0.045]	[0.058]	[0.056]	[0.044]	[0.054]	[0.042]
% Employed in Industry	0.006	0.004	-0.002	-0.005	0.007	0.003	0.006	0.005	0.003	0.006	0.003	0.002	0.002	0.001
	[0.006]	[0.009]	[0.010]	[0.011]	[0.006]	[0.009]	[0.006]	[0.006]	[0.009]	[0.006]	[0.006]	[0.009]	[0.006]	[0.008]
Car Ownership (in %)	-0.006	-0.002	-0.014	-0.013	-0.007	-0.001	-0.006	-0.008	-0.001	-0.006	-0.010	-0.003	-0.012	-0.001
	[0.015]	[0.013]	[0.014]	[0.012]	[0.015]	[0.013]	[0.015]	[0.016]	[0.013]	[0.015]	[0.013]	[0.012]	[0.014]	[0.013]
Physicians per capita	-0.133	-0.242**	-0.183*	-0.263**	-0.149	-0.234**	-0.132	-0.117	-0.239**	-0.133	-0.227**	-0.229**	-0.222*	-0.226**
	[0.120]	[0.117]	[0.103]	[0.115]	[0.121]	[0.111]	[0.121]	[0.121]	[0.108]	[0.120]	[0.110]	[0.104]	[0.112]	[0.095]
Infant Mortality Rate	0.000	-0.002	0.000	-0.002**	-0.000	-0.002	0.000	-0.000	-0.002	0.000	0.000	-0.002**	0.000	-0.002**
	[0.002]	[0.001]	[0.002]	[0.001]	[0.002]	[0.001]	[0.002]	[0.002]	[0.001]	[0.002]	[0.001]	[0.001]	[0.001]	[0.001]
Female Suffrage	0.049	-0.024	0.072	-0.011	0.047	-0.023	0.049	0.042	-0.046	0.049	0.050	-0.027	0.044	-0.045
	[0.073]	[0.050]	[0.069]	[0.044]	[0.075]	[0.048]	[0.073]	[0.069]	[0.054]	[0.073]	[0.075]	[0.049]	[0.074]	[0.051]
Executive Directly Elected	0.188	0.293	0.246	0.326*	0.182	0.308	0.188	0.191	0.305*	0.188	0.021	0.138	0.017	0.160
	[0.196]	[0.179]	[0.174]	[0.167]	[0.190]	[0.181]	[0.196]	[0.197]	[0.172]	[0.196]	[0.137]	[0.136]	[0.133]	[0.134]
% Urban Population			-0.001	-0.008**										
			[0.004]	[0.004]										
% Employed in Agriculture			-0.012	-0.009										
			[0.013]	[0.008]										
Linguistic Fractionalization			0.726	-1.151										
			[1.348]	[1.110]										
Religious Fractionalization			0.601	2.603*										
			[0.903]	[1.435]										
Past Spending					-0.062	0.157								
					[0.095]	[0.104]								
Past Spending Growth							-0.006							
							[0.034]							
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canton Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canton-Specific Linear Trend	No	Yes	No	Yes	No	Yes	No	No	Yes	Yes	No	Yes	No	Yes
Observations	2650	2650	2650	2650	2650	2650	2650	2575	2575	2650	2610	2610	2535	2535
R Squared	0.741	0.839	0.746	0.847	0.742	0.842	0.741	0.745	0.845	0.741	0.758	0.849	0.765	0.854

Notes : The table shows estimates of a linear probability model where the dependent variable is whether a canton has adopted proportional rule in a given year or not. All specifications include year and canton fixed effects and the same controls as in the baseline estimates in Tables 2 and 3. All independent variables are lagged two years to account for the time lag between the political process of adoption and the first election under the new rule which the dependent variable reflects. Even columns also include canton-specific linear trends. Columns (1)-(4) control for demographics, while columns (5)-(7) control for past levels and growth rates of total expenditures. Columns (8)-(10) test whether the cantonal seat share (level or trend) of left-wing parties at federal elections explains adoption. Columns (11)-(12) add the signature requirement of the initiative, the number of parties and the seat share of the largest nonleft party ("concentration") at federal elections. Columns (13)-(14) control for all political controls of columns (8) and (11) simultaneously. Standard errors clustered at the canton level are shown in brackets. *** p<0.01, ** p<0.05 and * p<0.1.

References

[1] Acemoglu, Daron (2005), "Constitutions, politics and economics: A review essay on Persson and Tabellini's 'The economic effects of constitutions'." Journal of Economic Literature, 43, 1025-48.

[2] Aidt, Toke S.; Jayasri Dutta and Elena Loukoianova (2006), "Democracy comes to Europe: Franchise extension and fiscal outcomes 1830-1938." European Economic Review, 50, 249-83.

[3] Austen-Smith, David (2000), "Redistributing income under proportional representation." Journal of Political Economy, 108, 1235-69.

[4] Bawn, Kathleen and Frances Rosenbluth (2006), "Short versus Long Coalitions: Electoral Accountability and the Size of the Public Sector." American Journal of Political Science, 50, 251–65.

[5] Bertrand, Marianne, Esther Duflo and Sendhil Mullainathan (2004), "How much should be trust difference-in-difference estimates." Quarterly Journal of Economics, 119, 249-275.

[6] Blais, Andre and R. K. Carty (1990), "Does proportional representation foster voter turnout?" European Journal of Political Research, 18, 167-81.

[7] Boix, Carles (1999), "Setting the Rules of the Game. The Choice of Electoral Systems in Advanced Democracies," American Political Science Review, 93, 609-624.

[8] Cox, Gary W. (1997), *Making votes count: Strategic coordination in the world's electoral systems.* New York: Cambridge University Press.

[9] Cusack, Tom, Torben Iversen and David Soskice (2010), *Coevolution of capitalism and political representation: The choice of electoral systems.* American Political Science Review, 104, 393-403.

[10] Duverger, Maurice (1954), *Political parties: Their organization and activity in the modern state.* New York: John Wiley.

[11] Funk, Patricia and Christina Gathmann (2011), "Preferences Matter! Voter Preferences, Direct Democracy and Government Spending. "Working paper, Universitat Pompeu Fabra, available at SSRN: http://ssrn.com/abstract=784446 .

[12] Gagliarducci, Stefano, Tommaso Nannicini and Paolo Naticchioni (2011), "Electoral rules and politicians' behavior: A micro test." American Economic Journal: Economic Policy, 3(3), 144-74.

[13] Garrone, Pierre (1991), *L'élection populaire en Suisse. Etude des systèmes électoraux et de leur mise en oeuvre sur le plan fédéral et dans les cantons.* Basel and Frankfurt aM.: Helbing und Lichtenhahn.

[14] Gruner, Erich (1977), *Die Parteien in der Schweiz.* Berne: Francke Verlag.

[15] Iversen, Torben and David Soskice (2006), "Electoral institutions and the politics of coalitions: why some democracies redistribute more than others. " American Political Science Review, 100, 165-181.

[16] Klöti, Erich (1901), *Die Proportionalwahl in der Schweiz. Geschichte, Darstellung und Kritik.* Bern: Kommissionsverlag Schmid und Francke.

[17] Lijphart, Arend (1994), *Electoral systems and party systems: A study of twenty-seven democracies, 1945-1990.* Oxford: Oxford University Press.

[18] Lijphart, Arend (1997), "Unequal Participation: Democracy's Unresolved Dilemma," American Political Science Review, 91, 1-14.

[19] Lizzeri, Alessandro and Nicola Persico (2001), "The provision of public goods under alternative electoral incentives." American Economic Review, 91, 225-45.

[20] Lizzeri, Alessandro and Nicola Persico (2005), "A drawback of electoral competition." Journal of European Economic Association, 3, 1318-48.

[21] Lutz, Georg and Nico Zila (2009), "Explaining the introduction of proportional representation in the Swiss cantons: the role of non-strategic actors and unfair electoral competition." mimeo, University of Berne.

[22] Lutz, Georg and Dirk Strohmann (1998), *Wahl- und Abstimmungsrecht der Schweizer Kantone.* Berne: Haupt.

[23] Milesi-Ferretti, G-M., R. Perotti and M. Rostagno (2002), "Electoral systems and the composition of public spending." Quarterly Journal of Economics, 117, 609-57.

[24] Myerson, Roger (1993), "Effectiveness of electoral systems in reducing government corruption: a game-theoretic analysis." Games and Economic Behavior, 5, 118-32.

[25] Persson, Torsten and Guido Tabellini (2003), *Economic effects of constitutions.* Cambridge, MA: MIT Press.

[26] Rae, Douglas W. (1967), *The political consequences of electoral laws.* New Haven: Yale University Press.

[27] Ritzmann-Blickenstorfer, Heinrich (1996), *Historische Statistik der Schweiz.* Zurich: Chronos.

[28] Rokkan, Stein (1970), *Citizens, elections, parties: Approaches to the comparative study of political development.* Oslo: Universitetsforlaget.

[29] Saripolos, Nikolaos (1899), *La Démocratie et l'élection proportionelle: Étude historique, juridique et politique.* Paris: Arthur Rousseau.

[30] Sassoon, Donald (1998), *One hundred years of socialism: The West European Left in the twentieth century* New York: The New Press.

[31] Taagepera, Rein and M.atthew S. Shugart (1989), *Seats and votes: the effects and determinants of electoral systems.* New Haven, CT: Yale University Press.

[32] Ticchi, David and Andrea Vindigni (2010), "Endogenous Constitutions", Economic Journal, 120, 1-39.

[33] Weingast, Barry, Kenneth Shepsle and C. Johnson (1981), "The political economy of benefits and costs: a neoclassical approach to distributive politics." Journal of Political Economy, 89, 642-64.

Table 1: Electoral Systems of Swiss Cantons in 1998

	Year PR Adopted	Mixed System	Seats in Parliament
Adopted prior to 1919:			
Ticino	1891		90
Geneva	1892		100
Zug	1894	X	80
Neuchatel	1895		115
Solothurn	1896		144
Schwyz	1900	X	100
Basle City	1905	X	130
Lucerne	1911		170
St. Gallen	1912		180
Zurich	1917		180
Adopted 1920-1950:			
Basle County	1920		90
Glarus	1920		80
Thurgau	1920		130
Aargau	1921		200
Fribourg	1921		130
Valais	1921		130
Berne	1922		200
Vaud	1949/1962		180
Adopted 1950-2000:			
Schaffhouse	1952	X	80
Nidwalden	1982		60
Obwalden	1986		55
Uri	1992	X	64
Not Adopted:			
Appenzell Outerrhode	N/A	X	65
Appenzell Innerrhode	N/A		46
Grisons	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 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: Proportional Representation and the Scope of Government

	Education		Welfare		Roads		Agriculture	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Proportional Representation	0.207***	0.096**	0.423**	0.219	-0.319	-0.286***	-0.098	-0.107
	[0.064]	[0.037]	[0.181]	[0.148]	[0.191]	[0.095]	[0.137]	[0.164]
Population Size (log)	-0.284	-0.790**	-2.393**	-1.198**	0.431	-0.493	-2.056***	-1.478**
	[0.358]	[0.312]	[0.909]	[0.505]	[0.671]	[0.525]	[0.571]	[0.554]
Federal Subsidies (log)	0.128**	0.028	0.075	0.028	0.166***	0.084*	0.197***	0.196***
	[0.048]	[0.023]	[0.063]	[0.031]	[0.043]	[0.043]	[0.061]	[0.049]
% Employed in Industry	0.024**	0.010	0.022	-0.024	0.036	0.030*	-0.007	-0.018
	[0.011]	[0.009]	[0.015]	[0.014]	[0.025]	[0.017]	[0.017]	[0.013]
Car Ownership (%)	0.005	0.013	0.019	0.013	-0.047***	0.005	-0.012	-0.017
	[0.014]	[0.009]	[0.012]	[0.010]	[0.016]	[0.020]	[0.025]	[0.013]
Physicians (per 1,000)	0.120	-0.058	0.185	-0.097	-0.101	0.023	0.263*	0.202**
	[0.093]	[0.078]	[0.124]	[0.115]	[0.167]	[0.208]	[0.129]	[0.083]
Infant Mortality Rate	-0.002	0.000	-0.013**	-0.003	0.000	-0.000	0.000	0.002
	[0.001]	[0.000]	[0.005]	[0.002]	[0.002]	[0.002]	[0.002]	[0.001]
Women's Suffrage	0.027	0.042	0.021	-0.047	0.221	0.270**	-0.007	-0.084
	[0.042]	[0.031]	[0.071]	[0.046]	[0.155]	[0.120]	[0.093]	[0.061]
Executive Directly Elected	-0.182*	-0.088	-0.645**	-0.366***	0.252	-0.306***	-0.258	0.459***
	[0.090]	[0.135]	[0.255]	[0.023]	[0.199]	[0.092]	[0.351]	[0.016]
Controls for Direct Democracy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls for Age Groups	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canton Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canton Specific Linear Trends	Yes	No	Yes	No	Yes	No	Yes	No
Canton-Specific Decade Dummies	No	Yes	No	Yes	No	Yes	No	Yes
Observations	2,631	2,631	1,799	1,799	1,884	1,884	1,799	1,799
R-squared	0.984	0.995	0.944	0.987	0.915	0.958	0.956	0.981

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). 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. Federal subsidies are the vertical transfers per capita measured in logs. Car ownership is the percentage of the population that owns a car while the number of physicians is measured per 1,000 inhabitants. The infant mortality rate is the number of children dying before the age of 1 among 1,000 births. All specifications include year and canton fixed effects, controls for the age structure of the population, population, federal subsidies, employment in manufacturing, proxies for income, the strength of direct democracy and indicators for women's suffrage and for direct elections of the canton executive. The first specification includes canton-specific linear trends, even columns instead control for canton-specific decade dummies centered around the reform date. Standard errors (in brackets) are clustered at the canton level. * p<0.1, ** p<0.05 and *** p<0.01.

Table 3: Proportional Representation and the Size of Government

	Expenditures		Revenues	
	(1)	(2)	(3)	(4)
Proportional Representation	0.072	0.025	0.057	0.024
	[0.056]	[0.035]	[0.059]	[0.036]
Population Size (log)	-0.381	-0.426*	-0.338	-0.622**
	[0.241]	[0.233]	[0.271]	[0.226]
Federal Subsidies (log)	0.128***	0.090***	0.111***	0.089***
	[0.022]	[0.021]	[0.020]	[0.020]
% Employed in Industry	0.005	0.005	0.005	0.006
	[0.005]	[0.005]	[0.006]	[0.004]
Car Ownership (%)	-0.006	-0.002	-0.003	-0.003
	[0.006]	[0.006]	[0.008]	[0.005]
Physicians (per 1,000)	-0.040	0.013	-0.052	0.000
	[0.088]	[0.068]	[0.088]	[0.061]
Infant Mortality Rate	-0.0001	0.000	0.0001	0.000
	[0.001]	[0.000]	[0.001]	[0.001]
Women's Suffrage	0.004	0.008	0.021	0.020
	[0.039]	[0.040]	[0.045]	[0.039]
Executive Directly Elected	-0.116	-0.082***	-0.083	-0.071**
	[0.074]	[0.024]	[0.079]	[0.034]
Controls for Direct Democracy	Yes	Yes	Yes	Yes
Controls for Age Groups	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Canton Fixed Effects	Yes	Yes	Yes	Yes
Canton Specific Linear Trends	Yes	No	Yes	No
Canton-Specific Decade Dummies	No	Yes	No	Yes
Observations	2,631	2,631	2,631	2,631
R-squared	0.986	0.995	0.984	0.995

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 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. Federal subsidies are vertical transfers per capita measured in logs. Car ownership is the percentage of the population that owns a car while the number of physicians is measured per 1,000 inhabitants. The infant mortality rate is the number of children dying before the age of 1 among 1,000 births. The specification also includes controls for women's suffrage and whether the canton executive is elected directly by the people. All specifications include year and canton fixed effects, controls for the age structure of the population and the strength of direct democracy in a canton. The first specification controls for canton linear trends, the second specification includes canton-specific decade dummies centered around the reform date. Standard errors (in brackets) are clustered at the canton level. * p<0.1, ** p<0.05 and *** p<0.01.

Table 4: Proportional System, Electoral Turnout and Changes in the Legislature

	Electoral Turnout		Left-Wing Parties		Number of Legislators		Number of Parties		Party Fragmentation	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Proportional Representation	16.654***	13.587***	0.066**	0.065**	6.059**	5.705*	0.663***	0.667***	0.113***	0.100***
	[2.272]	[3.244]	[0.024]	[0.023]	[2.866]	[2.833]	[0.153]	[0.150]	[0.028]	[0.026]
Population Size (log)	-2.759	-1.185	-0.049	-0.078	-13.659	-10.426	-2.310*	-2.443**	-0.160	-0.155
	[11.083]	[10.468]	[0.079]	[0.059]	[21.341]	[18.541]	[1.158]	[1.043]	[0.124]	[0.113]
Federal Subsidies (log)	1.190	1.296	0.016**	0.016**	0.142	-0.131	0.054	0.061	0.002	0.001
	[1.094]	[1.116]	[0.008]	[0.007]	[0.969]	[1.102]	[0.097]	[0.104]	[0.009]	[0.008]
% Employed in Industry	0.469*	0.548*	0.001	0.002	0.848**	0.801**	0.001	0.002	0.002	0.002
	[0.243]	[0.299]	[0.002]	[0.002]	[0.389]	[0.332]	[0.018]	[0.014]	[0.002]	[0.002]
Physicians (per 1,000)	-0.429	-0.212	0.001	0.003*	0.996*	0.884*	0.021	0.026	0.002	0.001
	[0.449]	[0.501]	[0.002]	[0.001]	[0.507]	[0.496]	[0.026]	[0.022]	[0.003]	[0.002]
Car Ownership (%)	-0.862	-0.593	0.056	0.055	-10.945*	-9.145	-0.043	-0.035	-0.044	-0.033
	[1.793]	[2.236]	[0.040]	[0.040]	[5.625]	[5.652]	[0.173]	[0.166]	[0.032]	[0.027]
Infant Mortality Rate	0.037	0.016	-0.001	-0.001	-0.022	-0.025	0.006*	0.005	-0.000	-0.000
	[0.041]	[0.041]	[0.000]	[0.000]	[0.038]	[0.043]	[0.003]	[0.003]	[0.000]	[0.000]
Women's Suffrage	-7.941***	-8.344***	-0.003	-0.006	-0.708	-0.273	0.128	0.067	0.024**	0.023**
	[2.142]	[2.165]	[0.009]	[0.009]	[2.828]	[2.843]	[0.129]	[0.133]	[0.011]	[0.011]
Executive Directly Elected	0.393	-0.913	0.011	0.016	-1.033	-1.425	0.165	0.211	-0.003	-0.002
	[3.664]	[4.213]	[0.028]	[0.024]	[3.653]	[3.866]	[0.193]	[0.180]	[0.022]	[0.021]
Other Canton Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canton Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canton-Specific Linear Trend	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Canton-Specific Decade Dummies	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	1,323	1,323	1,946	1,946	2,359	2,359	1,946	1,946	1,946	1,946
R Squared	0.932	0.929	0.908	0.905	0.979	0.979	0.829	0.833	0.901	0.910

Notes: The table reports regression estimates where the dependent variable is electoral turnout measured in percent (columns (1) and (2)), the percentage of seats held by the socialist and social democratic party in canton parliaments (columns (3) and (4)), the size of the canton parliament (columns (5) and (6), the number of parties in the legislature (columns (7) and (8)) and one minus the Herfindahl index of party concentration in canton parliaments (columns (9) and (10)). The main independent variable is an indicator equal to one if the canton parliament is elected under proportional representation and zero otherwise. All specifications include year and canton fixed effects and the full set of canton controls from previous tables. Odd columns include canton-specific linear trends, even columns canton-specific decade dummies centered around the reform date instead. Standard errors (i brackets) are clustered at the canton level. * p<0.10, ** p<0.05 and *** p<0.01. See also notes to previous tables.

Table 5: Failed Attempts of Constitutional Reforms and Public Spending

	Baseline for Subset of Cantons		Voter Initiatives to Adopt PR		Parliamentary Petitions to Adopt PR	
	Estimate	Std. Error	Estimate	Std. Error	Estimate	Std. Error
	(1)	(2)	(3)	(4)	(5)	(6)
Total Expenditures per capita (in logs)	0.100	[0.076]	-0.038	[0.022]	-0.003	[0.026]
Total Revenues per capita (in logs)	0.074	[0.085]	-0.053*	[0.026]	-0.015	[0.030]
Education Expenditures per capita (in logs)	0.213**	[0.084]	-0.053	[0.059]	0.035	[0.046]
Welfare Expenditures per capita (in logs)	0.518**	[0.218]	-0.091	[0.125]	-0.087**	[0.037]
Road Expenditures per 1,000 (in logs)	-0.396	[0.245]	0.097	[0.100]	-0.041	[0.066]
Expenditures for agricultural subsidies per 1,000 (in logs)	-0.272*	[0.135]	0.043	[0.044]	-0.196	[0.151]

Notes: The dependent variable is the log of per capita expenditures defined in the first column. The first specification (in columns (1) and (2)) reestimates the baseline for the subset of cantons for which we have information on failed reforms. The main independent variables in columns (3) to (6) are dummy variables whether there was an (ultimately unsuccessful) constitutional initiative (columns (3) and (4)) or a (ultimately unsuccessful) parliamentary petition (columns (5) and (6)) to adopt proportional representation (PR). Overall, we have information on 21 initiatives and 20 parliamentary or government petitions (see Online Table A5 for additional information). The sample in columns (3) to (6) is restricted to the pre-reform period. All regressions include canton and year fixed effects, canton-specific linear trends and the same controls as in Tables 2 and 3 (log population, age structure, federal subsidies, employment in manufacturing, car ownership, the infant mortality and number of physicians per 1,000, controls for direct democracy, women's suffrage and whether the executive is directly elected). Standard errors (in brackets) are clustered at the canton level. * p<0.1, ** p<0.05 and *** p<0.001. See also notes to previous tables.

Table 6: Additional Robustness Tests

	Expenditures (1)	Education (2)	Welfare (3)	Roads (4)	Agriculture (5)
(1) Voter Preferences	0.067	0.203***	0.428**	-0.315	-0.108
	[0.054]	[0.062]	[0.180]	[0.195]	[0.129]
(2) Population Heterogeneity	0.072	0.210***	0.408**	-0.282	-0.124
	[0.055]	[0.060]	[0.162]	[0.193]	[0.129]
(3) Political Conflict	0.076	0.212***	0.426**	-0.278	-0.056
	[0.055]	[0.065]	[0.178]	[0.190]	[0.130]
(4) Dummy out Years before/after Reform	0.092	0.250***	0.421**	-0.312	-0.089
	[0.060]	[0.072]	[0.197]	[0.208]	[0.137]
(5) 20 Years Window around Reform	0.034	0.151**	0.102*	-0.101	-0.189*
	[0.047]	[0.054]	[0.055]	[0.201]	[0.100]
(6) Canton-specific Decade Dummies	-0.023	0.042	0.178*	-0.199**	-0.203*
	[0.038]	[0.039]	[0.096]	[0.078]	[0.110]
(7) Lagged Dependent Variable	0.008	0.007	0.054*	-0.158***	-0.073
	[0.014]	[0.012]	[0.026]	[0.052]	[0.052]
Coefficient on Y_{t-1}	0.811***	0.894***	0.826***	0.756***	0.814***
	[0.028]	[0.011]	[0.014]	[0.036]	[0.022]
(8) Years since Adoption of PR	-0.006	-0.019**	0.010	-0.046**	-0.030*
	[0.004]	[0.007]	[0.016]	[0.020]	[0.014]
(9) Coefficient on PR Dummy	0.105	0.276***	0.370**	-0.449**	-0.018
	[0.064]	[0.074]	[0.164]	[0.178]	[0.091]
Separate Coefficient for Mixed PR	-0.124	-0.257**	0.11	0.275*	-0.168
	[0.077]	[0.116]	[0.228]	[0.134]	[0.275]
Canton Controls	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Canton Fixed Effects	Yes	Yes	Yes	Yes	Yes
Canton-Specific Linear Trend	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, canton-specific linear trends and the same controls as in Table 2. The coefficients are for the binary indicator of proportional representation. Row (1) controls for three dimensions of voter preferences (derived from voting behavior of each canton's population in federal referendums). Row (2) controls for religious and linguistic fractionalization (measured as one minus the Herfindahl index for 3 language and religious groups). Row (3) adds as determinants of the adoption decision the seat share of the largest non-left party and the number of parties in canton parliament. Row (4) shows the baseline with the two years before and after the reform dummied out. Row (5) uses only the twenty years before and after each reform for estimation. Row (6) includes flexible canton-specific decade dummies. Row (7) estimates a morel with lagged dependent variable. Row (8) uses the years since adopting proportional rule (rather than a binary indicator), while row (9) adds a separate indicator for cantons with a mixed proportional system (in addition to the indicator of proportional rule). Standard errors (in brackets) are clustered at the canton level. * p<0.1, ** p<0.05 and *** p<0.01. See also notes to previous tables.