

Referendums, citizens' initiatives and the quality of public goods: Theory and some evidence from Swiss Cantons 1970-1996.^α

PRELIMINARY AND INCOMPLETE

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2 June, 2001

Abstract

What makes governments more responsive and how can we create incentives for them to improve the quality of the public good provided by them? This paper tries to give theoretical and empirical insights into this question, that became salient issues as the role of the quality of governance has been recognised, by particularly looking at what the role of direct democratic institutions could play. We present a model with three parties that are elected via proportional representation. Parties need to form coalitions in order to be able to implement policy. Citizens endogenously decide whether to launch a referendum or a citizens' initiatives. By looking at the cost of this process to the citizens we show that when the direct democratic institutions are more open the legislator may increase his effort to provide the public good. We also find that as the cost goes to zero the median voter preferred outcome will always be implemented.

We test this results empirically by looking at the experience of Swiss Cantons that used such institutions extensively. By looking at infant mortality rates and an index of fatal traffic accidents, proxying the quality of the health

^αThis version of the paper has benefited from comments by Amrita Dhillon, and my two supervisors Ben Lockwood and Kim Scharf. All views and any mistakes remain my own. I would also like to thank the Research and Documentation Centre on Direct Democracy (C2D) at the University of Geneva for their exceptional hospitality and Alexandre Trechsel for sharing data with me. Financial support from the Department of Economics, University of Warwick, is gratefully acknowledged.

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sector and infrastructure, we find some empirical support that, after controlling for other factors more openness leads to better public goods. The role of religious and linguistic fractionalization is discussed, too.

Keywords: Citizens' initiatives, referendums, proportional representation, quality of public goods, infant mortality, infrastructure.

JEL: D72, H41, I18, I31.

1 Introduction

Can we make governments more responsive with direct democratic institutions? How can we create incentives for them to improve the quality of the public good? These questions are very much at the heart of the political economy literature just as of the many recent public debates. However little formal research has been done to investigate these two questions jointly. Also the literature that addresses the question in this context on how to improve the quality of public goods is also quite limited. This paper tries to give theoretical and empirical insights into both these questions that became salient issues as the role of the quality of governance has been recognised to have an important impact on the economy just as on the people's satisfaction with their government.

In the theoretical part of this paper we present a model of a democracy with proportional representation and the option of a referendum or a citizens' initiative.¹ In a recent paper Besley and Coate (2000) present a model with the option of a citizens' initiative within a framework of a representative democracy with a two-dimensional policy space under majority rule. One policy dimension is continuous whereas the other dimension is a discrete. They show how the initiative's sequential voting property yields a policy outcome that is closer to the median voters' preferences in both dimensions. If this is desirable than this can improve upon a constitution without a citizen's initiative. The issue of the public goods quality however is not a question of the median voter alone. When voters are concerned about quality, the effect of it may still not be valued equally by voters who differ in their preference over the public good to which the quality is related. We present a model where quality is provided by politicians of varying degree of competence. The more competent they are the easier it is for them to provide quality. Voters on the other hand will try to use elections to replace those politicians that are incompetent. When voters can not provide quality themselves, they need the politicians to do it for them, the question is why and how citizens' initiatives can affect the quality of public goods. Another central issue is the choice of electoral rule in the model. The vast majority in the political economy literature has focused on pure majority rule. When only a single elected policy maker is chosen to implement policy, the presence of an initiative need

¹An initiative is the right of citizens outside the legislature to originate legislation. Further description of the institutions are given below.

not have an effect on the quality of the policy outcome. When the incumbent is motivated to get reelected only as much effort will be put into increasing the quality of the public good as to ensure reelection by the majority of voters. Introducing the option of citizens' initiatives may not give fundamentally different incentives other than those implicit in the incumbent's career concern.

We can yet construct a framework when the delegation of policy making with policy initiatives gives rise to less trivial situation by changing the electoral rule from a pure-majority to a system of proportional representation.² Under the latter system a coalition between parties need to form in parliament to pass laws when none of them by itself has at least half the seats in the legislature. The effect of a referendum or a policy initiative can, then, be distinct from a system with pure majority rule where only a single candidate or party gets to decide policy. The reason for this lies in the different composition of the coalitions inside and outside of parliament. Policy decided by coalition partners in parliament can in principal be challenged by a constructive citizens' initiative that is supported by a different coalition of voters outside parliament. The ruling parties in parliament need not only anticipate voter satisfaction to ensure reelection, but they also need to consider that a different voter-coalition than that in parliament can form. They can then tilt the type of public good being implemented towards this out-of-parliament coalition's preference.

Each party has a different level of most preferred public good provision and these parties represent the three types of policy preference present in the population, too. Take a case when the level of public good is decided by a coalition between party A and B, called AB, and there is a third party C in parliament and that none of the parties alone has a majority. The coalition partners jointly choose the level of public good provided but also how much effort they should put into its delivery thereby affecting its quality. With the motivation of reelection coalition AB bargains over the optimal pair of level and effort. This choice of optimal policy would be different for the other pairwise coalitions AC and BC. If this coalition is offering a policy that is far from the optimal choice of, say, a coalition BC, then voters outside parliament have an incentive to form a voter-coalition to challenge this policy. They will be successful in their challenge since any two group of voters, by construction, will be a majority and then it is the initiative's policy that will be implemented using the quality investments that have already been made by the coalition partners in parliament. When the policy of the initiative is far away from the legislators most preferred policy than they will accommodate to this in order to keep the privilege of implementing policy themselves. They can do this in two ways, by choosing a different level of expenditure or by investing more into the quality of the public good. Which if these two instruments is chosen depends then on the marginal cost to the legislator of accommodating by quality or by quantity.

We show that when direct democratic institutions are more open the amount of

²See Austen-Smith (2000) and Baron and Diermeier (forthcoming) for a recent analyses of representative democracies under proportional representation.

effort put into providing quality is higher in certain cases.

In the empirical part of this paper we look at the experience of Swiss Cantons between 1970 and 1996. Switzerland is divided into 26 regions, called Cantons, which are highly autonomous both politically and financially. Each Canton's parliament is elected by proportional representation. Under this system many parties can be elected into parliament which makes the formation of coalitions necessary in order to pass laws under the majoritarian decision rule in parliament. However, the largest vote share goes to four major parties, FDP, CVP, SVP and SPS, representing a broad political spectrum.³ Parties elected into parliament need to find coalition partners to gather the necessary number of seats/votes in order to pass laws in parliament by majority rule, unless, of course, a single party holds more than half of the seats.

Broadly speaking there are two types of direct democratic institutions. A referendum allows voters to approve or to reject a law that has been authored by the legislator. When a referendum approves a law, it is enacted. Otherwise it has to be revised and voted upon again or it is abandoned. The second type of institution is the citizen's initiative where voters can put a policy decision directly onto the agenda.⁴ The legislative initiative then has to be approved by the majority of voters. Referendums and citizen's initiatives are subject to certain administrative rules affecting the openness of these institutions. Two rules are particularly important in this regard. The first rule is the number of signatures that has to be collected among the electorate, thereby showing the support for the issue. The second rule is the time constraint that within which these signatures have to be collected. Both these measures of openness vary across time and across Cantons. This gives us an indication for the openness of these institutions.

In order to measure the quality of public goods we need to find a variable that is available for all Cantons and all years and which is comparable across time and across space. The variable also needs to reflect the quality under the influence of the cantonal government. Only recently has data been collected for the purpose to measure quality.⁵ However we tried to find measures that are available for a much longer period of time than the range for which these surveys provided data.⁶ Nevertheless we believe to have found variables that can be adequately used as measures of quality. We mainly looked at two areas of public good provision: road infrastructure

³FDP (Freisinnig-Demokratische Partei der Schweiz) "Swiss Radical-Democratic Party", CVP (Christlich-Demokratische Volkspartei der Schweiz) "Swiss Christian-Democratic People's Party", SVP (Schweizerische Volkspartei) "Swiss People's Party" SPS (Sozialdemokratische Partei der Schweiz) "Swiss Social-Democratic Party". These parties are also referred to as "Ratsparteien" (Council Parties), as they hold the seven seats of in the federal council, the executive body, whose distribution of seats among these 4 parties stayed unchanged by tacit agreement since 1959 .

⁴See Trechsel (2000), and Trechsel and Serdült (1999) for a thorough survey.

⁵An institute devoted to this in Switzerland is the BADAS(?) in Lausanne.

⁶For instance the Audit Commission in the U.K. publishes a list of indicators for each borough that reflects how many time garbage has not been collected in a period of time or survey results on whether the instructions on some tax form are understandable just as if the service providing council housing is friendly and helpful.

and public health. For the former we looked at the safety of the streets as measured by the ratio of traffic fatalities to the total number of accidents. In the case of health we took the infant mortality rate. We found some empirical support, after controlling for other factors, that more openness of the institutions leads to higher quality of public goods.

2 The Model

2.1 Preferences

The model has two periods. In the first period policy is determined by a set of incumbents, explained more in detail below, that choose a policy and quality mix who then stand for election for the second period together with other candidates. There are $i = 1; \dots; N$ citizens with preferences over a one-dimensional public good $x \in [0; 1]$ and endowed with a private good y . Each citizen's preference over the public good takes on one of three values. Denote $j \in \{H; M; L\}$ the preference type and $n^j = N^j/N$ the share of j -types in the population. Each citizen then has a most preferred policy outcome z^j where $z^H > z^M > z^L$. In what follows we assume $z^H = 1$, $z^M = \frac{1}{2}$, $z^L = 0$. To make the model interesting we assume that no single group has a majority, i.e. $n^j < \frac{1}{2}$. Voters also care about the quality of public good q which can only be influenced by the legislator. To abstract from wealth effects a citizen's quasi-linear utility before the election is separable in goods and we can write:

$$U_i(x; q; y; j; \hat{\gamma}) = u(x; q; j; \hat{\gamma}) + y \quad (1)$$

where $u(x; q; j; \hat{\gamma})$ is strictly concave, single peaked at z^j and symmetric. The parameter $\hat{\gamma}$ refers to the policy maker's competence referred to in the next section. For the purpose of this paper we assume that for every $x \neq z^j$ the impact of a sub-optimal quality is to reduce utility. To get a closed form solution we take the following utility function for the voters:

$$U_i(x; q; y; j; \hat{\gamma}) = \hat{\gamma}(x - z^j)^2 + q + y \quad (2)$$

For the ease of notation we think of x as the utility of the public good net of taxes.

2.2 Voting under proportional representation

2.2.1 Background

A core feature of this model is the type of electoral rule. The legislature in Swiss cantons is determined by proportional representation in which the party's vote shares

determine the number of seats allocated to them on the legislature. Proportional representation is also the electoral rule in 21 of 28 Western Countries and in most of Central Europe and other recently democratized countries.⁷ In contrast to the single-member district plurality vote, where only one representative is elected per district, proportional systems translate the vote shares of each party or candidate into several seats in the district's legislature. There are a number of systems to allocate the seats according to the vote shares like, for example, the "largest remainder formula" to address the problem of mapping the vote shares, which can in principal be any number between zero and one, into the finite number of seats in the legislature. We abstract from the problem however and assume that each party receives a fraction of the total number of seats identical to her vote share.

The voting procedures under proportional representation can be usefully divided into two systems: the open and the closed list. Under a closed list, voters cast their vote for a party and the vote share determines how many of each party's candidates receive a seat in parliament. With the open list, voters have an additional degree of freedom as they can vote for candidates directly. In that they can not only influence the weight of each party but also the identity of the elected. In game of this section we will take the open list as a basis for the computation of equilibria, i.e. we assume that voters can choose the party and the candidate. However we must note that under a closed list the only way a voter can sanction a party through the election process itself is by simply voting for one of the other parties. The credibility of the threat will then determine as to how poorly the governments can allow themselves to perform. A voter deviates from voting for the party which is a priori closest to her most preferred policy outcome per se, when she can reasonably assume that by voting for one of the other parties she will get compensated for a loss along the policy dimension by an increase in quality. Under an open list, however, voters can choose candidates from a list directly and therefore sanction a bad member of government without having to compromise on the policy dimension.⁸

⁷An incomplete list of these countries are Austria, Belgium, Cyprus, Denmark, Finland, Germany, Greece, Ireland, Luxembourg, Malta, the Netherlands, Norway, Portugal, Spain, Sweden, and Switzerland. Examples among the recently democratized countries are in Europe Slovenia, Hungary, and Poland and for Africa the Rep. of South Africa. In these countries different degrees of proportional representation (or mixed forms of plurality rule and PR) are used on municipal, regional, and on national levels. In the Anglo-Saxon systems plurality rule is more common although New Zealand, Scotland, and Wales recently introduced a form of PR.

⁸There are many other strategic considerations related to the design of the list. One issue is that candidates can be seen as being either technocratic, i.e. a technical expert, or telegenic. Whereas the former can implement policies well the latter is the better at communicating with the public and at persuading voters during the campaign. A further issue is patronage, i.e. how the set-up of the list is controlled. From casual observation in German municipal elections, candidates that are hardly known by the public are found high up on the list which gives them a high probability to be elected which can be either motivated by patronage or by the parties strategic interest to get technically competent people which are not telegenic into parliament that in order to be perform well once in office.

2.2.2 Modelling proportional representation

To stylize the analysis, let there be a set of candidates where the candidates can be of one of the three types of citizens. So each elected candidate is identical in their most preferred policy outcome to one of the citizen's types. Voters can only give their vote to one candidate and only one candidate type- j can go into parliament. So each type of candidate will then be represented by the vote shares and the outcome of the election is a vector of vote shares $s = (s_L; s_M; s_H)$ that goes to the three most successful candidates of each of the three types. These vote shares are then directly translated into the share of seats in parliament.⁹ We assume that the vote share, which corresponds to the number of seats in a legislature, also determines each candidate's bargaining power in parliament.

2.3 Political environment and competence

At the beginning of the first period parliament will be composed by three incumbent candidates that have seat shares that correspond to the fraction in the population, i.e. a candidate of type j will receive a fraction n_j of the perfectly divisible seats on parliament. The fraction of each type in the population is common knowledge. When an elected candidate has more than half of the vote shares she or he can decide policy alone. However for the case where for all types j , $s_j < \frac{1}{2}$ the constitutional requirement is to form a coalition of (at least) two candidates need to be formed in order to be able to decide on policy.

Candidates also have a competence $\in \{ \frac{1}{B}; \frac{1}{G} \}$ with equal probability where B stands for bad and G stands for good and $B < G$: The level of competence of the incumbent is privately observed before policy is chosen. This means that the utility derived from policy both by the voters and the legislators made (weakly) worse when the legislator is of type B rather than type G : This can be seen as

$$\frac{1}{B}(i_j x_i - z^j_j + q) \cdot \frac{1}{G}(i_j x_i - z^j_j + q)$$

for any given x ; z^j , and q : Similarly, competence is observed by candidates standing for election other than the incumbents only once they are in office.

As the model has two periods with an election stage at the beginning of the second period voters use the election to try to reappoint those candidates that have high competence or to oust incompetent one and replace them by an alternative candidate with expected competence level $\frac{1}{2}(\frac{1}{B} + \frac{1}{G})$: In order to concentrate on the quality and signalling issue we want to abstract from the issue of pure strategies under which voters vote for a candidate that does not have the same type as herself.¹⁰

⁹We think of the number of seats in the legislature as a real number that can be subdivided into any other real number.

¹⁰Mixed strategies remain when this is possible but we want to focus on the more appealing pure strategies in this paper.

The incumbents are career concerned to get reelected in the sense that they derive an additional ego-rent R from re-election. To deliver on the quality dimension is costly to the legislators. We can now write the full utility function of the incumbent policy maker that gets to decide policy

$$U_i^C(x; q; y; j; \gamma) = \gamma(i_j x_i - z^j j + q) + \gamma(q)^2 + y + p_C R \quad (3)$$

so total cost of quality is $\gamma q + \gamma q^2$ which is concave in quality and competence dependent. Incumbents are reelected with a probability p_C :

We can now summarize the timing of events and the assumption on coalition formation.

- A1) Three incumbents, one of each type $j \in \{L, M, H\}$; are selected by nature each of them endowed with a competence and the number of seats of type- j incumbent is determined by n_j ; i.e. the fraction of that type in the population. This also determines her bargaining power.
- A2) Each incumbent simultaneously and independently announces his most preferred coalition partner.
- A3) A coalition is a binding contract for the whole legislative period.¹¹
- A4) The coalition with the majority of vote shares has agenda setting power.
- A5) Policy is decided by the majority of seats
- A6) The outcome of the policy decision is determined by Nash Bargaining Solution.

2.4 Coalition Formation and bargaining

The first two assumptions imply that a utility maximizing candidate chooses the coalition partner that gives her the highest pay-off and each incumbent reveals the most preferred coalition partner. Denote C_j the most preferred coalition partner by candidate j and C the set of candidate types in the coalition resulting from the coalition formation game. A5 requires some further notation. Let $d_j(x) \in \{0, 1\}$ be an incumbent's decision to approve or to reject policy x , where $d_j(x) = 1$ stands for "policy x approved". A policy proposed by the coalition and submitted to a vote is approved by parliament if $\sum_j d_j(x) s_j > \frac{1}{2}$.

The outcome of bargaining over policy in the coalition is determined by Nash Bargaining between the coalition partners. The details of the bargaining process depend on the presence of the policy initiative stage. When an initiative is available then

¹¹This implies that when a coalition partner wishes to break the coalition, new elections have to take place. This corresponds to observation of the working of parliaments. It is most unusual to have a broken coalition during a legislative period that does not entail an early call for election.

the set of possible utility pairs for the coalition partners on which Nash's bargaining solution should be determined. For instance when $C = \{L; M\}$ then the common platform x^C of the parties is determined by

$$x^C = \arg \max_{x^C} (u(x^C; q; L; \hat{\tau}^C) - (1-q)^2 + y)^{\frac{n_L}{n_L+n_M}} (u(x^C; q; M; \hat{\tau}^C) - (1-q)^2 + y)^{\frac{n_M}{n_L+n_M}}$$

$$s.t: u(x^C; q; j; \hat{\tau}^C) > u(x^j; q; j; \hat{\tau}^C) \text{ for } j \in \{L; M\}$$

where x^C is the policy selected by the coalition partners and x^j is the policy chosen by the initiative. We will discuss in further detail how the initiative policy is determined in the next section.

A note on the competence of the coalition Only when the two partners enter the coalition do they learn their own and each others type. We assume that the competence of the coalition is determined by the sum of the coalition partners' competences weighted by their bargaining power. So we can write

$$\hat{\tau}_{jk} = \frac{1}{n_j + n_k} (n_j \hat{\tau}_j + n_k \hat{\tau}_k) \quad (4)$$

where j and k stands for the type of the two coalition partners.

2.5 Policy making and choosing quality

The task of the coalition in parliament is to choose and to implement policy. Once a coalition is formed they alone are endowed with the technology that influences the level of quality. Therefore the initiative can only influence the level of the public good but it is not in the position to alter quality in the initiative directly. The idea is that the legislators are the residual decision takers and no complete contract can be written for the legislators outside the coalition to influence quality. It is simply too costly to define and specify the targets for quality and how it could be verified if they are met by an outside (constitutional) court.¹² Once the cost to develop quality are incurred it can not be undone.¹³ Cost of search is borne by members of the coalition only.

The level of investment into the production of quality q is not observed by the voters. All that the voters observe is the level of the public good x and the social utility they (would) derive $U_i(x; q; y; j; \hat{\tau})$: Therefore all they can infer is an estimate of the level of competence ($\hat{\tau}$) and the investment of the coalition partners into quality (q). More on this in the next section.

¹²Alternatively one can think of the case that a quality first has to be developed before it can be decided if it is appropriate. This is a further motivation why policy making is delegated to a legislature as only they have the resources to develop the quality.

¹³One can think of this costly search as a sequence of "debates" in parliament or in committees where the various possibilities are discussed. As we are primarily interested as to the efficiency of the search which is increasing in cost, the debate is not modelled.

2.6 Constructive citizens' initiatives

Once parliament has approved a policy voters can decide whether to challenge the policy. Several scenarios occur in the Swiss cantons:

1. For specific policy decision, a referendum is compulsory.
2. Policies can be challenged by a facultative referendum.
3. Voters can put forward a policy initiative.

In the first case the policy approved by parliament is automatically subjected to a vote. In the second case voters first have to organise the collection of a certain number of votes signatures within a time limit before a popular vote. In the third case a policy that is not on the agenda of the coalition is subjected to a popular vote once signatures have been successfully collected.

In what follows we will be concentrating on a combination of the last two cases in which a policy can be vetoed by a facultative referendum and an alternative policy is put forward instead. After the coalition has proposed a policy, voters receive a signal about the impact of the policy on their utility. This utility is influenced by a combination of the legislators competence and the level of quality.¹⁴

To model the policy initiative process we follow the approach proposed in Bagnoli and Lipman (1989) of providing a public good by private contributions.¹⁵ Specifically let there be a group that wants to challenge the policy by an initiative. A citizen wishing to join this group first pledges a contribution c to pay for the process. We think of this as the exogenous cost to each group member of the organisation of the initiative that is determined by the institutional set-up of this institution. For an initiative to be successful at least the majority have to approve of it in a vote where no abstention is allowed.¹⁶ If enough citizens have deposited the subscription fee such that the referendum can be successful the group launches the referendum process. If not, the pledged contributions are refunded. By assumption members of the legislature can not join a policy initiative group.

¹⁴One can think of a newspaper, or an institute like the NBER in the U.S.A. or the I.F.S. in the U.K. that evaluates the policy chosen by the government for the voters. So far we take this signal as a truthful evaluation of the impact of the policy and that this evaluation is understood by all voters. This may be restrictive in particular when we think of developing countries or non democratic countries where these information channels are poorly developed or absent. For an example of the effect of the media on government responsiveness see Besley, Burgess (2000).

¹⁵See an application by Felli and Merlo (2000) of this subscription game to endogenize lobbying in a citizen-candidate model of representative democracy.

¹⁶We could allow for abstention. Then those voters that are indifferent between the two propositions don't vote. This could then give rise to the possibility that one group of voters is indifferent and then only one group needs to be in favour and one against and the larger group will win.

When the number of subscriptions is less than half of the population then the policy initiative has not been successful and the policy of the coalition will be implemented.

2.7 Solving the game

In what follows we solve backwards for the Perfect Bayesian Equilibrium (Fudenberg, Tirole, 1991) of the policy setting and quality investment game when incumbents are career concerned and voters want to re-elect the competent incumbent only.

At the end of the first period each voter of type j decides if he votes for the incumbent of type j to represent his interests in the legislature or if he wants to choose another candidate of the same policy preference type. To concentrate on the signalling for competence of each type we assume that voters never find it in their interest to give their vote to a candidate that is not of their own type.¹⁷ Voters therefore form beliefs on the incumbents type based on the signals that they observe. The signalling space here comprises the level of expenditure x^C and the utility derived from the public good $u(\theta)$: Beliefs over the competence denoted as \hat{z} are formed when the signal pair $(x^C; u(\theta))$ is observed and are derived as

$$\hat{z} = \frac{u(\theta)}{x^C + \theta} \quad (5)$$

Note as \hat{z} and θ can not be observed separately a voter can only make an estimate of these variables. From the perspective of the incumbent his probability of reelection can then be written as

$$p_i = \begin{cases} \frac{1}{2} & \text{if } \hat{z} = \frac{1}{G} \\ 0 & \text{otherwise.} \end{cases} \quad (6)$$

2.7.1 Signalling of types

Each incumbent can invest in quality and the competence and the competence type determines how good she is at producing quality. In the absence of career signalling due to career concerns and incumbent chooses $q^a = \frac{1}{2^{1-\alpha}}$: However a good incumbent will try to seek a separating equilibrium in order to signal his type. When the income endowment y is high enough there always exist separating equilibria from coalitions where both candidates have the same level of competence.

Definition 1 A coalition is homogeneous when all its members have the same level of competence \hat{z} : Otherwise a coalition is heterogeneous.

¹⁷This seems very strong and it awaits more work to find out if this is true in equilibrium. For example one can think of cases when it is better to reelect someone that is of a known good type than to choose someone that is of an unknown type.

Lemma 2 All equilibria for homogeneous coalitions are separating.

Proof. (sketch) Each coalition can be composed by four levels of competence. One level where both incumbents are H-types, another level when both incumbents are L-types, and two levels of competence, as determined by $\hat{q}_{jk} = \frac{1}{n_j + n_k}(n_j \hat{q}_j + n_k \hat{q}_k)$ when one of the incumbents is H and the other L; for $n_j \neq n_k$: The maximum of quality investment any type of candidate can afford is the level $\hat{q}(\hat{q}_j)$ that solves

$$-(i \times i - z^j + q^C) i - (\hat{q})^2 + y = 0:$$

where $q^C = q_j + q_k$ is the some of investment by both coalition partners. Since the fraction of the seats is common knowledge to the voters they can therefore derive a maximum quality attainable for each combination of competences in the coalition. As the quality level is determined by the investment levels of both incumbents in the coalition stage each member of the coalition has an incentive to signal her type by increasing q in response to the observation of the coalition partner's type. For the case when both are H-types then for a any $y > y$ then by setting a $q^C(H; H) = q^C(L; L) + \epsilon$; where ϵ is a small positive number the homogeneous high competence separates from the homogenous low competence coalition. Next for the homogenous high type coalition to separate from is high enough there again exists a $y > y$ such that by setting a $q^C(H; H) = q^C(H; L) + \epsilon$; where the H-types in the heterogeneous coalition have a higher seat share, a separation is achieved. The y when this is true solves $\hat{q}^C(H; H) > \hat{q}^C(H; L)$; with $n_j > n_k$: ■

2.7.2 Policy Initiative stage

The initiative is constructive in the sense that those citizens supporting it present a platform of public good level x^I that the legislature has to implement.¹⁸

The initiative has three stages: (i) entry, (ii) bargaining for the initiatives platform and (iii) voting. to overcome to free-rider problem we employ the implementation framework by Bagnoli Lipman (1986) where citizens can pledge funds to provide the public good simultaneously and independently. By this process each citizen is pivotal and the public good is provided. For the referendum vote to be successful at least two groups of voter types need to vote together in the same way as the size of $n^j < \frac{1}{2}$ for all j . Therefore each voter of type j has the choice to pledge a contribution to one of two possible extra-parliamentary groups $I(j; k)$, $j; k \in \{L; M; H\}$; $j \neq k$, which are between one of the other two types. So a type L can either join a group with

¹⁸It is thus not a simple referendum where the voters are consulted whether a policy should be implemented or not nor a pure initiative where they force a policy onto the agenda of the legislature but a combination of both. To analyze the institutions separately requires a model with a multiple policy dimension as in Besley, Coate (2000).

M or with H-types.¹⁹ For a given policy and the associated utility proposed by the coalition $(x^C; u_i^C)$ each voter needs to decide to which group to pledge the amount. As citizens can not develop the quality q to implement policy themselves, they take the method developed by the coalition but can force them to implement a different level of policy, called x^I ; via the constructive initiative. Therefore citizen j pledges a contribution to group R whenever

$$v_j(x^C; z^j + \varphi) < v_j(x^{I(j;k)}; z^j + \varphi) \quad (7)$$

where x^I is the initiatives policy platform and φ is the fixed cost for the group member to launch the referendum.

Each citizen pledges a fund to the group conditional on the types of citizens joining them. In other words each citizen when deciding to pledge has a preference over the composition of the group as it will determine the initiative group's policy platform. Let S be the set of citizens types who join the group R . The platform determined by the initiative is the solution of a Nash Bargaining such that:

$$x^{I(j;k)} = \arg \max_{x^I} \prod_{j \in S} (v_j(x^{I(j;k)}; z^j + \varphi))^{n_j} \quad (8)$$

$$s.t: (7) \quad (9)$$

When bargaining over the policy initiatives platform x^R , we assume that the bargaining power of each citizen type is determined by the number of these types divided by the total number of citizens joining the group. The threat points for each citizen type is the utility she or he can get when the policy chosen by coalition is implemented for a given method pair of estimates $(z; \varphi)$. Each citizen of type j then chooses his or her preferred group partner k^* that gives the highest utility

$$k^* = \arg \max_k v_j(x^{I(j;k)}; z^j + \varphi) \quad (10)$$

subject to constraint (7) and where $x^{I(j;k)}$ is determined by equation (8).

When two citizen types pledge funds to a group that contains each others types as the preferred group partner then the policy initiative goes ahead with a group called $R^*(j; k)$ and will be successful as the majority of the voters, i.e. the group member types, will vote in favour of it.

The outcome of the policy initiative stage is therefore a vector $fR^*(j; k); x^{R^*(j;k)}g$.

2.7.3 Policy selection in the legislature (incomplete)

The policy selected in the legislature takes into account the outcome of the policy initiative stage when choosing the optimal level of effort e^C that influences the probability of funding the best method and the level of public good x^C . Any coalition

¹⁹It can be straightforwardly shown that a citizen group between all three types can never be the mutual best response for all three citizen types. To ease the notation a bit we only focus on pairwise groups.

partner therefore solves a set of simultaneous equations one for the bargaining solution in the legislature and one for the solution of the bargaining solution between policy initiative group members. We can now state the following result.

Lemma 3 The equilibrium of the policy initiative group formation stage for a given legislative coalition is unique and a policy initiative is launched if constraint (7) holds.

Sketch or a Proof: To prove this we first need to find the policy outcome for each coalition and each policy initiative group composition. Then we need to show that given these resulting pay-offs for a given vote share distribution only one group composition is an equilibrium. In the legislature coalition partners solve the system of equations:

$$\begin{aligned}
 (x^C; q^C) &= \arg \max_{x^C, q^C} \sum_{j,k} (i; jx^C; i; z^j + q_j^C) \cdot (\sum_{j,k} q_j)^2 + y \cdot \frac{n_j}{n_j + n_k} \cdot \mathbb{E} \\
 &\mathbb{E} \sum_{j,k} (i; jx^C; i; z^k + q^C) \cdot (\sum_{j,k} q_k)^2 + y \cdot \frac{n_k}{n_j + n_k} \\
 \text{s.t: } &\sum_{j,k} (i; jx^C; i; z^j + q^C) > \sum_{j,k} (i; jx^{(j;k)}; i; z^j + q^C) \\
 x^{(j;g)} &= \arg \max_{x^j} \sum_{j,k} (i; jx^j; i; z^j + \varphi) + y \cdot \frac{n_j}{n_j + n_g} > \sum_{j,k} (i; jx^j; i; z^g + \varphi) + y \cdot \frac{n_j}{n_j + n_g} \\
 \text{s.t: } &\sum_{j,k} (i; jx^C; i; z^j + \varphi) < \sum_{j,k} (i; jx^{(j;k)}; i; z^j + \varphi) \cdot
 \end{aligned}$$

where $q^C = q_j + q_k$ and from the perspective of the coalition partners in the legislature $\sum_{j,k} = \sum$ and $q^C = \varphi$ and where j and k are the coalition partner types and j and h are group member types in the policy initiative and $j; k; g \in \{L; M; H\}; j \in k; j \in g, x^j = x^{(j;g)}$:

Therefore the coalition in the legislature and the group outside it take each others actions into account. The coalition parties therefore will try to make at least two groups of voters indifferent in the way that for them it is true $\sum_{j,k} (i; jx^C; i; z^j + \varphi) > \sum_{j,k} (i; jx^{(j;k)}; i; z^j + \varphi) \cdot$, i.e. it is not utility increasing to launch an initiative.

We can also state a remarkable result that has not been present in earlier papers in such clarity.

Remark 4 When the cost of organizing a referendum or a citizen's initiative goes to zero ($\varphi \rightarrow 0$) the policy implemented will be the median preferred policy $x = \frac{1}{2}$:

2.7.4 Coalition formation

There are two classes of pairwise coalition equilibria in this sub-game for the case when no member has an absolute majority in the vote share, i.e. $s_j < \frac{1}{2}$ for all j . First, when two members mutually declare each other as their preferred coalition partner and the third member declares either of the other two as the preferred partner.

Second, when no two members declare each other as most preferred coalition partners. In the first case a coalition is formed in the second it is not. Figure 1 gives an example for these two classes of equilibria. However we can rule these cases out quite clearly.²⁰

Lemma 5 Coalitions are unique and always form whenever no single party has more than half of the votes.

Proof. By comparing outcome of the coalition process contained in proof of lemma (3). ■

Finally we can state the central result of the paper.

Claim 6 A lower cost of the direct democratic institution translates into a higher effort to increase the quality of public goods for homogeneous low coalition types.

The idea of this proposition is a bit more involved. Without the problem of signalling any coalition group would choose the level of quality such that $q^* = \frac{1}{2}z$: Recall that in the separating equilibria of the signalling game the high types will typically invest more in quality to signal their types.

Now add the citizens' initiatives. When an initiative is launched successfully the coalition in the legislature will no longer be implementing the the level of the public good x^C but it is the initiative groups policy x^I that will be chosen. The disadvantage of losing control over implementing the policy themselves is that the utility that a member of the legislator receives from the initiatives policy may be lower.

Now to accommodate for this situation the coalition has two instruments. It can either change the level of public good which is associated with a marginal cost to utility of $\frac{\partial u}{\partial x} = \beta$; or it can invest more into the quality at a marginal cost $\frac{\partial u}{\partial q_j} = \beta \frac{2q_j}{z}$: Comparing these costs shows that for very low levels of q it is more profitable to accommodate by increasing the quality than by changing the level of the public good x^C : This result is therefore true when in the absence of the initiative the level of quality were low which is the case for the homogeneous low competence coalition. In the other cases the coalition members compare $\beta > \beta \frac{2q_j}{z}$:

To summarize more open direct democratic institutions, as reflected by a lower cost to those who want to support the motion, translates in certain cases into a higher effort to produce quality by the legislator and therefore in a higher quality. Equally when this cost goes to zero the median voter's preferred policy outcome will be implemented. When this cost is positive however, the coalition in the legislator takes into account this cost and therefore the outcome will be biased towards the preference of the coalition in government which ultimately is determined by the size in the population of the different groups.

²⁰In an earlier version of this paper we used instead of the Nash Bargaining Solution a bargaining process where coalition partners take the a medium between their two most preferred policy outcomes weighted by their bargaining power which is given by their vote share or the size of that group in the total population. Results are available on request.

3 Institutional framework in the Swiss Cantons

Anticipating the empirical set-up presented in the next section we briefly present the institutional differences between 21 Swiss Cantons. As mentioned earlier there are a number of institutions and each of them differs substantially across cantons.²¹

To fix the terminology it is important to understand the general difference between initiatives and referendums: in the former the author is a group of citizens and in the latter it is the legislator.

A first type of institution is the referendum for total or partial revision of the constitution. This referendum is authored by the legislator and not by the electorate and has been present in all the cantons. The second type is the legislative referendum concerning all general or abstract changes in norms that subject a person or a company to responsibilities or endow it with further rights and any institutions regulating them. This option has not been present in all of the cantons and is less and less present as we move along time: whereas 11 out of 26 cantons had it in 1970, only eight still retained it in 1996. However this evolution has been compensated by a sharp increase of the legislative initiative. Referendums can either be compulsory or facultative, where in the latter case a specified number of signatures has to be collected within a time constraint, but not in the former.

The third type is the constitutional initiative where the initiator is not the legislator but some group of voters. This institution has been available in 19 cantons in 1970 and in 21 cantons in 1996.

In Switzerland the institutional framework depends on whether the legislation has been initially authored by the legislator himself and then challenged by the people or by the people themselves that request a vote. Only five cantons had the former institutions in 1970 but eleven in 1996. For the latter case, with the people's authorship, much more cantons used these institutions at the beginning and at the end of the time period: 20 cantons in 1970 and 21 cantons in 1996. A fourth class of institutions is the expenditure referendum. This refers to laws that are subjected to a vote purely on the basis of their financial volume. This can be either a fixed amount set by a canton or a ratio of the amount to total expenditures. One can think of a large construction project like a bridge or a tunnel that then has to be approved by the voters. Both the facultative expenditures and the compulsory referendum have been present but only in few cantons.

²¹In this study as in the rest of this paper only the case of 21 out of 26 cantons is discussed. Five cantons are excluded as they use a very different sort of assembly, called "Landsgemeinde", involving the whole (male) electorate at a specific day in a single place to decide policy. However we do not have a nested model to compare cantonal decision taking to them as yet and therefore we therefore excluded these cantons.

3.0.5 Administrative framework

There are two determining factors for how open these institutions are apart from the salience of an issue, questions of form and certain rules governing constitutionality. These are, firstly, the number of signatures to be collected among the electorate and, secondly, the time available to collect them. To illustrate, the ratio of signatures to the electorate varied between 0.7% and 14% across cantons and across time for an initiative. Concerning the time constraint, this varied between 30 and 90 days. For a referendum on the other hand, when the law is authored by the legislator, the signatures to electorate ratio varied between 0.7% and 7.8% and the time span between 90 days and twelve months.

3.1 Cost, openness, and delay

One of the main focuses in this paper is how the cost to the individual, or the openness of the institutions have an effect on the incentives of the governing coalition to invest in quality. Openness can be approximated by the number of signatures that are necessary for a motion to be recognised and the time constraint for collecting them. Certainly the salience of an issue is a critical factor too and will determine the ease with which these constraints can be met. Another factor that determines the cost is the time span between submitting the list of signatures and the moment when the actual vote takes place. The launch of a motion can be frustrated by the thought that the actual vote would only take place far in the future. By that time, the momentum within the population created during the collection of the signatures in the media, the parties or interest groups could be on the wane or the issue itself no longer corresponding to the spirit of the initiative due to many changes in between. Still this delay can also be beneficial as it allows time for proper debates on controversial issues. This is even more true when the initiative has complex implications and an exchange of arguments in the parties, the media, on an academic level and the general public is important for the success of a policy. In the data we found that for 356 citizens' initiatives between 1970 and 1999 the overall average has been about two years (776 days) with a variation between cantons ranging from 408 days in the canton of St. Gallen and 1797 days in Basel City.²² In most cantons the period between the acknowledgment of receiving the signature lists and the voting day is limited in one way or another to usually three years. In other cantons the legislature has more discretion as to the schedule of the vote.²³

But even with a fixed time limit, the legislator can challenge the constitutionality

²²The average in the densely populated City cantons of Geneva, Bern, and Zurich were 973, 542, and 942 days respectively. No trend over time has been apparent but for Basel City where the delay decreased from about more than 2000 days in the early seventies down to around 1000 days in the late nineties.

²³Collecting the legislative details on these restrictions in the cantons can be an interesting avenue for future empirical research.

of the proposal in court. In one case an initiative on an infrastructure project was submitted in March 1980 but subsequently challenged on grounds of conformity with the constitution until it reached the Federal Court, the highest level of jurisdiction. In March 1987 that Court declared that at least a part of the proposal can be voted upon. This vote eventually took place in March 1995 as the legislator elaborated a counter-proposition which allowed her to postpone the vote. In all it took fifteen years from the initial deposit of signatures and the actual vote. A general conclusion can be drawn for other countries considering the implementation of these institutions. During the design of referendums and initiatives their scope, purpose and principles must be well defined and must take into account the quality of the rule of law to avoid incommensurable proceedings in court.

A further issue still is the number of initiatives that are handled at any given point in time both by the public administration and the general public. The total number of all issues that have been voted on in that period varied between 41 in Tessin and 380 in Zurich with an average of 146. This means that on average 5 issues per year were voted on on top of federal and municipal referendums and initiatives.²⁴ The cluttering of issues could therefore be a serious problem in view of the need to debate the proposal properly.²⁵ The estimated effects on the covariates measuring the openness and the cost will therefore measure the net effect of each of these factors and should be interpreted accordingly.

3.2 Measuring the Quality of Governance

We also need to find a measure for quality that is both comparable across time and across cantons.

To measure the quality of a public good is far from straightforward as it has to meet a certain number of criteria. First, the policy under consideration has had to be determined by under the influence of the cantonal governments. As a general observation it should be noted that in the aggregate public budgets of the federal, the cantonal, and the municipal authorities, the cantonal budgets take up more than 50%. In particular we can separate three broad public goods: education, road infrastructure, and health. Second they need to be topics that for the whole period has drawn the attention of the voters which has been the case for all three of these areas of public provision. Third as the questions concerned is one of quality, it is not satisfactory to simply look at cost-efficiency as, for example 100 pupils can be educated at a primary school for less but the quality will suffer just as when a kilometer of cantonal road is built on a lower budget. My methodology therefore is to

²⁴For a complete discussion of the differences in practice and the observed votes see Trechsel (2000) and Trechsel and Serdult (1999).

²⁵A frequent criticism gleaned from the Italian experience with initiatives is that voters are overwhelmed by the amount and the complexity of the issues. In Switzerland every household, at least recently, is sent a short descriptive of the proposed change of law also containing a declaration by the legislator and a statement by the initiative committee.

...nd variables measuring outcome rather than output of public goods.

One such outcome concerning the cantonal road networks is traffic safety in general and traffic fatalities in particular.²⁶ A large number of referendums and initiatives have been concerned with the construction of roads and the regulation of traffic. For instance about a tenth of almost 3000 initiatives and referendums between 1970 and 1999 were related to traffic and roads documenting the salience of the issue.²⁷ When it comes to measuring the quality of this public good, mobility, it can be argued that the quality of roads and the regulation of traffic should be reflected in the probability that accidents have a lethal outcome: The effort deployed in clearly marking roads, in putting up and operating traffic lights, in lowering and implementing the alcohol limit just as in the quality of education of drivers and in the safety standards for vehicles are a host of institutional regulations and procedures that impact traffic safety and thereby the number of fatalities. Finally it is a measure that is easily comparable between cantons and across time. Concerning the measurement of quality one also needs to find appropriate scalars. The quantity of accidents as such is not necessarily a measure of quality as it is subject to the traffic volume the density of the road network the number of vehicles using it, etc. Optimally these numbers need to be scaled, by the total number of vehicles and kilometers travelled by them in a given road network. However these scaling variables are not available for the time period considered or the quality of it is (surprisingly) poor.

We therefore propose to scale the number of fatalities by the total number of accidents to get an indication as to the hazard rate of an having a lethal accident. Scaling by the number of vehicles does not seem appropriate as a considerable number of cars is not or rarely used and there is intense commuting across cantonal frontiers which is not reflected in the number of registered vehicles in a canton and year.

Another measure of quality identifying the quality of the health sector in a well developed country is the infant mortality rate, which is the ratio of death within the first 12 months of life to the total number of life-born babies. This is a measure also employed to compare the level of development of the health sector by the United Nations and the Audit Commission in the U.K..

3.2.1 Empirical set up and results

The models have been estimated under two different assumptions concerning the error terms. In the first case the panel has been estimated by a two-way error component fixed effects model that can be written as

$$q_{it} = A + \rho_{it}B_1 + x_{it}B_2 + \alpha_i + \beta_t + Z_{it} \quad (11)$$

²⁶Measuring the quality of education across cantons and for the time period in question is not possible as, to my knowledge, no data set exists or can be constructed to get indicators on school performance or class size.

²⁷This is not specific to Switzerland, witnessing the intense debate in the U.K. about how to improve the train network after a numerous recent fatalities.

Where q_{it} refers to the dependent quality measure for each canton $i = 1; \dots; 21$ and for each time period t .²⁸ The coefficient B_1 on p_{it} measures the effect of the legislation administering the direct democratic institution. These will be composed of the number of signatures necessary and the length of time available to collect them. B_2 are the coefficients on the control variables. The error term is composed of the canton specific α_i and the time period specific γ_t fixed effects²⁹ and a term $z_{it} \gg IID(0; \frac{1}{4})$: The results of these regressions are reported in columns (5)-(10) and (15)-(20) in Tables 2 and 3.

An alternative assumption for the dynamic structure of shocks could lead us to assume that the groupwise error terms follow an AR(1) process. Indeed, individual unit root tests on the variables using the procedure proposed in Im et al.(1997) (see table 5 for results) indicate that most variables are I(1). We therefore also estimated the following specifications

$$\begin{aligned} q_{it} &= \alpha + p_{it}B_1 + x_{it}B_2 + \alpha_i + \gamma_t + e_{it} \\ e_{it} &= \lambda e_{i;t-1} + z_{it} \end{aligned} \tag{12}$$

where $|\lambda| < 1$ implementing the procedure for unbalanced panels proposed in Baltagi and Ping (1999) two types of test results for $H_0 : \lambda = 0$ are reported namely the locally best invariant statistic and a modified Durbin-Watson statistic.³⁰ If the hypotheses of no serial groupwise autocorrelation is accepted then the specification with in equation (3.2.1) is preferred. When the null is rejected both specifications are acceptable in the absence of sharper prediction by economic theory as to the dynamic structure. Using a cross section of time series of cantonal data allows us to compare and to contrast the different institutions and also enables a control for idiosyncracies of a canton or of a specific year such as canton specific tastes' and country wide shocks.

We also included some control variables to capture the general level of development and other time-variant canton specific covariates. These are the real per capita cantonal revenue, the level of education measured by the fraction of the population with more than 12 years of education. A variable that has also emerged as an important measure for a countries economic and institutional performance is the religious and linguistic fractionalization of a country as showed in Reynal-Querol (2000) and Easterly and Levine (1994). This seems in particular important in a country with high heterogeneity both between and within cantons. Data is available for the four main

²⁸The time periods for each canton varies from a maximum time span of $t = 70; \dots; 96$ to any subspan of time depending on the presence of a direct institution in a canton. Also the canton Jura only exists since 1978 created out of a region which until then belonged to the canton of Bern-Land. Both these types of events are taken to be exogenous.

²⁹Hausman test in all regressions support this estimator. Test results are not reported but are available.

³⁰For those unfamiliar with dynamic panel data see Baltagi (1995) in general and Baltagi Wu (1999) and Bhargava et al. (1982) concerning the test statistics used.

language groups, (Swiss-)German, French, Italian, and Rhaeto-Romanic, and the other, often substantial groups, bundled as "other languages". For the religious index the denominations identified in the data are Roman-Catholic, Christian-Catholic, Protestant, Israelite, and "other" or "no denomination".

Both the religious (RF) and the linguistic fractionalization (LF) indexes are calculated as

$$RF = 1 - \sum_{i=1}^I \frac{n_i^2}{N^2}; \quad i = 1; \dots; I$$

where the i 's stand for the religious or the linguistic groups. The index measures the probability that two randomly selected persons from a given canton will not belong to the same religious or linguistic group. Therefore, the higher the index, the more fragmented the country.³¹

Table 2 presents regression results for fixed effects regressions for each of the direct democratic institution whenever they were present in a canton or a year. In the first three columns we control for canton and year specific effects and model the error term as an AR(1) process. We see that the time length available has a positive effect: the more time has been available for the collection of the signatures the higher has been the fraction of fatal to total number of accidents. This seems paradoxical. One can either think that dividing by the total number of accidents is not a good way to scale the traffic fatalities. Alternatively one can argue that there may be a non-linear relationship with the time available. Introducing the time constraint squared does not seem to be permissible as there is a very high autocorrelation with the linear time variable. In the last three columns we present the regressions where the error terms are not modelled as an autoregressive process but where we still control for canton and year fixed effects.

In table 3 we turn to another measure of quality in this case related to the health sector. For most countries the infant mortality rate is a closely scrutinized statistic that indicates how efficient and effectively the health sector works. Looking at the regression result we found a very strong relationship between the number of signatures and the infant mortality rate. The higher the number of signatures that have to be collected the higher is the mortality rate. One still has to be careful with the interpretation of this result. We take the infant mortality rate as an indicator of the quality of the health sector and we do not mean to say there is a direct medical benefit from reducing the number of signatures for the survival probability of life-borns. Nevertheless the size of the coefficient is surprising: reducing the ratio of signatures to the total size of the electorate by one per cent is associated by a reduction of one per mille on the infant mortality rate which is quite considerable.

³¹ Entering both measures jointly is a bit problematic due to the high groupwise correlation between these indexes. However the coefficients on the political variables, which are the focus of this paper, were not sensitive to model specifications for the regressions on infant mortality rate but were so for the fatal accidents ratio.

In general the time constraint coefficient should be judged with some caution. It is not simply the time to collect the signatures that is the relevant temporal dimension for the effectiveness of a direct democratic institution, but the time between the beginning of the collection of signatures and the moment when the issue is put in front of the electorate. Cantonal parliaments have a considerable discretion as for when to schedule the date of the vote. It would be interesting to look more closely at the effect of the time span between the end of collecting signatures and the day of the actual vote. On the other hand when too many initiatives are submitted they create a long waiting list for votes which can equally be seen as a cost of these institution. These questions will be addressed by an updated data set in a future paper.

A note on polarisation

In table (4) we also introduced an interaction term between the linguistic fractionalization and the number of signatures variables to investigate the co-movement of the variables. We found a very strong effect: the higher the degree of linguistic fractionalization together with a more signatures to collect the worse is the associated mortality rate.

4 Conclusions

The results of the theoretical and the empirical part are quite suggestive. Taking the drastic measures of quality used in this paper surely is some sort of a worse case scenario which reflect when problems of governance of a particular sort. More empirical and theoretical work can be done to get an even better understanding as to the underlying mechanisms of quality of public goods and how they can be influenced by changes in the decision taking process. For instance the measure of the time constraint that is available to collect signatures is not the only time dimension that need to be considered. Cantonal parliaments have a lot of discretion when to call for a vote on an issue that has satisfied the rules of number of signatures and the time constraint. They therefore can wait for a time when things have "cooled down", i.e. when the public opinion is less focused on a particular issue so that a law that has been unpopular can be more easily enacted. On the other hand the legislature need to be aware of the potential backsliding of such a strategy: when the public understands that the date of votes or scheduled in way that is most convenient for the ruling parties they may suffer in public prestige reducing their incumbency advantage over the opposition. Equally when too many initiatives suffice the legal requirements than this can create a long waiting list of votes to be held. Yet having a vote on every other Sunday can not be the answer as the electorate need to be informed and also need to be able to aggregate the information for an election outcome to be efficient.³² These questions need to be addressed by a model that encompasses these issues and also the

³²See Feddersen and Pesendorfer (1997) for a model of information aggregation.

necessary data need to be collected which. The empirical evidence on the legislative delay however gave no support to any of these problems but these are necessarily examined after the event of an initiative and these were not numerous enough to get good estimates for every canton and every year.

4.0.2 Future extensions and open questions

A number of questions remain open for further investigation in this setting both from a theoretical and an empirical view. First, the model does not contain any lobbying. One could have introduced the possibility of direct transfers to a lobby which, possibly, represents the interests of type j citizens. Then the approach for investigating the effect of the direct democratic institution is to ask how much rents the legislators can extract from the lobbies with and without citizens' initiatives. Interest groups in Switzerland are indeed powerful and an interesting feature is the reputation enjoyed by different lobbyists. Casual observations of the interest groups suggests that those lobbies associated with one of the ruling parties have a lower reputation than those that are not: the former seemed to be identified as another instrument of power whereas the latter are more trusted to be genuinely interested in the issue they are pursuing.

Second, the empirical examples presented in this chapter suggest that the dynamics are not yet well captured. How should we model the time-span between the moment when an initiative is submitted, then voted, and, if need be, implemented? Or, in other words: how can we correctly estimate the lag of the effect on quality of the administrative rule determining its cost and openness. Unfortunately the current data does not really give a satisfying answer as the discussion on the "legislative delay" has shown: there are simply not enough events to get a reliable estimate of the delay created by the legislator or for submitted initiatives to be dealt with. Moreover legislation on this delay varies between cantons and across time varying from total discretion to quite short delays. This could also be an avenue for further but mainly empirical work.

A more detailed analysis of the dynamics is yet even more necessary to look at questions of electoral business cycles. How do business cycles change when initiatives are available to the citizens. The Swiss political and administrative system with its high independence and decentralized decision taking on a cantonal level can be a very rich source of data for comparative studies complementing theoretical work and empirical evidence from the U.S. as in Besley Case (1995b).

Another interesting issue that has been neglected in the analysis so far is the effect of tax-competition between cantons. The canton of Zug for example has the highest concentration of companies in Switzerland reflecting the favourable marginal tax rates. The question can also be formulated from the voters perspective as with an information structure as in the Swiss cantons, voters learn a lot about how public goods are provided in different cantons which increase the effect of yardstick compe-

tition as discussed, for example, in Besley, Case (1995a).

Finally there is also a potential in describing in more detail the different electoral processes and the types of citizens' initiatives. We have assumed that voters can choose which party member to re-elect on the list which therefore gave her an incentive to satisfy voters in the first period. "Open list", as this voting rule is called, can also be replaced by a "closed list" where voters only get to choose a party but not directly the politician. Even if there can be an indirect effect such that parties signal that they replaced a politician in the current period this by no means need to be the only equilibrium. A more detailed analysis complete with an empirical test could be interesting.

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Fig1: Classes of coalition equilibria

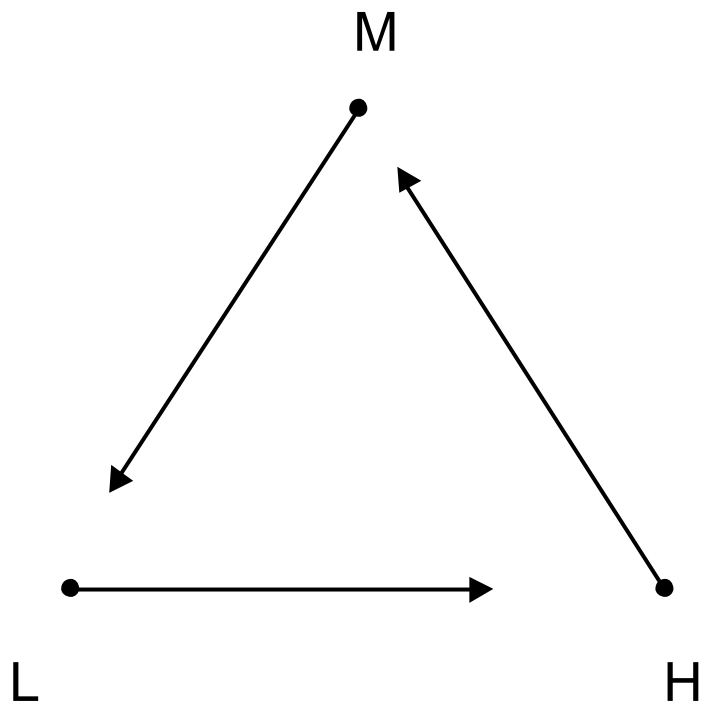
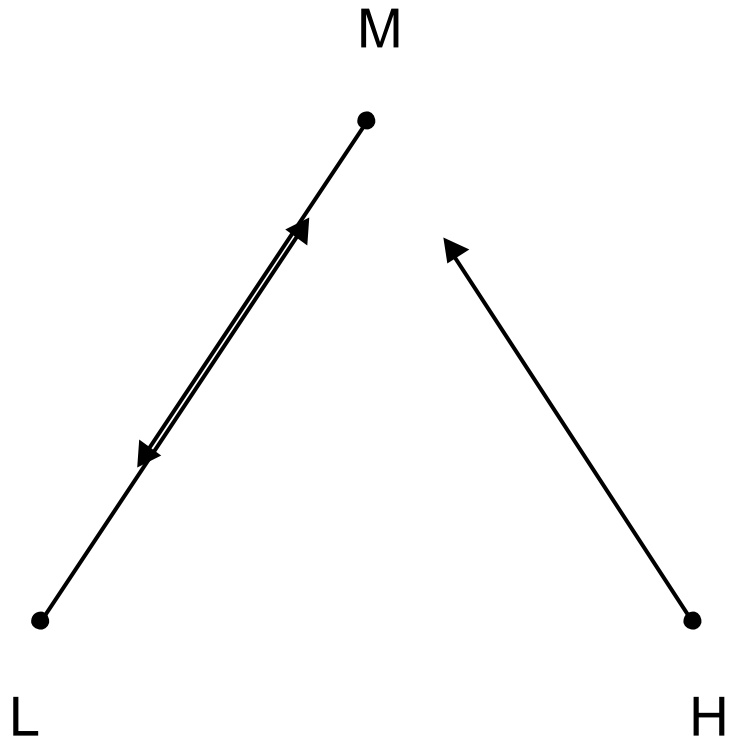


Table 1 - Data sources, definitions and summary statistics of included variables.

Variables	Number of obs.	Mean	Min	Max	Data source
Quality measures					
Number of traffic fatalities	558	52.7276	1	252	1)
Total number of traffic accidents	558	3704.982	301	122285	1)
Ratio number of fatalities to total number of accidents.	558	0.0176	0.0011	0.0592	1)
Infant mortality rate (number of deaths of children less than one year of age per 1,000 live births)	558	8.79	1.18	26	1)
Political variables					
<i>Required signatures that need to be collected for a vote to be held for a</i>					
- constitutional initiative total revision (absolut number)	537	5796	300	30000	2)
- constitutional initiative total revision (as a ratio to size of electorate)	537	0.0377	0.0073	0.2126	2)
- constitutional initiative partial revision (absolut number)	560	5683	300	15000	2)
- constitutional initiative partial revision (as ratio to size of electorate)	560	0.0361	0.0073	0.2126	2)
- legislative initiative (absolut number)	560	4990	300	15000	2)
- legislative initiative (as a ratio to size of electorate)	560	0.0318	0.0073	0.1417	2)
- legislative optional referendum (absolut number)	370	3989	300	12000	2)
- legislative optional referendum (as a ratio to size of electorate)	370	0.0289	0.0067	0.1174	2)
- expenditure optional referendum (absolut number)	425	3614	300	12000	2)
- expenditure optional referendum (as a ratio to size of electorate)	425	0.0232	0.0065	0.1174	2)
<i>Time constraint in months to collect the required signatures for a</i>					
- constitutional initiative total revision	537	14.82	2	24	2)
- constitutional initiative partial revision	560	14.36	2	24	2)
- legislative initiative	560	14.21	2	24	2)
- legislative optional referendum	370	1.9103	1	3	2)
- expenditure optional referendum	425	2.2053	1	24	2)
Control variables					
Education (fraction of the population with at least 12 years of education)	567	0.1605	0.0814	0.3203	1) *
Real per capita cantonal revenue (in prices of 1990)	560	331.7	213.03	694.76	1) **
Religion (Index of religious fractionalization)	560	0.4466	0.0931	0.6784	1) *
Language (Index of linguistic fractionalization)	560	0.3155	0.1284	0.588	1) *

Note: Yearly observations from 1970-1996 for 21 Swiss Cantons. Sources: 1) Swiss Federal Statistical Yearbooks (various years) and Swiss Federal Statistical Office (various departments) 2) Trechsel and Serdült (1999) used by courtesy of Alexander Trechsel. Data available on request.

* Based on Census data from 1970, 1980, and 1990 and linearly interpolated.

** Deflated by the federal consumer price index. Cantonal CPI are not available.

Table 2 - Openness of direct democratic institutions and effect on the ratio of traffic fatalities to total number of accidents.

Dependent variable	Fraction of fatal to total number of accidents.									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<i>Constitutional initiative total revision:</i>										
signatures per electorate	0.0064 (0.329)					0.027 (0.023)				
time constraint	0.0002** (0.0001)					0.00022*** (0.00009)				
<i>Constitutional Initiative partial revision:</i>										
signatures per electorate		0.012 (0.35)					0.036 (0.023)			
time constraint (months)		0.0002** (0.0001)					0.00023*** (0.00009)			
<i>Legislative initiative:</i>										
signatures per electorate			0.007 (0.043)					0.037 (0.030)		
time constraint (months)			0.0002** (0.0001)					0.00023*** (0.00009)		
<i>Legislative optional referendum:</i>										
signatures per electorate				0.0184 (0.67)					0.055 (0.050)	
time constraint (months)				0.0186* (0.0096)					0.026*** (0.008)	
<i>Expenditure optional referendum:</i>										
signatures per electorate					-0.0097 (0.072)					0.011 (0.051)
time constraint (months)					0.00078 (0.0018)					0.0010 (0.0015)
education	-0.1025*** (0.0394)	-0.141*** (0.037)	-0.1414*** (0.037)	-0.089* (0.0479)	-0.239*** (0.045)	-0.67** (0.028)	-0.1047*** (0.0258)	-0.1039*** (0.026)	-0.032 (0.037)	-0.1796*** (0.033)
real per capita cantonal revenue	0.00003* (0.00002)	0.00003** (0.00002)	0.00004** (0.00002)	0.00001 (0.00002)	0.00004** (0.00002)	0.00003** (0.00002)	0.00004*** (0.0000142)	0.00004*** (0.00001)	0.00001 (0.00002)	0.00005*** (0.00002)
linguistic fractionalization	0.026 (0.018)	0.0078 (0.016)	0.0077 (0.0162)	0.0125 (0.0214)	0.037* (0.0199)	0.0232* (0.0141)	0.0006 (0.0123)	0.000036 (0.0123)	0.145 (0.0176)	0.0198 (0.153)
Canton and year fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Error term modelled as AR(1)	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO
Joint significance of fixed effects						16.38***	15.98***	15.74***	9.65***	12.31***
Bhargava 1)	1.54	1.49	1.49	1.61	1.54					
Baltagi-Wu 1)	1.65	1.61	1.60	1.74	1.67					
Number of observations	514	537	537	351	402	535	558	558	368	423

Note: Results of fixed effects regression with two-way error component model. In the first five columns the error terms are modelled as AR(1) processes but not in the last five columns. Coefficients on the constant terms omitted. See Table 1 for data description and sources. Robust standard errors in brackets. * significant at 10%, ** at 5% level, and *** at 1% level.

1) Baltagi-Wu (1999) locally best invariant (LBI) test statistic that $\rho = 0$ and a modified version of the Bhargava et al. (1982) Durbin-Watson statistic.

Table 3 - Openness of direct democratic institutions and effect on infant mortality rate.

Dependent variable	Infant mortality rate									
	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
<i>Constitutional initiative total revision:</i>										
signatures per electorate	25.766*					29.82***				
	(14.1001)					(10.397)				
time constraint	-0.0105					-0.0110				
	(0.0461)					(0.0396)				
<i>Constitutional Initiative partial revision:</i>										
signatures per electorate		26.11*					29.61***			
		(14.86)					(10.657)			
time constraint (months)		-0.011					-0.0099			
		(0.046)					(0.0394)			
<i>Legislative initiative:</i>										
signatures per electorate			25.07					34.22**		
			(18.51)					(13.75)		
time constraint (months)			-0.011					-0.0078		
			(0.046)					(0.0396)		
<i>Legislative optional referendum:</i>										
signatures per electorate				9.38					24.663	
				(29.02)					(23.304)	
time constraint (months)				7.37*					8.033*	
				(4.11)					(3.79)	
<i>Expenditure optional referendum:</i>										
signatures per electorate					78.14**					72.388***
					(30.48)					(23.34)
time constraint (months)					-0.083					-0.0926
					(0.725)					(0.6554)
education	16.184	10.39	9.86	28.70	32.31*	34.021***	28.753**	29.024**	52.32***	54.886***
	(15.793)	(14.55)	(14.63)	(19.69)	(17.93)	(12.827)	(11.8961)	(12.016)	(17.31)	(14.95)
real per capita cantonal revenue	0.005	0.0055	0.0058	-0.0009	-0.005	0.0096	0.0099	0.01002	-0.00026	-0.0013
	(0.0076)	(0.0072)	(0.007)	(0.009)	(0.008)	(0.0069)	(0.0065)	(0.00652)	(0.0083)	(0.0073)
religious fractionalization	-5.004	-5.42	-4.16	-7.66	-14.67	-8.277	-8.999	-6.9086	-9.048	22.84
	(11.595)	(11.50)	(11.59)	(13.67)	(20.92)	(10.012)	(9.915)	(9.874)	(12.25)	(17.75)
linguistic fractionalization	2.964	0.03	-0.51	13.97	-13.10	0.014	-3.02	-3.916	11.898	-21.16
	(7.650)	(6.83)	(6.86)	(8.99)	(10.06)	(6.683)	(5.964)	(5.959)	(8.193)	(8.625)
Canton and year fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Error term modelled as AR(1)	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO
Joint significance of fixed effects						14.65***	14.61***	15.04***	10.07***	12.09***
Bhargava ¹⁾	1.81	1.80	1.80	1.89	1.80					
Baltagi-Wu ¹⁾	1.87	1.86	1.86	1.95	1.88					
Number of observations	514	537	537	351	402	535	558	558	368	423

Note: Results of fixed effects regression with two-way error component model. In the first five columns the error terms are modelled as AR(1) processes but not in the last five columns. Coefficients on the constant terms omitted. See Table 1 for data description and sources. Robust standard errors in brackets. * significant at 10%, ** at 5% level, and *** at 1% level.

1) Baltagi-Wu (1999) locally best invariant (LBI) test statistic that $\rho = 0$ and a modified version of the Bhargava et al. (1982) Durbin-Watson statistic.