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# Disciplining Ballots? – (Un-intended) Effects of Voter Engagement on the Fiscal Sustainability of Swiss Cantons

## Abstract

We test whether the proactive use of instruments of direct democracy by voters can help to explain fiscal sustainability of 25 Swiss cantons. Using data of all cantonal popular votes since 1977, our results show that the fiscal reaction of cantonal governments to an increase in the debt to GDP ratio of a canton is stronger, the more cantonal voters actively made use of their direct democratic rights in the previous year.

JEL-Codes: H110, H500, D720.

Keywords: direct democracy, political process, fiscal policy.

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## 1. Introduction

Enabling voters to influence policy between elections through direct popular rights is most common in Switzerland and the United States. In other countries and federations, direct democracy also experienced a surge in recent years. On national levels the “Brexit” vote in the United Kingdom as well as popular votes on structural reforms in Greece and Italy are examples for electorates unveiling distinctly different preferences than their governments, inducing major policy changes (Matsusaka 2020). On the subnational level, direct popular rights are even more common and growing across countries (Qvortrup 2021), although there is also direct democratic backsliding in the U.S. (Matsusaka 2023).

Several studies show that policy outcomes come closer to the preferences of the median voter if voters can directly influence political decisions (Gerber 1999, Matsusaka 2010). Regarding fiscal policies, existing evidence shows that this leads to lower levels of public spending and public revenues (Matsusaka 2018). But does this mean that an electorate that directly influences fiscal policy is also enhancing the *sustainability* of public finances? According to existing evidence, this answer depends on the instrument of direct democracy used. While fiscal referendums serve as a veto instrument preventing additional public spending (Feld and Matsusaka 2003, Funk and Gathmann 2011), popular initiatives may increase or decrease public spending (Matsusaka 1995, 2000 for the U.S., Asatryan et al. 2017 for Germany) and therefore have different impacts on fiscal sustainability. Moreover, theoretically, the impact of direct democracy on fiscal sustainability may depend on citizens' fiscal preferences. If voters influence the government's fiscal policy directly, they may opt for deficit financing when they are fiscally less conservative than their elected representatives (see the seminal paper by Peltzman 1992). However, even with a fiscally conservative electorate, sustainability of public finances can be at risk if spending preferences of voters are higher than their preferences for public revenues.

In this paper, we study the case of 25 Swiss cantons from 1977 to 2017 and link existing theoretical considerations on the fiscal effects of direct democracy (Romer and Rosenthal 1979, Gerber 1996, Matsusaka and McCarty 2001, Besley and Coate 2008) to the concept of fiscal sustainability outlined by Bohn (1995, 1998). We collect data on the popular votes that are triggered by the electorate and not by the government as our measure for the extent to which cantonal electorates proactively use their direct democratic rights. We estimate whether the number of these votes influences the fiscal reaction of the government to an increased debt to GDP ratio, while controlling for time-variant fiscal preferences of voters within each canton.

Our main finding is that, while cantonal governments run sustainable fiscal policies through increasing their primary surpluses after an increase in the canton's debt to GDP ratio, this fiscal reaction to increasing debt is significantly stronger the more cantonal voters actively make use of their direct democratic rights in the previous year. Thus, part of this fiscal reaction can be explained by the engagement of voters. Our estimates indicate that with every additional popular vote triggered by the electorate, cantonal governments increase their fiscal reaction to rising debt to GDP ratios by 0.01 to

0.02 percentage points of cantonal GDP in the year following the vote. We show that this effect comes via increased revenues and is driven by those votes that are not successful. This supports the theoretical reasoning of Matsusaka (2014) who shows that the threat of becoming confronted with a popular vote is already changing government policy.

Our paper contributes to the literature on the fiscal consequences of direct democracy in two ways. First, instead of focusing on the levels of fiscal outcomes such as expenditures, revenues, deficits and debt this paper is, to the best of our knowledge, the first that investigates the effect of direct democracy on fiscal reaction behavior and, thus, on fiscal *sustainability*. Second, most of the existing studies that investigate the fiscal effects of direct democracy are interested in the effect that different direct democratic institutions by themselves exert on fiscal outcomes. In this paper, we ask whether the extent to which voters *actively make use* of their existing direct democratic rights affects fiscal policy. Besides the literature on direct democracy, we contribute to the literature on fiscal sustainability, as we are the first to show that the use of direct democratic rights explains parts of cantonal fiscal reactions to increased debt and, thus, sustainable fiscal policies of Swiss Cantons.

## **2. Population-Triggered Direct Democracy and Fiscal Policy**

There are three institutional ways as to how a particular decision may arrive at the ballot (Matsusaka 2018). The first is a mandatory referendum. A mandatory referendum is a public vote on a governmental policy that is required by law. A common example of a mandatory referendum is the fiscal referendum, i.e., that an expenditure project of the government needs the approval of the electorate if it exceeds a certain expenditure threshold. The second institution is the optional referendum or “petition-referendum” (Matsusaka 2018). In an optional referendum, voters can approve or deny a policy of the government if they are successful to collect a sufficient number of signatures constitutionally required to trigger the referendum in the first place. If the government calls a referendum by its own initiative, e.g., in order to seek the support of voters for a particular decision, this type of referendum is called a plebiscite. The third institution of direct democratic decision-making is the popular initiative. Different to the mandatory and the optional referendum, in an initiative, voters do not vote on a policy set by the government. Instead, the policy that comes to the ballot is proposed by a certain fraction of the electorate collecting a constitutionally required number of signatures to put their own policy proposal to the ballot.<sup>1</sup>

These three instruments for the participation of voters in political decision-making can be separated along two lines. Matsusaka (2018) refers to the agenda setting power and differs between the referendum where the government sets the agenda and the initiative where agenda setting moves to the electorate. A second way to categorize these institutions propose here is to differentiate between the trigger of the vote. While the mandatory referendum and the plebiscite are triggered either by law or by the government (top-down), the petition referendum and the initiative are triggered by the electorate

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<sup>1</sup> For a detailed overview over the implementation of these institutions in Switzerland and the US as the two countries that use direct democracy most actively, see Matsusaka (2018).

(bottom-up). As we are interested in the degree to which voters proactively *make use* of their direct democratic rights, we use this latter categorization. Thus, we use the number of petition-referendums and initiatives that appear at the ballots as our main empirical measure for the alertness of the electorate.

## **2.1 Theoretical Differences between Petition Referendum and Initiative**

Gerber (1996), Matsusaka and McCarty (2001) and Matsusaka (1995, 2018) show that the initiative and the petition referendum differ theoretically in the way the two institutions shift the policies of the government towards the preferences of the median voter. In particular, the initiative should bring policy closer to the preferences of the median voter than the petition referendum because of the shift in the agenda setting power from the government to the voters that call the initiative. First, transferring agenda setting to the voters shifts a policy that constitutes the alternative to the status quo from the government's preferred policy to that of the median voter. Second, with an initiative, voters can induce a stronger or a weaker policy than the government proposes, while a referendum is a veto instrument only effectively binding the government if the median voter prefers a weaker policy than the government. To illustrate this, consider the government plans to raise taxes. A petition-referendum would only constrain the government if the median voter prefers lower taxes than the government. If the median voter preferred higher taxes than the government, voters would not reject the proposal of the government as they prefer the proposal of the government over the status quo. With the initiative at hands, voters could propose lower as well as higher taxes than the government and shift policy in both directions. Therefore, the initiative offers voters broader opportunities to restrain government than the petition-referendum.

This does not mean that the petition-referendum is not prone to restrain the government in its fiscal policy, as the government does usually not know what the preferences of the median voter are (Matsusaka and McCarty 2001). Thus, if a petition-referendum comes to the ballot, the government will not know whether its policy will eventually be confirmed or rejected. Although offering less possibilities to bring policy closer to median voter's preferences than the initiative, voters who actively use the petition-referendum can still induce major changes in the policy of the government and use the petition-referendum to exert harming or enhancing effects on the sustainability of public finances depending on the original government proposal. Hence, both institutions through which voters can proactively exert direct influence on policy decisions can effectively restrain the government, change the behavior of representatives and enhance or harm fiscal sustainability.

## **2.2 Direct Effects**

How can referendums and initiatives change fiscal policy? The obvious channel through which direct democracy influences public finances are its direct effects. A direct effect occurs, if representatives propose policies that differ from the preferences of voters (Matsusaka 2014). In such a case, voters can proactively use either the initiative or the petition referendum and change or reject the government's policy. Matsusaka (2014) argues that identifying this direct effect is not simple for the initiative. To exert a direct fiscal effect, an initiative that was adopted needs to induce another policy than the one that

would have prevailed without the initiative. In other words: To infer the direct effect of an adopted initiative, it needs to be ensured that without the initiative, another policy would have prevailed (Matsusaka 2014). Moreover, it needs to be ensured that the policy the initiative calls upon comes into effect and is not challenged by a court ruling or a lack of enforcement (Gerber et al. 2001, Kousser et al. 2008, Matsusaka 2014).

### **2.3 Indirect Effects**

More important than the direct effects of the two proactive direct democratic institutions are the indirect effects that they exert on the government's policies. As Matsusaka (2018, p. 118) argues:

*“Policy may change not because voters approve a proposition, but because the threat of a proposition causes the government to choose a different policy. Put differently, the initiative and referendum matter simply by being available, even if they are not used.”*

Thus, the government may change its policy only based on the expectation that a proactive electorate could challenge or amend it. In fact, in game-theoretic models it is *only* this “threat”-effect which is at work. Under complete information about the preferences of the median voter the government will always proactively change its policy in order to deter a petition-referendum or an initiative (Gerber 1996; Matsusaka and McCarty 2001; Matsusaka 2014).

Besides this “threat”-effect, there are two other indirect effects of the initiative and the referendum which are important for our investigation. Boehmke (2005) and Boehmke and Bowen (2010) argue that the possibility to proactively exert influence on policy creates incentives for the formation of interest groups. Even if their policy proposals fail at the ballots, these groups influence representatives via lobbying, PR-activities or campaign contributions. In the context of this paper, this is one of the channels through which an increased use of direct popular rights could induce a worsening of fiscal sustainability, as low barriers to such rights could give small but well-organized interest groups political over-representation resulting in an exploitation of common fiscal resources (the fiscal commons problem).

Most empirical evidence, however, shows that increased participation is associated with less and not more spending (Feld and Kirchgässner 2001, Feld et al. 2010, Funk and Gathmann 2011). That increased direct participation of voters in decision-making can improve policy outcomes is also supported by Smith and Tolbert (2004). They show that an increased number of initiatives can have educative effects on the electorate (Matsusaka 2014). Being confronted with election campaigns regularly improves the knowledge of voters and enables them to hold their representatives accountable in a more effective way than uninformed voters could. Facing a tighter control, governments then pursue policies that are closer to the preferences of the electorate.

Empirical evidence indicates that these indirect effects of the initiative and the referendum are severely larger than the direct effects (Matsusaka 2014). Therefore, Matsusaka (2018) highlights that it is not possible to measure the *entire* effect of the two institutions by only looking at the votes that appear at



the ballots. Instead, the crucial point that influences policy is that representatives *expect* that voters will challenge or amend the government's policy. However, the expectations of the government that voters will use their direct democratic tools proactively may increase, if voters showed to be alert in the past. We use the example of the Swiss cantons to investigate whether governments change their fiscal policy in a way that enhances or worsens sustainability when the government has to expect that voters will intervene into its policy because they showed to be alert in the past.

### **3. Institutional Background and Previous Findings**

Switzerland provides for an interesting example of direct democracy. The constitutions of Swiss Cantons to different degrees stipulate mandatory and optional referendums as well as initiatives to involve voters in cantonal decision-making. Thus, the cantons use all of the three direct democratic instruments described above. In the context of this paper, we focus on the two bottom-up instruments which are the petition (optional) referendum and the popular initiative.

In 2020, all cantonal constitutions offer the possibility to call a petition-referendum to challenge the policy of a canton's government. If voters collect signatures exceeding a threshold, the referendum is put to the ballot. In addition to the signature requirement, regarding fiscal referendums, some cantons implement spending thresholds. Both thresholds must be exceeded in order to bring a petition-referendum to the ballots. The second bottom-up instrument, the popular initiative, is also widely available in the cantons. With the initiative, voters can propose an entirely new law. Regarding public spending, the initiative offers a possibility to challenge projects of the government that fail to exceed the spending threshold for a petition-referendum (Feld and Matsusaka 2003). To bring an initiative to the ballots, the initiators need to collect a predetermined number of signatures. The higher the signature requirement is, the harder it gets for the electorate to challenge or amend government policy.<sup>2</sup>

Figure 1 shows, that voters in the cantons widely use their tools to engage in cantonal policy and to interfere with their governments. However, the use of the instruments varies between the cantons. During the past 40 years, the voters in Zurich showed to be most active, bringing on average four votes per year to the ballots. The least number of votes are called in Grisons, where voters on average only call for a vote once every two years.

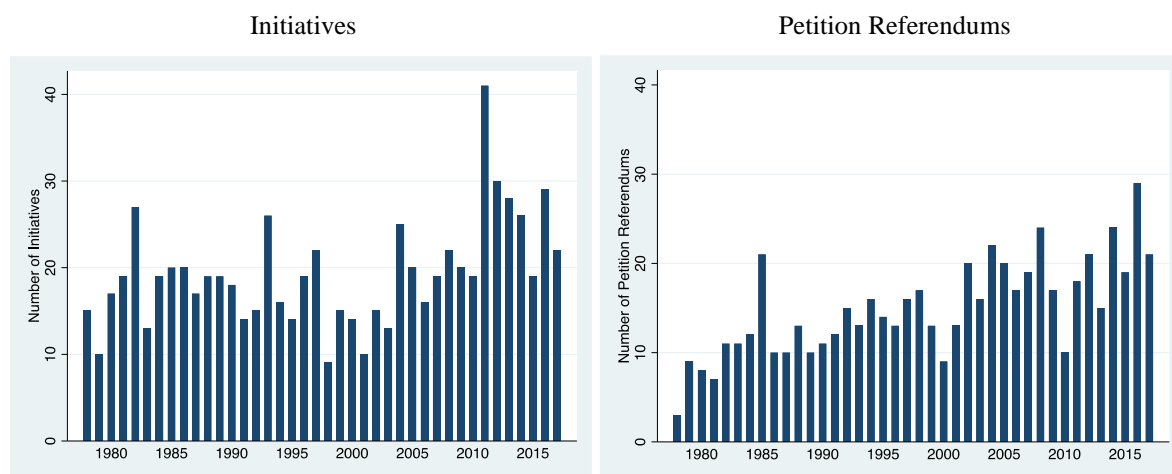
According to the empirical literature, both the referendum and the initiative have effects on cantonal fiscal policy. Existing evidence shows that referendums on fiscal policy issues lead to lower cantonal expenditures (Feld and Matsusaka 2003; Funk and Gathmann 2011, 2013) and revenues (Feld and Kirchgässner 2001, 2007; Schaltegger 2002; Freitag and Vatter 2006). However, as revenues are reduced slightly more than expenditures, the existing evidence shows that the referendum has at best

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<sup>2</sup> A special form of direct democratic provisions in the cantons are cantonal assemblies similar to town meetings at the local level. Today, only two cantons (Appenzell-Inner-Rhodes and Glarus) still use cantonal assemblies to involve their electorate in public decision-making. In these assemblies, all voters that are entitled to vote meet at a central place in the canton. Decisions are made by acclamation of all eligible voters that are present.

none (Schaltegger 2002; Feld and Kirchgässner 2007) or even increasing (Feld and Kirchgässner 2001) effects on cantonal deficits. Although these studies do not report deficit-reducing effects of fiscal referendums, they find that fiscal referendums are associated with lower public debt. This could be the outcome of accounting provisions leading to stock-flow adjustments, i.e., some fiscal operations are not included in the budgetary accounts but are included in the net asset calculation. Kirchgässner (2013) offers another explanation and argues that public debt is lower in the presence of referendums because fiscal referendums are institutions that are constant over time, showing rather long-run effects on debt than short-run effects on deficits. A third explanation is provided by Feld and Kirchgässner (2005) who argue that fiscal referendums are prone to limit the overall volumes of the public budget. Thus, even if deficits are increased, the amounts of accumulated deficits are lower if the overall budget is lower.

**Figure 1: Number of Population-Triggered Votes in the Swiss Cantons 1977-2017**



*Source:* Own depiction based on Center for Democracy Studies Aarau.

For the initiative, existing empirical results are similar. Feld and Matsusaka (2003) find that lower signature requirements to launch an initiative are associated with lower cantonal spending. Funk and Gathmann (2011) confirm this result, however with a smaller magnitude. That lower barriers to initiatives also induce revenue-reducing effects is shown by Freitag and Vatter (2006) and Funk and Gathmann (2011). A different effect of the initiative is found by Burret and Feld (2018) presenting evidence that lower thresholds to launch an initiative are associated with more spending and revenue of cantons. Taken together, existing evidence on the initiative and the referendum shows effects on spending and revenues, while most of the papers find reducing effects on both. There is, however, no clear pattern which side of the budget is changed more and, thus, how these tools may help to explain the long-run sustainability of cantonal public finances.

#### 4. Linking Fiscal Sustainability and Direct Democracy

Theoretically, an analysis of the sustainability of public finances starts with the intertemporal budget constraint of the government according to which the outstanding debt to GDP ratio  $d_0$  has to equal all future discounted primary surpluses plus the discounted future debt to GDP ratio (Bohn 2008):

$$d_0 = - \sum_{t=1}^{\infty} \left( \frac{1+y}{1+r} \right)^t p_t + \lim_{T \rightarrow \infty} \left( \frac{1+y}{1+r} \right)^T d_T \quad (1)$$

In order to meet the intertemporal budget constraint, two conditions must be met. According to the first expression on the right-hand-side of equation 1, today's debt to GDP ratio  $d_0$  has to equal all discounted future primary surpluses  $p_t$ , with  $y$  depicting the growth rate of real GDP and  $r$  the real interest rate. The second expression on the right-hand-side of equation 1 is the transversality or “no-Ponzi” condition requiring that the discounted debt to GDP ratio  $d_T$  has to converge to zero if the number of years  $t$  approaches infinity. Empirical approaches to assess debt sustainability pick up these two theoretical conditions.

To analyze the sustainability of decentralized public finances in Switzerland and the effects that an alert electorate may have on it, we estimate fiscal reaction functions of the cantons following Bohn (2008). Estimating the government's fiscal reaction to an increase in its debt to GDP ratio is straightforward in order to assess the sustainability of public finances (Bohn 1996, 2007, 2008). The theoretical reasoning behind this approach is that if the government did not react to an increased debt to GDP ratio by adapting its primary surplus in the subsequent year, its debt stock would continue to rise as  $t$  approaches infinity and thus fiscal sustainability could not be ensured (Bohn 2008). In this case, the government would violate its intertemporal budget constraint (Bohn 1995, D'Erasmus et al. 2016, Feld et al. 2020). Note, that this approach requires that both the debt stock and the primary surplus are expressed in terms of GDP to encounter the effects of GDP fluctuations on the sustainability of a jurisdiction's public finances. Moreover, to consider the effects of interest rate fluctuations on fiscal sustainability, it is the primary surplus that needs to be included as dependent variable in the empirical analysis.

##### 4.1 Empirical Framework

Given these considerations, our approach to assess the sustainability of cantonal public finances is to estimate a fiscal reaction function (FRF) for the cantons that takes the form

$$\text{Primary Surplus}_{i,t} = \rho \text{ Public Debt}_{i,t-1} + \beta \text{ Controls}_{i,t} + \text{Primary Surplus}_{i,t-1} + \delta_i + u_{i,t} \quad (1)$$

where the dependent variable is the primary surplus of canton  $i$  in relation to GDP in year  $t$ . Our key explanatory variable is the canton's debt to GDP ratio of the previous year  $t-1$ . The coefficient of interest is  $\rho$  which indicates whether cantonal politicians adapt the budget balance after the cantonal debt increased (Bohn 1998). A positive and significant coefficient indicates that politicians react to an

increase in the debt to GDP ratio by increasing the canton's primary surplus in the subsequent year. In this case, a canton's intertemporal budget constraint would be fulfilled.

To estimate whether the extent to which voters use their direct democratic rights explains part of the fiscal reaction of the government, we add an interaction term of our reaction coefficient and the number of population-triggered votes that took place in the canton in the previous year. Thus, we amend our baseline equation in the following way

$$\begin{aligned} \text{Primary Surplus}_{i,t} = & \rho \text{Public Debt}_{i,t-1} + \alpha \text{Number of Votes}_{i,t-1} + \\ & \gamma \text{Public Debt}_{i,t-1} * \text{Number of Votes}_{i,t-1} + \beta \text{Controls}_{i,t} + \\ & \text{Primary Surplus}_{i,t-1} + \delta_i + u_{i,t} \end{aligned} \quad (2)$$

Our coefficient of interest now is  $\gamma$ , indicating whether the number of referendums and initiatives that were effectively triggered by the electorate in the previous year has an effect on the slope of the government's FRF and thus, on its reaction to an increase in the debt to GDP ratio. A positive and significant  $\gamma$  indicates an increased slope of the cantonal FRF and, thus, a stronger fiscal reaction due to the number of population-triggered votes. We include canton-fixed effects  $\delta_i$  in our regression estimating the effects of a changing number of population-triggered votes within each canton and use a generalized difference-in-differences approach for identification (Burret and Feld 2018).

We include two additional explanatory variables to control for variations in the primary surplus caused by the business cycle or by other events that would cause extraordinary public spending. We follow Bohn (2008), Mendoza and Ostry (2008) and Feld et al. (2020) and include explanatory variables taken from the closed solution of Barro's tax smoothing model (Barro 1981, 1986) that reflect temporary fluctuations in output (YVAR) and spending (GVAR) taking the following form

$$YVAR_{i,t} = \left(1 - \frac{Y_t}{Y_t^T}\right) * \frac{G_t^T}{Y_t} \quad (3a)$$

$$GVAR_{i,t} = \frac{(G_t - G_t^T)}{Y_t^T} \quad (3b)$$

where  $Y_t$  stands for cantonal imputed GDP and  $G_t$  for cantonal expenditures.  $Y_t^T$  and  $G_t^T$  are the respective trend variables which are calculated using a standard Hodrick-Prescott (1997) filter using a smoothing parameter of 100 (Feld et al. 2020).

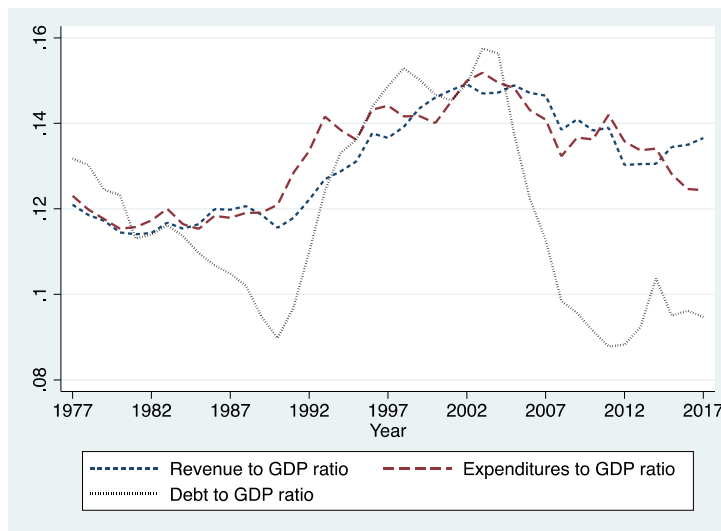
Fiscal policy is persistent (Claeys 2006). This is why Feld et al. (2020) and Theofilakou and Stournaras (2012) argue that a lagged dependent variable should be included when FRF are estimated over a long period to control for unobserved persistence that would otherwise lead to omitted variable bias. An additional reason why controlling for persistency is important are fiscal preferences. Schaltegger (2002), Krogstrup and Wälti (2008) and Funk and Gathmann (2011, 2013) argue that fiscal preferences of the electorate may lead to an endogeneity problem if they influence the engagement of voters and the

primary surplus simultaneously. Therefore, including a lagged dependent variable in combination with canton-fixed effects serves as a first control for persistency and unobserved fiscal preferences.

## 4.2 Data

Our panel dataset covers 25 of the 26 Swiss cantons over the period between 1977 and 2017, which gives us 1,025 observations.<sup>3</sup> Data for cantonal debt to GDP ratios, revenues, expenditures and interest spending comes from the Swiss Federal Statistical Office and the cantonal public finance reports. We impute cantonal GDP by weighting national GDP based on cantonal population numbers. Thus, we assume identical per-capita productivity within and across cantons. Although this is a strong assumption, we opted for this procedure due to the limitations of cantonal GDP data which stems from insufficient cantonal export and import data. Fiscal data for the aggregate of the 25 cantons is depicted in Figure 2.

**Figure 2: Cantonal Debt, Revenues and Expenditures relative to GDP 1977-2017**



*Source:* Own depiction based on Swiss Federal Federal Statistics Office.

Data on referendums and initiatives within each canton is taken from the “Database on Citizen’s Initiatives” provided by the Center for Democracy Studies Aarau. This database contains information on all initiatives and petition-referendums on the cantonal level that came to the ballot since 1976. Using this dataset, we are able to analyze the effects of 1,634 population-triggered votes on fiscal sustainability in 25 cantons over a 40 years period. We can separate these votes into 824 petition-referendums, 735 initiatives and 75 cantonal assemblies. For the period since 1986, the database provides complete additional information on the turnout and results of all votes. Thus, for the 30 years period between 1987 and 2017 we can estimate whether a vote successfully influenced policy.

<sup>3</sup> The canton of Jura seceded from the canton of Berne in 1979.

### 4.3 Estimator

Reaching from urban Zurich to rural Grisons, from wealthy Zug to economically-weak Uri, the 25 cantons are structurally and politically diverse. This diversity is likely to cause not one uniform, but 25 heterogenous fiscal reaction functions. To account for this heterogeneity, we follow Feld et al. (2020) and use Pesaran's Common Correlated Effects Mean Group (CCEMG) estimator (Pesaran 2004, 2006) for our panel estimations of cantonal fiscal policy. The CCEMG-estimator amends for every canton  $i$  all variables with the cross-sectional means of the  $N-i$  other cantons as further explanatory variables. The mean group itself then reflects the average effect of all canton-individual estimates, yielding the estimate for the panel as a whole. Conceptually, this procedure is equivalent to a two-way fixed-effects estimation and thus a generalized difference in differences approach. However, CCEMG-estimates go beyond the simple inclusion of canton and time fixed effects. Instead, the estimator allows for multiple slopes of cantonal fiscal reaction functions through controlling for time-invariant canton-individual unobservables while it simultaneously allows for time-variant unobserved common factors and, thus, for cross-cantonal correlations such as the economic downturn in the 1990s or following the year 2008.

## 5. Results

Results for the estimated fiscal reaction function of the Swiss cantons are reported in Table 1. We find a positive significant reaction of cantonal fiscal policy on an increase in the cantonal debt to GDP ratio for the period since 1977. This indicates that cantonal governments service the intertemporal budget constraint by increasing their primary surplus after experiencing an increase in their canton's debt to GDP ratio. The lagged primary surplus is statistically and economically highly significant which is evidence in favor of our hypothesis of persistency in cantonal fiscal policies. Besides fluctuations in output and expenditures, existing evidence shows that fiscal rules exert effects on the budget balance of the cantons. Therefore, it could be the case that fiscal reactions are triggered by the introduction of fiscal rules and not by increases in the debt to GDP ratio. In column 3 we include the fiscal rule index of Burret and Feld (2018) as additional control variable that could influence the primary surplus. We find a positive effect of fiscal rules on the primary surplus. However, our fiscal reaction coefficient remains positive and statistically significant.

### 5.1 Effects of Referendums and Initiatives on Fiscal Reactions

The estimates of fiscal reaction of Swiss cantons to an increase in their debt to GDP ratios show that the cantons run sustainable fiscal policies. They react to an increase in their debt to GDP ratios by increasing their primary surpluses. In columns 3 and 7, we include an interaction term between the lagged debt to GDP ratio of a canton and the number of popular votes that have been triggered by the electorate in the previous year. We continue to find a positive fiscal reaction coefficient and, thus, evidence in favor of fiscal sustainability if we amend our model regarding the effects of a proactive electorate.

**Table 1: Baseline Effect of Bottom-up Votes on the Fiscal Reaction Function of Cantonal Governments**

	1977-2017				1987-2017			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Lagged Debt	0.025** (0.012)	0.048** (0.022)	0.046* (0.026)	0.065** (0.029)	0.071*** (0.017)	0.123*** (0.028)	0.093*** (0.034)	0.152*** (0.035)
Lagged Debt*No. of Bottom-up Votes			0.008* (0.005)	0.010** (0.004)			0.019*** (0.006)	0.017** (0.008)
Number of Bottom-up Votes			-0.001** (0.000)	-0.001*** (0.000)			-0.002*** (0.001)	-0.002*** (0.001)
YVAR	2.345*** (0.795)	1.596** (0.724)	1.212* (0.713)	0.760 (0.703)	1.739** (0.691)	0.723 (0.902)	-0.155 (0.951)	0.475 (0.739)
GVAR	-0.780*** (0.240)	-0.835*** (0.222)	-0.790*** (0.208)	-0.755*** (0.202)	-1.181*** (0.331)	-1.158*** (0.292)	-1.126*** (0.287)	-1.210*** (0.343)
Primary Surplus (t-1)	0.260*** (0.044)	0.888*** (0.134)	0.140*** (0.048)	0.077 (0.049)	0.214*** (0.047)	0.093** (0.042)	0.069 (0.048)	0.018 (0.037)
Fiscal Rule Index		0.002* (0.001)	0.002** (0.001)	0.002* (0.001)		0.001 (0.001)	0.002* (0.001)	0.001 (0.002)
Squared change of debt				0.066 (0.313)				1.364* (0.787)
F-Test: Joint Sign. of Bottom-up Votes			4.47**	6.73***			11.39***	12.18***
CSA Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cantons	25	25	25	25	25	25	25	25
Years	41	41	41	41	31	31	31	31
N	1,025	1,025	1,025	1,025	775	775	775	775

Dependent variable: Primary Surplus relative to imputed cantonal GDP. Effects are estimated with Pesaran's (2006) CCEMG estimator that controls for cross-sectional-dependence and time variant unobservables with heterogenous impact across panels. We use the Stata routine xtmg. F-Test of joint significance show Chi2 coefficients and indicate the joint effects of lagged debt and number of bottom-up votes and the interaction of both.

This indicates that even if the electorate is not using its direct popular rights, the cantons run sustainable fiscal policies. This does, however, not mean that we could rule out an effect of direct democratic institutions on fiscal reactions. As shown by Matsusaka (2014, 2018), even if the direct democratic provisions are not used by the electorate, they can have an effect on fiscal policy by exerting a “threat”-effect only because they are available and could be used potentially.

However, the question we are interested in is: Does this “threat”-effect increase, if the direct democratic institutions are indeed used? The interaction between the number of votes triggered by the electorate and the lagged debt to GDP ratio is positive and statistically significant, while the fiscal reaction coefficient becomes smaller compared to the model without the interaction term. Therefore, our results show that parts of the fiscal reaction to increased debt to GDP ratios can be explained by the number of population-triggered votes that came to the ballot in the previous year. Our estimations indicate that with every population-triggered vote that arrived at the ballot, cantonal governments increased their primary surplus by additional 0.008 to 0.019 percentage points of imputed cantonal GDP to counteract an increase in their debt to GDP ratio. In 2017, this would correspond to a per capita increase in a canton’s primary surplus of 6 to 15 Swiss franc per ballot.

In columns 4 and 8 we include the squared deviation of cantonal debt from its mean in order to consider non-linearities in debt development. Our results on cantonal fiscal sustainability and of the effect of an alert electorate on fiscal reactions of governments hold, now indicating an additional fiscal reaction to increased debt of 0.010 to 0.017 percentage points of imputed GDP for every population-triggered vote.

## **5.2 Considering Time-Variant Expenditure Preferences**

Funk and Gathmann (2011, 2013) find smaller effects of direct democratic institutions on cantonal fiscal outcomes if they include fiscal preferences of the electorate into their empirical analysis. They show that fiscal preferences of voters vary considerably between the cantons and are systematically correlated with fiscal institutions. In particular, they find that voters in cantons with strong direct democratic institutions are fiscally more conservative than voters in cantons with weaker direct democratic provisions. For our analysis, these findings imply that not sufficiently accounting for the fiscal preferences of the electorate could lead to an omitted variable bias. Cantons with stronger direct democratic institutions impose lower barriers for the electorate to trigger popular votes, while the number of votes that come to the ballots is higher in cantons with low barriers to call a vote. Thus, our estimates of the effects of an alert electorate could simply reflect differing fiscal preferences between the cantons’ electorates if we did not sufficiently account for them. One possibility to incorporate fiscal preferences of voters into the analysis of cantonal fiscal policy proposed by Funk and Gathmann (2011, 2013) is to include canton-fixed effects into the estimated model. This is one of the reasons why we use the CCEMG-estimator that attains its panel estimate out of 25 canton-individual estimation effects and accounts for time-invariant unobserved heterogeneity of the cantons, such as fiscal preferences. Conceptually, this is equivalent to an inclusion of canton fixed effects.



**Table 2: Effect of Bottom-up Votes on the Fiscal Reaction Function of Cantonal Governments including Expenditure Preferences**

	1977-2017				1987-2017			
	Time Trend		Preferences Variable		Time Trend		Preferences Variable	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Lagged Debt	0.043 (0.031)	0.077** (0.035)	0.054** (0.027)	0.070** (0.030)	0.081** (0.036)	0.140*** (0.038)	0.103*** (0.032)	0.156*** (0.038)
Lagged Debt*No. of Bottom-up Votes	0.010** (0.005)	0.011* (0.006)	0.008** (0.004)	0.011** (0.004)	0.023*** (0.008)	0.022** (0.010)	0.019*** (0.007)	0.018** (0.009)
Number of Bottom-up Votes	-0.001** (0.000)	-0.001** (0.000)	-0.001** (0.000)	-0.001*** (0.000)	-0.002*** (0.008)	-0.002*** (0.001)	-0.002** (0.001)	-0.002** (0.001)
YVAR	1.056 (0.702)	0.847 (0.702)	1.287* (0.774)	0.722 (0.699)	-0.237 (1.305)	0.086 (0.808)	-0.099 (0.921)	0.768 (0.838)
GVAR	-0.799*** (0.216)	-0.759*** (0.204)	-0.820*** (0.232)	-0.767*** (0.219)	-1.129*** (0.278)	-1.177*** (0.309)	-1.132*** (0.302)	-1.169*** (0.341)
Primary Surplus (t-1)	0.088** (0.041)	0.018 (0.006)	0.147*** (0.047)	0.073 (0.052)	0.005 (0.040)	-0.038 (0.043)	0.073 (0.051)	0.018 (0.043)
Fiscal Rule Index	0.003* (0.001)	0.002 (0.002)	0.003** (0.001)	0.003* (0.001)	0.001 (0.002)	0.000 (0.000)	0.003* (0.001)	0.002 (0.002)
Squared change of debt		-0.132 (0.437)		0.139 (0.326)		1.122* (0.661)		1.260 (0.922)
Expenditure Preferences of Voters			-0.010 (0.013)	-0.007 (0.012)			-0.022 (0.019)	-0.008 (0.021)
F-Test: Joint Sign. of Bottom-up Votes	3.53**	6.41**	5.50**	6.91***	8.24***	10.21**	13.08***	9.86***
Cantonal Time Trend	Yes	Yes	No	No	Yes	Yes	No	No
CSA Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cantons	25	25	25	25	25	25	25	25
Years	41	41	41	41	31	31	31	31
N	1,025	1,025	1,025	1,025	775	775	775	775

Dependent variable: Primary Surplus relative to imputed cantonal GDP. Effects are estimated with Pesaran's (2006) CCEMG estimator that controls for cross-sectional-dependence and time variant unobservables with heterogenous impact across panels. We use the Stata routine xtmg. F-Test of joint significance show Chi2 coefficients and indicate the joint effects of lagged debt and number of bottom-up votes and the interaction of both.

But are fiscal preferences time-invariant? While Dafflon and Pujol (2001) argue that fiscal preferences are persistent, Funk and Gathmann (2013) show that fiscal preferences may evolve over time if, e.g., the composition of a canton's population changes or if voters experience a shift in their individual preferences. Only accounting for time-invariant unobservables may therefore not sufficiently reflect voters' fiscal preferences, especially if a long  $t$  dimension is observed. The CCEMG-estimator allows for unobserved time-variant cross-cantonal effects. Thus, using this estimator goes beyond the simple inclusion of canton-fixed effects as it allows for changes in the fiscal preferences over time for the federation as a whole and the different impact that these changes have on every canton in each year. However, the CCEMG-estimator only allows for time-variant unobservables *within* each canton that are in line with the federations as a whole and, thus, not for time-variant deviations of fiscal preferences within a canton compared to the federation as a whole.

To allow for time-invariant fiscal preferences of voters within the cantons that deviate from the federation, we follow Funk and Gathmann (2011) and amend our model in two ways. First, we include canton-specific time trends into the model. As preferences evolve slowly, time trends should capture gradual changes in the primary surplus that can be explained by preference shifts. However, there may be other factors that influence the primary surplus over time. Therefore, we use an updated version of Funk and Gathmann's (2011) variable of fiscal preferences as second approach to measure time-variant fiscal preferences within the cantons. Following them, we use the 613 popular votes that took place on the Swiss federal level between 1977 and 2017. From these votes, we separate those that would have increased or decreased public spending (Funk and Gathmann 2011). We then use the average support for increases (against decreases) of public spending within each canton in every year as our measure for the expenditure preferences of voters within a canton. We update the data of Funk and Gathmann (2011, 2013) twofold. First, we extend the data until 2017. Second, we weight each cantonal vote share with the turnout of the vote in the respective canton to consider that a federal vote might have a varying relevance among the cantons and low turnouts that result out of this could bias approval shares and, thus, the preference indicator.

Estimation results that include our measures for time-variant fiscal preferences of the electorate within the cantons are reported in Table 2. We include canton-specific linear trends in columns 1 and 5. In columns 2 and 6 we include canton-specific trends and allow for non-linearities in the development of the debt to GDP ratio. Including cantonal trends leaves our results on fiscal sustainability unchanged, while the effect of an additional population triggered vote is slightly larger than without including cantonal trends.

In column 3 and 7, we include our variable for the expenditure preferences of voters within a canton into the model. If we explicitly control for the expenditure preferences of voters, the fiscal reaction coefficient slightly increases, while the inclusion of time-variant expenditure preferences leaves the effect of an additional population-triggered vote on the government's fiscal reaction almost unchanged.

These results hold if we allow for non-linearities in the debt to GDP ratio (columns 4 and 8). The expenditure preferences variable shows the expected negative sign, indicating that higher expenditure preferences of the electorate are associated with lower primary surpluses. However, this effect is not statistically significant. We explain the statistical insignificance of the expenditure preferences variable with the characteristics of the CCEMG-estimator, that already incorporates large parts of the cross-cantonal time-variation of fiscal preferences of voters.

### **5.3 Disentangling Indirect and Direct Effects**

Why do additional population-triggered votes increase the fiscal reaction of cantonal governments to an increasing debt to GDP ratio? Both, indirect and direct effects are conceivable. According to Gerber (1996) and Matsusaka (2018) the expectation of governments that voters could challenge or amend their policy induces them to change their policy preemptively. In our case, this would mean that governments act fiscally more cautiously after experiencing an alert electorate, expecting that their policy could be challenged in the current year (indirect effect).

It could, however, also be the case that voters use their direct democratic rights and effectively change the fiscal policy of a canton. A higher number of votes would then be associated with a larger increase in a canton's debt to GDP ratio. In this case, the stronger fiscal reaction would result out of a changed fiscal need to adopt the primary surplus (direct effect).

To disentangle the indirect and the direct effects, we separate the population-triggered votes into those that are approved by the electorate and those that fail at the ballots. Again, we interact the number of approved and non-approved votes in the previous year with the lagged debt to GDP ratio to analyze whether fiscal reactions to increasing debt change if the electorate uses its direct democratic rights actively. If the change of fiscal reactions comes through the approved votes or through both, the approved and the non-approved votes, we cannot clearly disentangle the indirect from the direct effects. If, however, the effect only comes via the votes that fail at the ballots, we find evidence supporting the indirect channel as these votes did not effectively change the government's intended policy.

Results for the disentangled approved and non-approved votes are reported in columns 1 and 2 of Table 3. We only find a positive and statistically significant effect on the fiscal reaction of cantonal governments to increasing debt to GDP ratios for the number of votes that fail at the ballot. The effect size of an additional vote increases compared to the pooled number of population-triggered votes. Our estimates indicate that with every population-triggered vote that fails at the ballots, the government increases the primary surplus by additional 0.057 percentage points of imputed GDP to counteract an increase in the debt to GDP ratio, while we find no significant effect of successful population-triggered votes on the fiscal reaction of cantonal governments.

**Table 3: Effect of Bottom-up Votes on the Fiscal Reaction Function of Cantonal Governments with Disentangled Effects 1987-2017**

Dependent Variable:	Primary Surplus		Primary Expenditures		Revenues	
	(1)	(2)	(3)	(4)	(5)	(6)
Lagged Debt	0.071* (0.043)	0.068* (0.041)	0.063** (0.032)	0.319 (0.305)	0.137*** (0.028)	0.111*** (0.030)
Lagged Debt*No. of Bottom-up Votes			-0.062 (0.049)	-0.011 (0.035)	0.012* (0.007)	0.016** (0.007)
Lagged Debt*No. of Bottom-up Votes Approved	0.019 (0.051)	0.005 (0.056)				
Lagged Debt*No. of Bottom-up Votes Non-Approved	0.057** (0.029)	0.054* (0.031)				
No. of Bottom-up Votes			0.005 (0.004)	-0.001 (0.003)	-0.001 (0.001)	-0.001 (0.001)
No. of Bottom-up Votes Approved	-0.002 (0.003)	-0.001 (0.003)				
No. of Bottom-up Votes Non-Approved	-0.004* (0.002)	-0.003 (0.002)				
YVAR	0.373 (1.235)		3.975 (5.081)		-0.059 (0.887)	
GVAR	-1.252*** (0.348)		19.131*** (4.268)		0.579*** (0.163)	
Output Gap		-0.121 (0.121)		-1.030 (0.897)		-0.118 (0.097)
Expenditure Gap		- 0.559*** (0.066)		10.252*** (0.231)		0.458*** (0.069)
Primary Surplus (t-1)	0.072 (0.061)	0.138** (0.055)				
Primary Expenditures (t-1)			0.155*** (0.034)	0.171*** (0.031)		
Revenues (t-1)					0.141** (0.067)	0.138** (0.067)
Fiscal Rule Index	0.003** (0.001)	0.003* (0.002)	-0.007 (0.010)	-0.008 (0.008)	0.001 (0.002)	0.001 (0.002)
Expenditure Pref. of Voters	-0.013 (0.026)	-0.011 (0.026)	0.014 (0.105)	-0.060 (0.088)	-0.020 (0.022)	-0.014 (0.019)
Cantonal Time Trend	Yes	Yes	Yes	Yes	Yes	Yes
CSA Controls	Yes	Yes	Yes	Yes	Yes	Yes
F-Test: Joint Sign. of Bottom-up Votes	11.26***	11.74***	4.23**	0.61	25.52***	16.24***
Cantons	25	25	25	25	25	25
Years	31	31	31	31	31	31
N	775	775	775	775	775	775

Effects are estimated with Pesaran's (2006) CCEMG estimator that controls for cross-sectional-dependence and time variant unobservables with heterogenous impact across panels. We use the Stata routine xtmg. F-Test of joint significance show Chi2 coefficients and indicate the joint effects of lagged debt and number of bottom-up votes and the interaction of both.

There could still be a direct effect at work if the failure of a vote induces an increase in a canton's debt to GDP ratio. This would be the case if the government favored an increase in the debt to GDP ratio in  $t-1$ . To check for this possibility, we estimate an auxiliary regression with the cantonal debt to GDP ratio as dependent variable and the number of population-triggered votes that fail as explanatory variable. Moreover, we control for extraordinary fluctuations in output and expenditures as well as fiscal

preferences of the electorate. Results are shown in Table A1. We find no effect of failing votes on cantonal debt to GDP ratios. Therefore, our results support the theoretical reasoning of Gerber (1996) and Matsusaka (2018) on the indirect effects of direct democracy on fiscal policy outcomes.

#### 5.4 Does Adaption Come through Cutting Expenditures or Raising Revenues?

If cantonal governments act fiscally cautiously because they expect voters to challenge or to amend their policies, they can either reduce primary expenditures, increase revenues or combine the two policies. In columns 3 to 6 of Table 3, we estimate which of those three policies cantonal governments choose to counteract an increase in their debt to GDP ratio.

**Table 4: Isolated Effects of Initiatives on the Fiscal Reaction Function of Cantonal Governments 1987-2017**

	(1)	(2)	(3)	(4)	(5)	(6)
Lagged Debt	0.106*** (0.036)	0.139*** (0.038)	0.136*** (0.043)	0.135*** (0.046)	0.162*** (0.034)	0.160*** (0.054)
Lagged Debt*No. Initiatives	0.021* (0.012)	0.025** (0.010)	0.033*** (0.012)	0.034*** (0.013)		
Number of Initiatives	-0.001 (0.001)	-0.002** (0.001)	-0.002** (0.001)	-0.002* (0.001)		
Lagged Debt*No. Initiatives Approved					-0.151 (0.173)	
Number of Initiatives Approved					0.007 (0.010)	
Lagged Debt*No. Initiatives Non-Approved						0.037** (0.018)
Number of Initiatives Non-Approved						-0.002 (0.001)
YVAR	0.776 (0.907)	1.063* (0.566)	0.677 (0.794)	0.951 (0.727)	0.810 (1.160)	0.873 (0.676)
GVAR	-1.171*** (0.312)	-1.216*** (0.347)	-1.194*** (0.320)	-1.139*** (0.322)	-1.117*** (0.287)	-1.141*** (0.314)
Primary Surplus (t-1)	0.133*** (0.048)	0.072* (0.043)	-0.005 (0.051)	0.020 (0.060)	0.001 (0.063)	0.010 (0.059)
Fiscal Rule Index	0.002* (0.001)	0.002 (0.002)	0.000 (0.003)	0.001 (0.003)	0.001 (0.003)	0.001 (0.003)
Squared change of debt		1.800** (0.800)	1.325** (0.585)	1.313* (0.694)	1.221 (0.767)	1.338* (0.763)
Expenditure Preferences of Voters				-0.010 (0.022)	-0.006 (0.026)	-0.005 (0.021)
Cantonal Time Trend			Yes	Yes	Yes	Yes
CSA Controls	Yes	Yes	Yes	Yes	Yes	Yes
F-Test: Joint Sign. of Bottom- up Votes	12.95***	17.83***	15.71***	13.03***	0.01	16.90***
Cantons	25	25	25	25	25	25
Years	31	31	31	31	31	31
N	775	775	775	775	775	775

Dependent variable: Primary Surplus relative to imputed cantonal GDP. Effects are estimated with Pesaran's (2006) CCEMG estimator that controls for cross-sectional-dependence and time variant unobservables with heterogenous impact across panels. We use the Stata routine xtmg. F-Test of joint significance show Chi2 coefficients and indicate the joint effects of lagged debt and number of bottom-up votes and the interaction of both.

Our results show that cantonal governments increase their revenues after their debt to GDP ratio increased, while we find no robust effects for expenditure cuts. In line with this general fiscal reaction, our results indicate that the effect of an alert electorate on the fiscal reaction of the government also evolves on the revenue side of the public budget. Our estimates indicate that, with every additional population-triggered vote, cantonal revenue increases by 0.012 to 0.016 percentage points of imputed cantonal GDP in the following year. On the contrary, we find no significant effect of additional population-triggered votes on primary spending. According to these results, an increased expectation of governments that voters intervene into their policy incentivizes cantonal governments to increase revenues and not to cut expenditures.

## 5.5 Effects of Initiatives

According to theory (Matsusaka 2018), initiatives and referendums have different effects on the relative correction of governmental policy towards the preferences of the electorate. Not controlling for the exclusive effect of initiatives would be problematic if fiscal preferences of voters and governments differed one-dimensionally over all cantons and years. Although this is unlikely in our case, we cannot rule out this scenario. Thus, we run separate estimations and investigate whether our results on fiscal reactions hold if we only use the number of initiatives that appeared at the ballot in the previous year.

Separate results for initiatives are reported in Table 4. Our results on fiscal reactions hold, if we only use the number of initiatives that appeared at the ballot as our measure for the alertness of the electorate. The effect of an additional initiative that appears at the ballots on the fiscal reaction to an increase in the debt to GDP ratio is larger than the effect of population-triggered votes in general. This is in line with theory indicating that the initiative is binding governments more strictly than the petition-referendum. Our separate estimates for the initiative support the evidence on the indirect effects of population-triggered votes. Again, we only find a significant effect on fiscal reactions for those initiatives that fail at the ballot.

## 6. Robustness

We run a series of robustness checks to ensure that our empirical results on the effects of additional votes on the fiscal reaction of cantonal governments are not spurious. First, we use the control variables that are proposed by Bohn (2008) and applied by Potrafke and Reischmann (2015) and Feld et al. (2020) to consider fluctuations in output and cantonal expenditures instead of using the GVAR and YVAR controls that Barro's (1981, 1986) model yields. Bohn (2008) uses the deviation of the actual value of output and expenditures from their trend. Again, we calculate trend values using the Hodrick-Prescott (1997) filter with a smoothing parameter of 100. In line with theory, we expect a negative correlation of Bohn's expenditure- and output-gap with the primary surplus. Results with Bohn controls are reported in Table A2 in the appendix. For the analysis of disentangled effects, results with the control variables

of Bohn are shown in Table 5. Our results hold if we use the alternative specification to control for fluctuations in output and expenditures.

Second, we include dummy variables that indicate whether a cantonal election took place in the previous year. Burret and Feld (2018) find that political budget cycles influence cantonal fiscal policy and show that governments increase expenditures in election years. If voters triggered more popular votes in election years, the increased need to restore the additional expenditures in the year following the election could bias our results. Our measure would then act as a proxy for a political budget cycle. Column 1 and 5 of Table 5 show our model with election dummies included. In column 2 and 6 we include an interaction term between election dummies and the lagged debt to GDP ratio to estimate whether fiscal reactions are stronger after election years. In both specifications, we continue to find a positive and significant effect of the number of population-triggered votes on the fiscal reaction to increased debt. On the contrary, we find no effect of an increased fiscal reaction in a year following an election.

Third, in addition to control for the influence of fiscal rules on the primary surplus, we include an interaction between the fiscal rule index and the lagged debt to GDP ratio to control for effects of fiscal rules on fiscal reactions. If changes in a canton's fiscal rule coincided with popular votes, this could influence our results. Our results in columns 3 and 7 of Table 6 show however that fiscal rules, although having an effect on the level of the primary surplus, do not impair our estimates on the effects of popular votes on fiscal reactions.

Fourth, we use the average turnout of population-triggered votes in the previous year instead of the number of votes as alternative measure for the alertness of cantonal electorates. Results are reported in columns 4 and 8 of Table 5. We find no effects of an increased participation of electorates in popular votes on the fiscal reaction of a canton's government to increased debt. This result supports that it is the sheer possibility of a vote that induces governments to become fiscally cautious, expecting that voters could challenge their policies.

To check our results on direct and indirect effects of population-triggered votes further, we include the number of population-triggered votes in the current year as additional control variable into our model. It is likely that the number of population-triggered votes in the current year are correlated with the number of population-triggered votes in the past year. Then, our measure for the alertness of voters would act as a proxy for the number of votes in the current year. In this case, our results which support the indirect effects of an alert electorate would not hold. We include the number of population-triggered votes in the current year as additional control variable into our model. Moreover, we include an interaction between the lagged debt to GDP ratio and the number of votes in the current year. Estimations are reported in Table A3. We find no effects of the number of population-triggered votes in the current year on the primary surplus or on fiscal reactions. With both changes in the model, our results on the effects of the number of votes in the previous year on fiscal reactions hold.

**Table 5: Robustness**

	1977-2017				1987-2017			
	Political Budget Cycles		Fiscal Rules	Turnout	Political Budget Cycles		Fiscal Rules	Turnout
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Lagged Debt	0.048*	0.054**	0.036	0.088**	0.094***	0.109***	0.052	0.128***
	(0.026)	(0.023)	(0.023)	(0.042)	(0.034)	(0.037)	(0.045)	(0.044)
Lagged Debt*No. of Bottom-up Votes	0.009*	0.008*	0.009*		0.017**	0.021**	0.018**	
	(0.005)	(0.005)	(0.005)		(0.008)	(0.012)	(0.007)	
Lagged Debt*Election		0.003				0.024		
		(0.016)				(0.052)		
Lagged Debt*Fiscal Rule Index			-0.067				-0.013	
			(0.082)				(0.067)	
Lagged Debt*Turnout				0.017				-0.011
				(0.020)				(0.053)
Election Dummy	0.001	-0.001			0.001	-0.002		
	(0.000)	(0.002)			(0.001)	(0.004)		
Number of Bottom-up Votes	-0.001*	-0.001	-0.001**	0.000	-0.001*	-0.001	-0.002**	-0.001*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)
Fiscal Rule Index	0.003**	0.002*	0.001	0.002*	0.003**	0.002	-0.001	0.002
	(0.001)	(0.001)	(0.004)	(0.001)	(0.001)	(0.001)	(0.006)	(0.001)
YVAR	1.071	1.106	0.703	1.549**	0.085	0.049	-0.737	1.374
	(0.886)	(0.838)	(0.674)	(0.777)	(0.886)	(1.007)	(0.922)	(0.896)
GVAR	-0.794***	-0.802***	-0.803***	-0.883***	-1.126***	-1.191***	-1.126***	-1.327***
	(0.227)	(0.216)	(0.221)	(0.257)	(0.296)	(0.299)	(0.309)	(0.360)
Primary Surplus (t-1)	0.142***	0.150***	0.043	0.141***	0.050	0.071	-0.017	0.067
	(0.043)	(0.046)	(0.052)	(0.048)	(0.045)	(0.056)	(0.047)	(0.055)
Expenditure Preferences of Voters	-0.007	-0.002	-0.019	-0.007	.022	-0.040*	-0.035**	-0.012
	(0.014)	(0.015)	(0.018)	(0.014)	(0.024)	(0.024)	(0.015)	(0.022)
Average Turnout of Votes				-0.008				0.002
				(0.007)				(0.004)
CSA Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F-Test: Joint Sign. of Bottom-up Votes	5.59**	7.75***	5.50**	7.33**	12.63***	12.35***	13.70***	4.95**
Cantons	25	25	25	25	25	25	25	25
Years	41	41	41	41	31	31	31	31
N	1,025	1,025	1,025	1,025	775	775	775	775

Dependent variable: Primary Surplus relative to imputed cantonal GDP. Effects are estimated with Pesaran's (2006) CCEMG estimator that controls for cross-sectional-dependence and time variant unobservables with heterogenous impact across panels. We use the Stata routine xtmg. F-Test of joint significance show Chi2 coefficients and indicate the joint effects of lagged debt and number of bottom-up votes and the interaction of both.



Finally, we want to ensure that our estimations are not biased due to single observations. We exclude single cantons from the panel to check whether the non-stationarity of the debt series of single cantons disturbs our empirical results. We can trace back the result of panel-non-stationarity in the debt to GDP ratio to the four cantons Obwalden, Basel-County, St. Gallen and Ticino. Table A4 shows estimation results excluding these four cantons and estimate the effects for cantons with stationary debt series. The empirical results remain robust. Thus, non-stationarity in the debt series of single cantons does not change our results.

## **7. Conclusion**

By estimating fiscal reaction functions, we show that the Swiss cantons run sustainable fiscal policies. The cantons react to a rise in their debt to GDP ratio by increasing their primary surplus to counteract this increase. According to our estimates, the extent to which citizens use their direct democratic rights explains parts of a canton's fiscal reactions. Our results indicate that the fiscal reaction to increased debt is stronger, the more proactive cantonal voters use their direct democratic rights. Moreover, we find that those votes that fail at the ballot induce stronger fiscal reactions of cantonal governments. In line with the existing theory on the effects of direct democracy on fiscal outcomes, we explain these findings with the "threat"-effect of direct democracy: Representatives act fiscally more cautiously if they expect that voters will change or amend their policy. These expectations rise, the more voters actively use direct democratic provisions.

Does this support the claim that voters who use their direct democratic rights proactively enhance fiscal sustainability, instead of harming it? Based on the empirical evidence in this paper, for the case of the Swiss cantons the ultimate answer to this question is yes. However, neither enhancing fiscal sustainability nor inducing more conservative fiscal policies needs to be the intention of voters. Moreover, spending preferences of voters do not need to be more conservative than those of governments to attain a sustainability-enhancing effect. Instead, and with reference to the theory on the indirect effects of direct democracy, the evidence of this paper suggests that the eminence of the fiscal commons problem increases for governments if they expect that their intended policies will be changed by a proactive electorate in a way they cannot foresee. As a consequence, our results suggest that cantonal governments adapt their policies preemptively and counteract increases in their debt to GDP ratio precautionarily stronger to retain fiscal space for the case that voters thwart their fiscal plans. Thus, involvement of the electorate through direct democracy helps to explain why the Swiss cantonal level runs sustainable fiscal policies.

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## Appendix

**Table A1: Auxiliary Regression of the Influence of Failed Votes on Debt 1987-2017**

	(1)	(2)
No. of failed Bottom-up Votes	0.000 (0.001)	0.001 (0.001)
Lagged Debt	0.600*** (0.065)	0.341*** (0.058)
YVAR	-0.264 (1.892)	-0.207 (2.469)
GVAR	0.249 (0.168)	0.288 (0.238)
Fiscal Rule Index	-0.005** (0.002)	-0.001 (0.005)
Squared change of debt		-2.551 (2.307)
Expenditure Preferences of Voters	0.013 (0.035)	0.003 (0.031)
Cantonal Time Trend	Yes	Yes
CSA Controls	Yes	Yes
Cantons	25	25
Years	31	31
N	775	775

Dependent variable: Debt to GDP ratio. Effects are estimated with Pesaran's (2006) CCEMG estimator that controls for cross-sectional-dependence and time variant unobservables with heterogenous impact across panels. We use the Stata routine xtmg.

**Table A2: FRF Estimations with Bohn Controls**

	1977-2017				1987-2017			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Lagged Debt	0.038* (0.023)	0.060** (0.026)	0.058* (0.031)	0.055* (0.031)	0.093*** (0.028)	0.140*** (0.042)	0.072** (0.030)	0.076** (0.032)
Lagged Debt*No. of Bottom-up Votes	0.009* (0.005)	0.010* (0.006)	0.012* (0.007)	0.014** (0.007)	0.013* (0.007)	0.013 (0.009)	0.018* (0.010)	0.016** (0.008)
Number of Bottom-up Votes	-0.001 (0.000)	-0.001* (0.001)	-0.001* (0.001)	-0.001** (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Output Gap (Bohn)	-0.123** (0.056)	-0.064 (0.073)	-0.058 (0.064)	-0.067 (0.066)	-0.181** (0.082)	-0.143 (0.100)	-0.243*** (0.074)	-0.228*** (0.087)
Expenditure Gap (Bohn)	-0.527*** (0.053)	-0.526*** (0.051)	-0.511*** (0.044)	-0.508*** (0.049)	-0.535*** (0.059)	-0.529*** (0.047)	-0.525*** (0.063)	-0.515*** (0.067)
Primary Surplus (t-1)	0.180*** (0.042)	0.121*** (0.040)	0.038 (0.033)	0.035 (0.036)	0.128*** (0.045)	0.042 (0.043)	0.042 (0.038)	0.058 (0.040)
Fiscal Rule Index	0.001 (0.001)	0.001 (0.001)	0.001 (0.002)	0.002 (0.002)	0.002 (0.002)	0.002 (0.003)	0.002 (0.002)	0.002 (0.002)
Squared change of debt		0.142 (0.317)				1,810* (0.926)		
Expenditure Preferences of Voters				-0.008 (0.011)				-0.026 (0.016)
Cantonal Time Trend			Yes	Yes			Yes	Yes
CSA Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cantons	25	25	25	25	25	25	25	25
Years	41	41	41	41	31	31	31	31
N	1,025	1,025	1,025	1,025	775	775	775	775

Dependent variable: Primary Surplus relative to imputed cantonal GDP. Effects are estimated with Pesaran's (2006) CCEMG estimator that controls for cross-sectional-dependence and time variant unobservables with heterogenous impact across panels. We use the Stata routine xtmg.

**Table A3: Effects of Population-Triggered Votes in the Current Year**

	1977-2017		1987-2017	
	(1)	(2)	(3)	(4)
Lagged Debt	0.096*** (0.035)	0.090** (0.045)	0.188*** (0.060)	0.132* (0.073)
Lagged Debt*No. of Bottom-up Votes		0.016** (0.008)		0.021* (0.012)
Number of Bottom-up Votes		-0.002** (0.001)		-0.002* (0.001)
Lagged Debt*No. Bottom-up Votes in t	-0.003 (0.006)	0.000 (0.009)	-0.012 (0.012)	-0.006 (0.016)
Number of Bottom-up Votes in t	0.000 (0.001)	0.000 (0.001)	0.001 (0.001)	0.000 (0.001)
YVAR	0.912 (0.745)	1.131 (0.771)	1.105 (0.819)	2.029 (1.349)
GVAR	-0.806*** (0.225)	-0.755*** (0.207)	-1.129*** (0.315)	- 1.241*** (0.376)
Primary Surplus (t-1)	0.034 (0.049)	0.027 (0.047)	0.017 (0.061)	0.027 (0.065)
Fiscal Rule Index	0.004 (0.002)	0.003 (0.002)	0.003 (0.003)	0.002 (0.003)
Squared change of debt	-0.170 (0.432)	-0.100 (0.497)	1.770** (0.767)	1.439** (0.675)
Expenditure Preferences of Voters	-0.004 (0.013)	-0.002 (0.012)	-0.001 (0.026)	-0.019 (0.027)
Cantonal Time Trend	Yes	Yes	Yes	Yes
CSA Controls	Yes	Yes	Yes	Yes
Cantons	25	25	25	25
Years	41	41	31	31
N	1,025	1,025	775	775

Dependent variable: Primary Surplus relative to imputed cantonal GDP. Effects are estimated with Pesaran's (2006) CCEMG estimator that controls for cross-sectional-dependence and time variant unobservables with heterogenous impact across panels. We use the Stata routine xtmg.

**Table A4: Excluding Cantons with Non-Stationary Debt Series**

	1977-2017	1987-2017	1987-2017	1987-2017
	(1)	(2)	(3)	(4)
Lagged Debt	0.081** (0.041)	0.167*** (0.056)	0.163*** (0.048)	0.103** (0.050)
Lagged Debt*No. of Bottom-up Votes	0.015** (0.007)	0.020* (0.011)		
Lagged Debt*No. of Bottom-up Votes Approved			0.023 (0.026)	
Lagged Debt*No. of Bottom-up Votes Non-Approved				0.033 (0.021)
No. of Bottom-up Votes				
No. of Bottom-up Votes Approved			-0.002 (0.002)	
No. of Bottom-up Votes Non-Approved				-0.002 (0.002)
YVAR	0.796 (0.674)	0.536 (0.973)	0.769 (1.386)	0.593 (1.530)
GVAR	-0.772*** (0.246)	-1.108*** (0.321)	-1.180*** (0.309)	-1.105*** (0.306)
Primary Surplus (t-1)	0.023 (0.049)	-0.052 (0.044)	-0.086* (0.049)	0.008 (0.044)
Fiscal Rule Index	0.004* (0.002)	0.004 (0.003)	0.004 (0.004)	0.004 (0.002)
Squared change of debt	-0.103 (0.449)	0.688 (1.182)	1.217 (1.013)	1.336 (1.116)
Expenditure Preferences of Voters	-0.001 (0.014)	0.003 (0.019)	0.012 (0.024)	-0.004 (0.015)
Cantonal Time Trend	Yes	Yes	Yes	Yes
CSA Controls	Yes	Yes	Yes	Yes
Cantons	21	21	21	21
Years	41	31	31	31
N	861	651	651	651

Dependent variable: Primary Surplus relative to imputed cantonal GDP. Effects are estimated with Pesaran's (2006) CCEMG estimator that controls for cross-sectional-dependence and time variant unobservables with heterogeneous impact across panels. We use the Stata routine xtmg.