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# Economics

HEI Working Paper No: 15/2007

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### Abstract

This paper focuses on the observed empirical relationship between fiscal rules and budget deficits, and examines whether this correlation is driven by an omitted variable, namely voter preferences. We make use of two different estimation methods to capture voter preferences in a panel of Swiss sub-federal jurisdictions. First, we include a recently constructed measure of fiscal preferences. Second, we capture preferences through fixed effects with a structural break as women are enfranchised. We find that fiscal rules continue to have a significant impact on real budget balances.

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# Do fiscal rules cause budgetary outcomes?\*

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April 2007

## Abstract

This paper focuses on the observed empirical relationship between fiscal rules and budget deficits, and examines whether this correlation is driven by an omitted variable, namely voter preferences. We make use of two different estimation methods to capture voter preferences in a panel of Swiss sub-federal jurisdictions. First, we include a recently constructed measure of fiscal preferences. Second, we capture preferences through fixed effects with a structural break as women are enfranchised. We find that fiscal rules continue to have a significant impact on real budget balances.

*JEL Classification:* C2; D7; E6; H6.

*Keywords:* Fiscal policy; fiscal rules; fiscal institutions; budget deficits; fiscal preferences; endogeneity.

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# 1 Introduction

The emergence of persistent budget deficits and rising public debt levels in industrialised countries has triggered a large amount of research into causes and possible solutions. Theoretical models increasingly incorporate the view that politicians act as optimizing agents instead of improbable benevolent social planners, in turn illustrating how the political process can lead to suboptimal economic outcomes with a bias toward deficits<sup>1</sup>. In response to the emergence of a deficit bias, some have argued in favour of formal restraints on fiscal policy. Skeptics, however, argue that fiscal rules can always be circumvented when policy makers wish to run deficits, and hence, that fiscal rules do not work as an effective restraint on fiscal policy.

The empirical evidence that fiscal rules result in lower budget deficits tentatively suggests that rules do work. For instance, several studies conducted at the sub-federal (cantonal) level in Switzerland find effects of formal restraints which are both statistically significant and economically quite relevant<sup>2</sup>. But there is concern that the estimated impact of fiscal rules does not constitute a causal link from rules to budgets, but is instead driven at least partially by unobserved heterogeneity in the cross section. A candidate for such unobserved heterogeneity is voter preferences. Poterba (1996) argues that

“The critical question for policy evaluation is how to interpret these correlations between budget institutions and fiscal policy outcomes. It is possible

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<sup>1</sup>See Persson and Tabellini (2000), chapter 9, and Alesina et al. (1999), chapter 9, for surveys. The seminal contribution is Weingast et al. (1981).

<sup>2</sup>In Switzerland, a structural balanced budget rule was adopted at the federal level in 2002, and at the cantonal level there is an increasing drive to adopt similar budget rules with the aim of controlling local government indebtedness.

that the correlations simply reflect correlations involving fiscal discipline, fiscal institutions, and an omitted variable, voter tastes for fiscal restraint.”<sup>3</sup>

Suppose that more fiscally conservative voters prefer lower budget deficits and prefer their constitutions to reflect this by containing balanced budget rules or debt “breaks”, even though these rules are not ex post enforceable. Suppose also that politicians on average care about reelection and have a greater probability of reelection if they cater to voters’ preferences (a median voter type of argument). Then jurisdictions with more fiscally conservative electorates would tend to see lower budget deficits as well as a higher likelihood of having a fiscal rule, without necessarily having any direct effect of the latter on the former.

This paper tests whether the often estimated impact of fiscal rules on budgetary outcomes is mainly driven by voter preferences. We make use of two complementary approaches. First, we include a new measure of fiscal preferences by Funk and Gathmann (2006) in an otherwise standard panel specification for budget deficits. In so doing, we are able to test whether the significance of the statistical relationship between fiscal rules and budget deficits remains once we control for voter preferences. This has not previously been possible because such measures did not exist or were not reliable. In a second approach, we follow Dafflon and Pujol (2001) and assume that an individual voter’s fiscal preferences are largely time-invariant. If this is the case, then the only change in an electorate’s fiscal preferences will happen when the composition of the electorate changes. Over the last 50 years, the most important change in the composition of Swiss cantonal electorates occurred

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<sup>3</sup>Poterba (1996), p. 399.

when women were granted the right to vote, which happened relatively late (the first cantons to grant women the right to vote were Neuchâtel and Vaud in 1959, and the last was Appenzell I. Rh. in 1990), and at different times across cantons. Krogstrup and Wälti (2007) provide evidence that adding women to the electorate changed the preferences of the median voter with regard to fiscal discipline in Swiss cantons. We therefore propose to capture the electorate's preferences for fiscal discipline by cross section fixed effects, and by allowing for a structural break arising from women's enfranchisement. Including simple fixed effects in budget balance regressions with fiscal rules is not usually done in regressions including fiscal rules because the low time variation in fiscal rules indices implies that the standard fixed effects estimator is likely to produce inefficient estimates. As a remedy, we make use of the newly proposed vector decomposition approach by Plümper and Troeger (2007) to disentangle observed and unobserved cross-sectional heterogeneity. In this way, we are able to include fixed effects as well as to generate more efficient estimates.

We focus on Switzerland as a case study and find that the two estimation approaches result in the same outcome: fiscal rules continue to have a significant, positive effect on budgetary outcomes after controlling for voter preferences. The estimated impact of fiscal rules decreases only by a small amount when voter preferences are taken into account.

The remainder of the paper is organized as follows. Section 2 reviews the literature on fiscal rules and budgetary outcomes. Section 3 presents our two econometric approaches to controlling for voter preferences, while Section 4 presents the data. Results for OLS regressions and vector decompositions are presented in Section 5 and Section 6 respectively. The final section concludes.

## 2 Review of the literature

A number of empirical studies address the question of whether or not fiscal rules have empirical effects on the budget balance and the level of public debt. Much of the work in this area focuses on federal states, most notably the United States, Canada and Switzerland. The sub-federal jurisdictions of these countries have some degree of fiscal independence and cross-jurisdictional variation in their fiscal institutions, while being less heterogeneous in other political, institutional or cultural dimensions than central government fiscal authorities might be. As such, these federal states provide laboratory-like conditions for testing the impact of fiscal rules on budgetary outcomes.

The results of these studies largely support the hypothesis that fiscal rules result in lower budget deficits. Several studies carried out in the mid-nineties for the United States find that the presence and/or strength of fiscal rules are associated with faster policy initiatives to reduce unexpected deficits (Poterba, 1994; Alt and Lowry, 1994) or lower budget deficits overall (Bohn and Inman, 1996; Alesina and Bayoumi, 1996). Similar evidence for Canadian provinces indicates that provincial legislation against deficits leads to stronger budget balances, other things equal (Tellier and Imbeau, 2004). Finally, Feld and Kirchgässner (2006) and Schaltegger (2002) conclude that fiscal rules in Swiss cantons are associated with smaller budget deficits.

The main question now posed in the literature is whether this correlation between fiscal rules and budgetary outcomes represents a causal relationship. Poterba (1996) notes that fiscal rules and budgetary outcomes would be correlated without any causal relationship

because of an omitted variable, namely voter preferences. Following Poterba's critique, more recent studies attempt to control for voter preferences. Feld and Matsusaka (2003), in a regression of spending on the presence of mandatory budget referenda in Swiss cantons, make use of the share of seats held by left-wing parties in cantonal parliaments to capture voter preferences and find that the associated coefficient is not statistically significant. They therefore conclude in favour of a causal relationship between referenda and budgetary outcomes. However, making use of the relative share of seats held by political parties does not capture fiscal preferences adequately. Voters are likely to choose to support a political party on the basis of numerous different facets, of which only one is the degree of fiscal prudence. The relative share of seats therefore comprises much more information than just the fiscal preferences of voters and as such, it is at best a noisy indicator of fiscal preferences. In the words of Dafflon and Pujol (2001), "the pertinent measure of conservatism for our issue ought to be directly related to the notion of fiscal conservatism which is different from the general notion of political conservatism"<sup>4</sup>.

To better control for voter preferences in regressions of fiscal outcomes on fiscal institutions, Dafflon and Pujol (2001) and Funk and Gathmann (2006) exploit the instruments of direct democracy in Switzerland to construct targeted measures of fiscal preferences. Swiss citizens vote several times every year on various issues, including projects with direct fiscal implications. The main idea of these authors is to use the cantonal outcome of federal votes on fiscal matters to construct measures of preferences. Dafflon and Pujol (2001) identify seventy-five federal referenda on fiscal issues between 1979 and 1996, and use these to rank

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<sup>4</sup>Dafflon and Pujol (2001), p. 56.

cantons according to their share of fiscally conservative votes for each of these referenda. This produces a relative measure of fiscal conservatism. As fiscal federal referenda are the same across all cantons, and concern federal fiscal issues rather than cantonal fiscal issues, the voter behavior can be directly compared across cantons, as it is less likely to be linked to the particular fiscal situation in the canton in question. Dafflon and Pujol (2001) consider the average of the outcome of this ranking across the entire period, and use this as a time invariant index of fiscal conservatism. The hypothesis that fiscal preferences are constant over time is motivated by the fact that the responses of voters are consistent over long periods of time but change significantly from one specific vote to another. It therefore appears that the precise nature of the fiscal object of the vote affects cantonal voting outcomes. Dafflon and Pujol (2001) argue that this volatility occurs despite the fact that actual preferences do not change.

Dafflon and Pujol (2001) find that the presence of fiscal rules or the presence of mandatory fiscal referenda have no effect on budget deficits once voter preferences are controlled for. But the result is not very robust as the cross-section regressions exhibit very few degrees of freedom (there are only 25 Swiss cantons). When using Swiss cantonal data, it is therefore desirable to extend the sample by exploiting the variation in the time-series dimension, and thereby to obtain better estimates of coefficients and their respective standard errors.

Recent work by Funk and Gathmann (2006) on measuring fiscal preferences allows for such time variation. A median voter in a given canton faces a sequence of federal binary choices between a new policy and the status quo, both of which are characterized



by attributes (Lancaster, 1966; Gorman, 1980). The median voter votes in favour of the new policy if her utility of accepting the new policy is greater than her utility of rejecting the proposition. When the attributes of both the new policy and the status quo are observed, a probit model can be estimated given the availability of cantonal data on voting outcomes in federal ballots and a functional form for the utility function of the median voter. Unfortunately, such attributes are unobservable.

Funk and Gathmann (2006) model the attributes as a set of latent factors (Heckman and Snyder, 1997). In this setup, the factors are the unobserved attributes and the canton-specific factor loadings capture the cantonal median voter's valuation (preferences) of the latent policy attributes associated with federal binary choices. Funk and Gathmann (2006) estimate factor loadings by decade from a dataset of 335 federal votes between 1950 and 2000. They identify three factors, corresponding respectively to a conservative-liberal dimension, a favourable attitude towards redistribution, and a favourable attitude towards state regulation. The factor loadings associated with the second factor are then included into an otherwise standard specification for public spending to examine a potential omitted variable bias in regressions focusing on the relationship between fiscal mandatory referenda and public expenditures in Swiss cantons. When fiscal preferences are taken into account, the effect of mandatory referenda is much smaller than initially thought, and completely disappears when municipal spending levels are also taken into account. These findings imply that controlling for voter preferences remains essential for policy evaluation. We turn to this below.

### 3 Empirical strategy

Suppose that the true model of budget balances is given by

$$b_{it} = \alpha fr_{it} + \gamma vp_{it} + \varepsilon_{it} \quad (1)$$

This model abstracts from an intercept term and from other control variables for the clarity of the exposition. The dependent variable, denoted as  $b_{it}$ , measures the budget balance of canton  $i$  at time  $t$ ,  $fr_{it}$  is an index capturing the presence or strength of fiscal rules, and  $vp_{it}$  stands for the degree of fiscal conservatism of the electorate. Estimating this model by ordinary least squares while omitting voter preferences yields

$$\hat{\alpha}_{OLS} = \alpha + \gamma \frac{Cov(fr_{it}, vp_{it})}{Var(vp_{it})} \quad (2)$$

The estimate of the coefficient  $\alpha$  obtained by ordinary least squares, denoted as  $\hat{\alpha}_{OLS}$ , is biased and inconsistent when the covariance between fiscal rules and voter preferences is different from zero. In other words, the coefficient estimate will be biased and inconsistent when both the budget balance and the presence/strength of fiscal rules are simultaneously determined by a third factor. In particular, the coefficient estimate will be biased upwards in so far as it captures part of the effect of voter preferences on the budget balance.

We explore two avenues to address this omitted variable problem. First, we make use of the measure of cantonal fiscal preferences constructed by Funk and Gathmann (2006) to control for voter preferences in an otherwise standard regression equation for budget balances. Our aim is to examine whether the statistical significance of the coefficient

estimate for fiscal rules survives the introduction of a direct measure of voter preferences. In such a way, we are able to preclude that the estimated relationship is driven only by voter preferences.

There is a caveat here. Funk and Gathmann (2006) interpret their measure of voters' fiscal preferences as capturing preferences for redistribution and, hence, preferences for overall spending and the size of the state. Since there is no direct or obvious link between preferences for more public spending and preferences for larger budget deficits if the intertemporal budget constraint is understood and respected, we have to assume that this measure also captures preferences for *intertemporal* redistribution (we could also resort to fiscal illusion theories a la Buchanan, 1964, to make a link from size of the state to deficits). But it is not possible to know whether preferences for fiscal discipline are actually captured by this measure. We nevertheless use it since it is the best that we have for sub-federal entities in Switzerland, and keep this caveat in mind for the interpretation of our result.

Because of the lack of a clear interpretation for this measure of fiscal preferences, we propose a second and alternative way of controlling for voter preferences in budget deficit regressions relying instead on econometric technique. As in Dafflon and Pujol (2001), assume that voter preferences for budget deficits are largely time-invariant. In this case, equation (1) can be rewritten as

$$b_{it} = \alpha fr_{it} + \gamma vp_i + \varepsilon_{it} \quad (3)$$

Exploiting the panel structure of the dataset allows to capture cantonal fiscal prefer-

ences through the introduction of cross-section fixed effects. This is indeed the standard motivation for using panel data in that it solves the problem of time-invariant omitted variables. But many authors, e.g. Feld and Kirchgässner (2006), have resisted using fixed-effects estimation on the ground of efficiency. Fiscal rules display relatively little time variation and the introduction of fixed effects implies that we do not take the between variation of the data into account. Consequently, the standard error of the coefficient estimates will be very large, thereby making statistical inference difficult.

We remedy the problem of inefficiency of the fixed-effects estimation by applying the fixed-effects vector decomposition approach of Plümper and Troeger (2007). Suppose that budgetary outcomes depend on a time-varying explanatory variable, denoted as  $x_{it}$ , a set of time-invariant cantonal characteristics (such as language), denoted as  $c_i$ , as well as an almost time-invariant variable capturing the presence of fiscal rules. Time-invariant preferences are assumed to be included in a cross-section fixed effect, denoted as  $v_i$ . The model is given as

$$b_{it} = v_i + \beta x_{it} + \varphi c_i + \alpha fr_i + \varepsilon_{it} \quad (4)$$

In this case, the estimation of the coefficients  $\alpha$  and  $\varphi$  is problematic because the fiscal rule variable contains very little time variation and time-invariant cantonal characteristics are perfectly collinear with cross-section fixed effects. Plümper and Troeger (2007) suggest estimating this model in three steps. First, we regress budgetary outcomes on the cross-section fixed effect and the time-varying factor  $x_{it}$ , omitting the time-invariant and almost

time-invariant variables  $c_i$  and  $fr_i$ :

$$b_{it} = v_i + \beta x_{it} + \varepsilon_{it}$$

Second, we decompose the estimated fixed effect  $\hat{v}_i$  into time-invariant observed heterogeneity, captured by  $c_i$  and  $fr_i$ , and time-invariant unobserved heterogeneity, denoted by  $\xi_i$ . The former part captures the effect of time-invariant and almost time-invariant variables, whereas the latter part will capture time-invariant cantonal fiscal preferences and other unobserved heterogeneity:

$$\hat{v}_i = \psi + \beta fr_i + \xi_i$$

Finally, we reestimate the full model including the estimated unobserved heterogeneity, which is by definition orthogonal to the almost time-invariant variable capturing fiscal rules:

$$b_{it} = \hat{\xi}_i + \beta x_{it} + \varphi c_i + \alpha fr_i + \varepsilon_{it}$$

The decomposition allows for solving the problem of inefficiency of the coefficient estimates. Plümper and Troeger (2007) show that this decomposition is a superior approach (in terms of the root mean squared errors) to the traditional fixed-effects estimation when the time-invariant or almost time-invariant variables exhibit a ratio of the between variance to the within variance that is large enough. Plümper and Troeger (2007) run Monte Carlo simulations to compare the vector decomposition to the standard fixed-effects approach

and conclude that the former remains superior whenever the variance ratio exceeds 2.8. In our context, a variable qualifies as being almost time-invariant when its between variance is at least 2.8 times its within variance. Our data indicate that the ratio of variances for our fiscal rule dummy variable is 2.92, such that we consider this dummy variable as being almost time-invariant.

Finally, our assumption of time-invariant preferences could be questioned since our sample period contains a major structural break in the composition in the electorate. Female enfranchisement was introduced in different years across cantons: women were first given the right to vote in Neuchâtel and Vaud in 1959, and the last canton to grant women the vote was Appenzell I. Rh. in 1990 - all other 23 cantons introduced women's suffrage between these dates. Krogstrup and Wälti (2007) discuss why this enfranchisement represents a structural break in voters' preferences and show that women prefer a different level of fiscal discipline. This structural break is taken into account in our analysis by introducing a dummy variable taking a value of one when women have the right to vote in a given canton in a given year.

## 4 Data

The sample covers twenty-five cantons over the period 1955 to 1999. All quantitative variables included in the regressions are measured in constant 1993 prices (deflated with the consumer price index). Sources and definitions are summarized in the Appendix.

The dependent variable is the cantonal real budget balance per capita<sup>5</sup>. Only one canton,

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<sup>5</sup> Figure A1 in the Appendix shows real budget balances for each canton in each year. We follow Feld and Kirchgässner (2006) and control for an outlier for Appenzell A. Rh. in 1996 with a dummy variable.

Appenzell I. Rh., had an average budget balance in surplus across the time span considered, while all other cantons exhibited average deficits.

There are five cantons that have fiscal rules during our sample period: St Gallen, Fribourg, Solothurn, Appenzell A. Rh. and Graubünden<sup>6</sup>. These rules are written either in the cantonal constitution or in the cantonal budget law. Beyond differences in their characteristics and implementation, they have in common that they constrain fiscal policy by limiting the size of deficits and requiring a balanced budget either in the current fiscal year or over the medium term.

The previous theoretical and empirical literature on budget deficits suggests a list of control variables which are relevant for explaining deficits. Tax-smoothing arguments (Barro, 1979) and Keynesian countercyclical fiscal policy prescriptions imply that budget deficits should co-vary negatively with economic conditions. We therefore control for the rate of growth of real gross cantonal income (federal and international economic conditions will be captured through time fixed effects). Fiscal redistribution across cantons is taken into account by including the growth rate of the real unconditional federal grants per capita that each canton receives. The cantonal demographic structure could put pressure on cantonal public finances and it is captured by including the share of the population above sixty-five years old. We control for changes in the ideological orientation of cantonal parliaments (Hibbs, 1977; Persson and Svensson, 1989) by including the share of seats held by left-wing political parties. Finally, we also make use of dummy variables to take account of time-invariant cantonal characteristics such as language (which takes a value of unity

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<sup>6</sup>See Feld and Kirchgässner (2006) for a detailed overview of these cantonal rules.

for French and Italian-speaking cantons), the presence of a large city, and the presence of a university.

## 5 Observed fiscal preferences: OLS regressions

Our first approach to control for voter preferences is to include the measure of cantonal fiscal preferences computed by Funk and Gathmann (2006) into an otherwise standard regression equation for budget balances. So doing, we are able to test whether the estimate of the coefficient attached to the dummy variable capturing fiscal rules remains statistically significant. Table 1 presents the results.

TABLE 1 ABOUT HERE

Specification (I) includes only time effects, a dummy variable for the outlier of Appenzell A. Rh. in 1996, and the fiscal rule dummy variable. The coefficient estimate is positive and statistically significant: the presence of a fiscal rule is correlated with stronger budget balances, other things equal. Is this correlation reflecting causality? Specification (II) augments the basic specification by also including the measure of fiscal preferences. Two results emerge. Firstly, the coefficient estimate for fiscal rules declines by a relatively small amount and remains highly statistically significant. Therefore, our first approach suggests that allowing for voter preferences does not substantially affect the estimated impact of fiscal rules on budgetary outcomes. Secondly, the negative sign on the measure of fiscal preferences is also as expected: a stronger taste for government is associated with weaker budget balances, other things equal. This coefficient estimate is statistically significant, so



that voter preferences seem to cause budgetary outcomes independently of fiscal institutions (here captured by fiscal rules)<sup>7</sup>.

Specifications (III) to (V) include many control variables while omitting voter preferences. Some observations, including those for Appenzell A. Rh., are lost because there are no data on the ideology of the cantonal parliament. This explains the mild drop in the sample size. Overall, lower transfers per capita and the presence of a large city contribute to weaker budget balances. French-speaking and Italian-speaking cantons exhibit larger deficits as conventional wisdom might suggest. Specification (VI) includes all control variables along with voter preferences. The coefficient estimate for the fiscal rule dummy variable remains highly significant with the expected sign<sup>8</sup>. Interestingly, the direct effect of voter preferences does not seem to be robust to the inclusion of several control variables. The coefficient estimate for the variable capturing fiscal preferences is significant only at the 10% level.

Overall, including the Funk-Gathmann measure of fiscal preferences in regressions of fiscal rules on budgetary outcomes, we find no evidence that voter preferences are driving the estimated qualitative impact of fiscal rules. Voters' fiscal preferences do not have a robust direct effect on budgetary outcomes. However, given the caveat that these are preferences for redistribution, it is necessary to complement these results with our second

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<sup>7</sup>An interesting little aside here is that if the measure of fiscal preferences relate solely to intra-temporal redistribution issues and the size of the state, the result suggests partial fiscal illusion of voters, who prefer more government without fully internalizing the associated necessary tax increases to comply with the intertemporal budget constraint.

<sup>8</sup>Beyond statistical significance, our results also cast light on the economic significance of fiscal rules. The introduction of fiscal rules decreases the average budget deficit per capita by about 83 Swiss francs (measured in 1993 prices) in a given year. This amount is relatively large compared to the average budget deficit per capita of Swiss cantons which is equal to 121 Swiss francs (measured in 1993 prices).

approach.

## 6 Unobserved fiscal preferences: fixed-effects vector decompositions

Our second approach relies on the assumption that voter preferences are constant over time, so that they can be captured through cross-section fixed effects. A dummy variable accounts for the structural break in preferences induced by the enfranchisement of women during our sample period. Table 2 presents two sets of estimations: specifications FE(I) to FE(III) are estimated using the standard fixed-effects approach, while specifications VECD(I) and VECD(II) are estimated using the vector decomposition methodology of Plümper and Troeger (2007).

TABLE 2 ABOUT HERE

The estimation results for Specification FE(I) show that the introduction of cross-section fixed effects decreases the size of the coefficient for fiscal rules, and makes it not significantly different from zero. This result holds when we add time-varying control variables in Specifications FE(II) and FE(III). At first sight, therefore, we would conclude that fiscal rules are not causing budgetary outcomes. Furthermore, the strong statistical significance of the cross-section fixed effects and the dummy variable capturing the structural break would suggest that voter preferences explain both the presence of fiscal rules and budget balances.

The estimation of the fixed-effects vector decomposition model VECD(I) assumes that the dummy variable for fiscal rules exhibits enough time variation, so that we do not have

to consider it as an explanatory variable in the second-stage regression. Only the dummy variables capturing, respectively, language, the presence of a large city and the presence of a university are considered as time-invariant. Again, the coefficient estimate for fiscal rules is not significantly different from zero. However, when we consider the dummy variable for fiscal rules as a rarely changing variable in specification VECD(II), as it should be since its between variance is greater than 2.8 times its within variance, the coefficient estimate for the dummy variable for fiscal rules is positive and statistically different from zero at the 1% level. The value of the estimate is consistent with the results from our first approach. Clearly, an efficient method of estimation shows that fiscal rules continue to exert a positive pressure on budget balances even in the presence of fixed effects. This finding lends further support to the results obtained in the previous section. Moreover, while it is harder to interpret fixed effects than a direct measure of fiscal preferences, the high statistical significance of the cross-section fixed effects and the dummy variable capturing a structural break in the third-stage regression could be taken to imply that voter preferences have explanatory power on their own.

Standard fixed-effects regressions are highly inefficient when including cross-section fixed effects along with a fiscal rule dummy variable which exhibits little time variation. As expected, the values of coefficient estimates and the associated  $t$  statistics decrease by a significant amount. It is therefore necessary to employ alternative techniques which are relatively more efficient when the empirical specification includes both cross-section fixed effects and variables that are almost time-invariant. Our results make this point very clear.

## 7 Concluding remarks

Fiscal indiscipline has been on the rise in industrial countries since the late 1970s, leading to increasing average levels of deficits and public debt levels. One of the means by which policy makers have attempted to “tie their own hands” to more fiscal prudent policies has been the adoption of so called fiscal rules requiring that budgets remain above a certain threshold in either actual or cyclically adjusted terms. The question is whether such rules work, and this question has triggered a large and growing research agenda. The empirical literature finds relatively unambiguously that fiscal rules are associated with improved budget balances. But it has not been possible to convincingly establish whether this relationship represents a causal link from rules to outcomes. The main concern is that the relationship is driven by a third variable, namely voters’ preferences for fiscal policies.

In this paper, we propose two solutions to these issues and investigate whether voter preferences are ultimately what is driving budget balances and fiscal rules. First, we add a new measure of fiscal preferences of the electorate in Swiss cantons constructed by Funk and Gathmann (2006) in an otherwise standard regression equation for budget balances. Second, we seek to capture fiscal preferences through the introduction of cross-section fixed effects with a structural break as the electorate is infused with women voters, and by using a newly proposed efficient estimator to account for the low within variation of the variable capturing fiscal rules.

We revisit the existing evidence based on Swiss cantonal data with these two approaches in hand. Our results are consistent across the two methods. When taking into account fiscal

preferences of the electorate, the estimated impact of fiscal rules on real budget balances decreases slightly but remains highly significant. Our results therefore lend further support to the conclusions of the existing literature, and imply that fiscal rules might just work for the purposes of keeping average budget balances in check over the medium to long term, at least in Swiss cantons.

What our results do not tell us is whether fiscal rules work better than other means of “tying one’s hands” when it comes to a more elaborate set of goals of fiscal policy. It is important in this respect to keep in mind that while fiscal rules might enhance fiscal discipline, they have been argued to potentially obstruct the conduct of countercyclical fiscal policy and to reduce beneficial productive public investments (see for example Krogstrup and Wyplosz, 2007).

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Table 1: OLS regressions<sup>a,b</sup>

Regressors	OLS(I)	OLS(II)	OLS(III)	OLS(IV)	OLS(V)	OLS(VI)
Fiscal rule	89.78 (4.00) <sup>***</sup>	73.45 (3.17) <sup>***</sup>	86.90 (3.86) <sup>***</sup>	84.67 (3.71) <sup>***</sup>	90.67 (3.34) <sup>***</sup>	83.05 (3.01) <sup>***</sup>
Economic growth			5.23 (0.89)	1.39 (0.24)	3.55 (0.61)	3.15 (0.54)
Transfers per capita			118.56 (2.39) <sup>**</sup>	97.99 (1.87) <sup>*</sup>	100.73 (1.93) <sup>*</sup>	100.21 (1.93) <sup>*</sup>
Share of elderly people			-5.01 (0.90)	1.21 (0.15)	10.42 (1.27)	11.12 (1.34)
Parliament ideology				-3.73 (4.32) <sup>***</sup>	-1.45 (1.95) <sup>*</sup>	-0.68 (0.85)
Language					-77.47 (3.37) <sup>***</sup>	-55.09 (2.17) <sup>**</sup>
Large city					-102.50 (3.01) <sup>***</sup>	-100.17 (2.96) <sup>***</sup>
University					-37.17 (1.65) <sup>*</sup>	-35.51 (1.57)
Fiscal preferences		-196.26 (6.56) <sup>***</sup>				-71.08 (1.93) <sup>*</sup>
Observations	1125	1125	1125	1024	1024	1024
Cantons	25	25	25	23	23	23
Canton-specific effects	No	No	No	No	No	No
Time effects	Yes	Yes	Yes	Yes	Yes	Yes
$R^2$ statistic	0.3065	0.3398	0.3124	0.3186	0.3486	0.3504

<sup>a</sup> Robust standard errors are used. Absolute values of  $t$  statistics in parentheses.

\* Significant at 10%; \*\* significant at 5% level; \*\*\* significant at 1% level.

<sup>b</sup> The dependent variable is real budget balances per capita (measured in 1993 Swiss francs).

<sup>c</sup> As per footnote (5), all regressions include a dummy variable for Appenzell A. Rh. in 1996.

Table 2: Fixed-effects regressions<sup>a,b</sup>

Regressors	FE(I)	FE(II)	FE(III)	VECD(I)	VECD(II)
Fiscal rule	51.75 (1.25)	50.37 (1.20)	55.91 (1.11)	55.91 (0.89)	97.75 (19.94) <sup>***</sup>
Economic growth		5.26 (0.87)	1.97 (0.31)	1.97 (0.40)	1.97 (0.04)
Transfers per capita		96.80 (2.09) <sup>**</sup>	91.69 (1.88) <sup>*</sup>	91.69 (1.82) <sup>*</sup>	91.69 (6.98) <sup>***</sup>
Share of elderly people		5.63 (0.40)	21.07 (1.19)	21.07 (1.60)	21.07 (8.18) <sup>***</sup>
Parliament ideology			-2.81 (1.07)	-2.81 (1.09)	-2.81 (0.09)
Language	-	-	-	-88.16 (3.80) <sup>***</sup>	-84.51 (3.62) <sup>***</sup>
Large city	-	-	-	-118.80 (4.38) <sup>***</sup>	-102.26 (3.40) <sup>***</sup>
University	-	-	-	-32.92 (1.30)	-48.73 (1.72) <sup>*</sup>
Structural break	140.75 (3.59) <sup>***</sup>	143.72 (3.67) <sup>***</sup>	123.48 (2.62) <sup>***</sup>	123.48 (2.53) <sup>**</sup>	123.48 (2.53) <sup>**</sup>
Observations	1125	1125	1024	1024	1024
Cantons	25	25	23	23	23
Canton-specific effects	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes
$R^2$ statistic	0.3404	0.3441	0.3308	0.3966	0.3966

<sup>a</sup> Robust standard errors are used. Absolute values of  $t$  statistics in parentheses.

\* Significant at 10%; \*\* significant at 5% level; \*\*\* significant at 1% level.

<sup>b</sup> The dependent variable is real budget balances per capita (measured in 1993 Swiss francs).

<sup>c</sup> As per footnote (5), all regressions include a dummy variable for Appenzell A. Rh. in 1996.

## A Data sources and definitions

Nominal budget balances: Swiss Federal Finance Administration, electronic issue.

Population: Swiss Federal Bureau for Statistics, electronic issue.

Consumer price index: base year 1993. Stutzer and Kienast (2005).

Fiscal rules: dummy variable taking a unit value when a fiscal rule is in place. Own calculations based on Schaltegger (2002).

Fiscal preferences: Funk and Gathmann (2006).

Growth rate of real cantonal income: 1965-2002: Swiss Federal Bureau for Statistics. Data prior to 1965: estimations by Stutzer and Kienast (2005).

Unconditional federal transfers: Swiss Federal Finance Administration, electronic issue, and *Annuaire statistique de la Suisse*, various issues.

Income per capita: 1965-2002: Swiss Federal Bureau for Statistics. Data prior to 1965: estimations by Stutzer and Kienast (2005).

Share of elderly (above 65) people: Stutzer and Kienast (2005).

Share of young (below 20) people: Stutzer and Kienast (2005).

Ideology of cantonal parliaments: share of seats in parliament held by left-wing political parties. Own calculations based on data from the Swiss Federal Bureau for Statistics, electronic issue.

Language: dummy variable taking a unit value for French-speaking and Italian-speaking cantons. Own calculations.

Large city: dummy variable taking a unit value when the canton has a large city. Debrun (2006).

University: dummy variable taking a unit value when the canton has a university. Debrun (2006).

Figure A1: Real budget balances per capita (constant 1993 Swiss francs)

