

PHILIPPS-UNIVERSITÄT MARBURG
Fachbereich Wirtschaftswissenschaften

Lars P. Feld / Gebhard Kirchgässner

Sustainable Fiscal Policy in a Federal System:
Switzerland as an Example

Nr. 24/2004

Volkswirtschaftliche Beiträge

Marburg 2004

[Forthcoming in: HANSPETER KRIESI, PETER FARAGO, MARTIN KOHLI and MILAD ZARIN
(eds.), *Contemporary Switzerland: The End of Exceptionalism?*, Palgrave Macmillan, Basingstoke 2004]

Prof. Dr. Lars Feld
Philipps-Universität Marburg X Philipps University at Marburg
FB Wirtschaftswissenschaften X Dept. of Business Administration and Economics
Abteilung Finanzwissenschaft X Public Finance
Am Plan 2 • D-35037 Marburg
Tel. ++49-6421-2821702 • Fax ++49-6421-2824852
E-Mail: feld@wiwi.uni-marburg.de

Sustainable Fiscal Policy in a Federal System: Switzerland as an Example

by

Lars P. Feld

Philipps-University of Marburg, and CESifo
and

Gebhard Kirchgässner

University of St. Gallen (SIAW-HSG), CESifo, and Leopoldina

Abstract

How a sustainable fiscal policy can be performed in a federal system is not only a Swiss problem but is also discussed in other federal countries like Germany and Austria, and in the European Union. Contrary to most other countries, the Swiss fiscal system is characterised by an extensive fiscal federalism with high fiscal autonomy at all governmental levels, by direct popular rights which include fiscal referenda at the cantonal and local levels, and by particular constitutional and/or statutory fiscal restraints in order to prevent excessive public debt. In this paper, the effects of these constitutional clauses on public finances are investigated. Using a panel of the 26 Swiss cantons from 1980 to 1998, we provide evidence that direct democracy leads to significantly lower expenditure and revenue. The fiscal constraint, on the other hand, significantly reduces budget deficits. Total, cantonal as well as local expenditure and revenue are the lower the higher the share of local expenditure is.

Keywords: Direct Democracy, Referenda, Initiatives.

JEL Classification: D78.

We gratefully acknowledge financial support from the Swiss National Science Foundation (Grant-No. 5004-58524). Second revised Version, July 2004. – Forthcoming in: HANSPETER KRIESI, PETER FARAGO, MARTIN KOHLI and MILAD ZARIN (eds.), *Contemporary Switzerland: The End of Exceptionalism?*, Palgrave Macmillan, Basingstoke 2004.

Mailing Address: Prof. Dr. Lars P. Feld
Philipps-University of Marburg
Public Finance Group
Am Plan 2
D-35037 Marburg (Lahn)
Germany
e-mail: Feld@wiwi.uni-marburg.de

Prof. Dr. Gebhard Kirchgässner
University of St. Gallen
SIAW-HSG
Bodanstrasse 8
CH-9000 St. Gallen
Switzerland
Gebhard.Kirchgaessner@unisg.ch

1 Introduction

Current policy debates on public finances across OECD countries focus on the question how a sustainable fiscal policy can be obtained. The most pertinent discussion takes place in the European Union (EU) where the Stability and Growth Pact (SGP) as a follow-up to the fiscal convergence criteria of the Maastricht Treaty requires EU member states to keep budget deficits below 3 percent of GDP and public debt below 60 percent of GDP. Deviations from this general rule are only allowed for under specific circumstances like severe economic downturns or extraordinary events like natural disasters.¹ The governments of member states are held responsible to stick to the SGP which poses additional problems in those that are organised as federal states. In Austria, Germany and Spain, regional authorities have a certain fiscal autonomy such that deficits at the sub-federal level may go to the expense of the federal level. In Germany, this situation has led to a national stability pact.

The discussion in the EU is not unique. In the United States, the GRAMM-RUDMAN-HOLLINGS (GRH) act was enacted in 1985 in order to reduce federal public debt (GRAMLICH 1990). Several U.S. states have formal fiscal restraints with characteristics that strongly vary across the states. In 2001, Switzerland has also introduced a debt brake at the federal level in order to keep the federal government from incurring excessive public debt. Contrary to nearly all other OECD countries, however, the Swiss and the U.S. fiscal system have two special features: fiscal federalism, which is organised in a competitive way and gives the lower level jurisdictions (cantons/states and local communities) the power to tax, and direct popular rights in political decision-making which include fiscal referenda at the sub-federal levels. Like in the U.S. states, there are special constitutional and/or statutory restrictions in some Swiss cantons in order to induce sound finances. Moreover, large differences with respect to the institutional design between the cantons persist that even exceed those between U.S. states, thus making Switzerland a unique laboratory where the effects of fiscal institutions can be studied.

Since the 1990's, several empirical studies have considered the variety of different institutional designs of fiscal systems in the U.S. and Switzerland. BOHN and INMAN (1996) for example extensively study the impact of balanced budget requirements on public finances of U.S. states by investigating which specific design is most successful in restraining governments.² O'SULLIVAN, SEXTON and SHEFFRIN (1995, 1999) analyse how Proposition 13 has affected fiscal policies of U.S. states and local jurisdictions.³ The effectiveness of fiscal restraints has also been investigated in the Swiss case. Using a panel of the 26 Swiss cantons and the years 1986 to 1997, FELD and KIRCHGÄSSNER (2001) show that cantons with such restrictions have significantly lower debts and deficits. Similar results are obtained by SCHALTEGGER (2002) for a different time period. The cross-country and the U.S. results on

-
1. For a description of the SGP and the most recent cases of excessive deficits in the EU see http://europa.eu.int/comm/economy_finance/about/activities/sgp/edp_en.htm. EIJFFINGER and DE HAAN (2000) provide a good overview on the EU discussion.
 2. POTERBA (1997), KIRCHGÄSSNER (2002) and SCHALTEGGER (2002) provide surveys about the effects of constitutional and/or statutory rules which are intended to reduce expenditure and/or the deficit.
 3. KIRCHGÄSSNER (2002) summarises the subsequent U.S. studies about the impact of Proposition 13 on the quality of public goods and services, in particular the quality of public education.

the impact of fiscal federalism on public finance are more ambiguous (KIRCHGÄSSNER 2002, 2002a). According to the theoretical arguments by BRENNAN and BUCHANAN (1980), fiscal decentralisation reduces the ability of governments to exploit tax bases because the latter have increased exit possibilities in a federal system. While several authors find evidence for this proposed effect of fiscal decentralisation on the size of government, others do not. In a recent paper, FELD, KIRCHGÄSSNER and SCHALTEGGER (2003) present evidence for the Swiss cantons from 1980 to 1998 that fiscal decentralisation decreases government revenue mainly because of an intense tax competition. Finally, there is a large body of evidence on the impact of referenda and initiatives on public finance. MATSUSAKA (2002) provides a comprehensive discussion about the impact of legislative initiatives on spending and revenue of U.S. states and local jurisdictions, while KIEWIET and SZAKALY (1996) present evidence on the influence of referenda on guaranteed debt of U.S. states. These U.S. studies show that direct democracy is associated with sounder public finances. The studies on Swiss cantons and local jurisdictions corroborate this conclusion (FELD and KIRCHGÄSSNER 1999, 2001, 2001a, FELD and MATSUSAKA 2003). Fiscal referenda induce lower spending and revenue.

In this chapter, the effects of these three types of constitutional or statutory clauses on public finances of the 26 Swiss cantons are investigated again by looking at four important indicators of public finances: public spending, public revenue, tax revenue, and budget deficits for the period 1980 to 1998. We focus on the impact of all three classes of constitutional or statutory provisions in the same econometric model. This is done by estimating models in logarithmic and in absolute terms in order to assess the robustness of the estimates to the functional form of the underlying model. The results form the basis of an evaluation whether such restraints are desirable.

The analysis deviates in several ways from the existing studies. Either they investigate a shorter time period, for example 1986 to 1998 (FELD and KIRCHGÄSSNER 2001), or they only look at one indicator of public finance if they use data for the longer period 1980 to 1998 (e.g. SCHALTEGGER 2001 or FELD and MATSUSAKA 2003 on spending, FELD, KIRCHGÄSSNER and SCHALTEGGER 2003 on revenue), or they do not consider all three types of constitutional or statutory clauses.⁴ Our main results are that direct democracy leads to significantly lower expenditure, revenue, and tax revenue, but does not have any significant effect on the budget deficit. The fiscal constraint, on the other hand, significantly reduces budget deficits. Cantonal expenditure, revenue, and tax revenue is the lower the higher the share of local expenditure. Taking all results together, one can conclude that at least those cantons with ‘strong’ fiscal instruments have the institutional pre-requisites to perform a sustainable fiscal policy. They can serve as examples for developing corresponding fiscal rules for other federal countries.

The chapter is organised as follows: In *Section 2*, we present the basic econometric model. In *Section 3*, we discuss the empirical results. An evaluation of these results and some conclusions are provided in *Section 4*.

4. FELD and KIRCHGÄSSNER (2001) leave out fiscal decentralisation; VATTER and FREITAG (2002) as well as FREITAG, VATTER and MÜLLER (2003) leave out fiscal restraints; SCHALTEGGER (2002) leaves out fiscal federalism; and FELD and MATSUSAKA (2003) leave out fiscal decentralisation and fiscal restraints.

2 An Econometric Model for Fiscal Policy

In order to look at fiscal policy as comprehensively as possible, we consider public expenditure (per capita), public revenue, tax revenue, and the budget deficit as dependent variables.⁵ The explanatory variables of interest are the institutional variables which represent the constitutional and legal structure of fiscal policy decisions in the Swiss cantons. The first and most important variable is the index of direct democracy as it is employed by FREY and STUTZER (2000, 2002) in various studies. Most cantons have some form of semi-direct democracy with a parliamentary system with legislators elected according to a system of proportional party representation. Today, only two rural cantons, Appenzell-Innerrhoden (AI) and Glarus (GL), still take political decisions in canton meetings (Landsgemeinde). In addition, the cantons have different institutions of political participation rights (TRECHSEL and SERDÜLT 1999, FELD and MATSUSAKA 2003). Proposals can be initiated by the voter initiative, and new laws passed by the legislature are, to different degrees, subject to an optional or a mandatory popular referendum. Given the results by PELTZMAN (1992) that voters are fiscally more conservative than representatives, we can expect that fiscal referenda restrict the spending capabilities of representatives. It should lead to lower spending, revenue, and deficits.

As a second variable, an index of statutory fiscal restraints is included in the model. It ranges from zero in cantons without statutory fiscal restraints to three in the cantons with the most stringent restraints. While nearly all cantons have constitutional fiscal restraints that demand them to balance their budgets over time in one way or the other, during the time period considered in this chapter only five cantons, Appenzell a. Rh., Fribourg, Graubünden, St. Gallen and Solothurn, have statutory fiscal requirements.⁶ Those require the cantons to increase their tax rates if budget deficits increase above a deficit threshold. In Fribourg this requirement is specified such that local taxes are not covered by it. In St. Gallen and Solothurn, there is an additional restriction on decreases of the tax rates in order to restrict deficit financing. The requirements are less restrictive in Appenzell a.Rh. and even lesser in Graubünden. The more restrictive the statutory fiscal constraints are, the sounder public finances should be, i.e. the lower public spending, and budget deficits should be. Since these requirements have a strong revenue bias forcing the cantons to avoid deficits by higher tax rates, the sign of this variable on public revenue is not determined a priori: It might lead to higher revenue. But if this is the case, the size of the coefficient in the revenue equation should be smaller than the one in the spending equation.

The third institutional peculiarity of Switzerland is its strong extent of fiscal autonomy at the subfederal level which establishes a system of competitive federalism. To analyse the impact of federalism on cantonal fiscal policy, two different variables are used: decentralisation and tax competition. Decentralisation is proxied by the ratio of local revenue to the aggregated state and local revenue. Tax competition is measured by the inverse of the weighted average

5. The model we use is quite common in the study of fiscal policy, it corresponds, e.g., to the deficit and debt models of ROUBINI and SACHS (1989) and the spending and revenue models of MATSUSAKA (1995).

6. For a detailed description of these restraints see STAUFFER (2001, pp. 72). – Since 1998, Luzern (in 2001) as well as Bern and the Wallis (both in 2002) also introduced such regulations.

of the competing cantons' tax burden in the highest income tax bracket of a million Swiss francs annual taxable income. The competing cantons are all cantons except the one of consideration, weighted by the inverse of the distance (see FELD and REULIER 2002 for a discussion of empirical studies). This variable indicates that the lower the average tax burden of the other cantons, the higher the pressure of tax competition on the cantonal and local tax authorities and the lower is tax revenue, total revenue and spending. A negative impact on government revenue and spending is thus expected for both fiscal federalism variables. The impact of tax competition on budget deficits is, however, indeterminate.

We additionally include economic, demographic and political control variables. The economic and demographic variables are those usually employed in models of fiscal policy. The most important of these variables is the disposable income per capita. Generally, higher income is supposed to lead to higher spending and revenue. Higher spending results because citizens increase their demand for public services if their income increases. Higher revenue results because revenue of the Swiss cantons is mainly derived from progressive personal income taxes. Whether lower or higher deficits occur due to higher income is not easy to determine a priori. On the one hand, higher income may be accompanied by a lower level of public deficits for liquidity reasons. On the other hand, sub-federal jurisdictions with higher incomes may have to contribute larger amounts to fiscal equalisation systems and thus have an incentive to increase public deficits in order to reduce these contributions. In this case, higher income might be associated with higher deficits.

In order to control for the impact of intergovernmental grants between jurisdictions, the model also contains federal unconditional grants per capita. In contrast to matching grants, unconditional grants enable cantons to allocate the funds according to their own priorities. A higher level of unconditional grants should lead to higher spending as well. In the literature on the flypaper effect, it is much discussed whether the availability of lump-sum grants increases public spending by more than the amount of these grants (FELD and SCHALTEGGER 2004). Unconditional grants may also be used to reduce spending from own public funds such that the increase of spending due to the grants is less than 100 percent. In addition, a high amount of grants is related to a higher extent of bail-out by other jurisdictions. This might lead to lower incentives to use the resources economically. Therefore, it may – ceteris paribus – incur higher budget deficits.

We also include a regional dummy variable that reflects the language differences among the Swiss cantons and takes on the value of one for cantons with a French or Italian speaking population. A quite common prejudice is that 'Latin' cantons and communities have stronger preferences for 'public sector solutions' of social problems and are thus inclined to have more 'unsound' public finances, i.e. higher spending, higher revenue, and higher deficits. Moreover, the model contains a political variable which follows the arguments of the partisan cycles models that left wing parties generate unsound public finances. The share of left wing parties in the government should have a positive impact on the level of public spending, public revenue, and budget deficits.

Since the number of inhabitants can play a crucial role on the level of public expenditure, a population variable has to be included in the equation as well. However, the expected sign of

this variable is ambiguous. On the one hand, more inhabitants will pay for public goods. This reduces cost per capita, and it should lead to lower public expenditure. On the other hand, due to economies of scale in their provision some public goods might only be provided in agglomerations. In this case, the overall level of public expenditure for the agglomeration might increase and – *ceteris paribus* – budget deficits might also rise. In order to disentangle both effects, the share of the urban population is additionally included in the model. Moreover, we control for the demographic structure of a canton by using the shares of the population older than 65 and younger than 20 years. Both variables may be interpreted as indicating the demand of these two particular population groups for public spending as well as their ability to generate public revenue. Finally, a dummy variable for the canton of Appenzell a.Rh. in 1996 is included. In this year, cantonal revenue of that canton lies about 50 percent above the ‘normal’ value, because this canton sold its ‘own’ cantonal bank to the Union Bank of Switzerland (UBS) which created a large additional revenue.⁷

Thus, for our empirical analysis we end up with the following model:

$$(1) \quad y = \alpha_0 + \alpha_1 \text{Dem} + \alpha_2 \text{Constr} + \alpha_3 \text{Fed} + \alpha_4 \text{Taxcomp} + \alpha_5 \text{grants} + \alpha_6 \text{Ideol} \\ + \alpha_7 \text{inc} + \alpha_8 \text{pop} + \alpha_9 \text{Urban} + \alpha_{10} \text{Latin} + \alpha_{11} \text{Old} + \alpha_{12} \text{Young} \\ + \alpha_{13} \text{D(AR-96)} + \varepsilon .$$

where the dependent variable X, stands for the following four fiscal variables (all in 1000 CHF per capita),

exp	public expenditure,
rev	public revenue,
tax	tax revenue,
deficit	budget deficits.

The explanatory variables are:

Dem	index of direct democracy,
Constr	statutory fiscal constraints which takes on values between zero for the cantons with no and three for those with the strongest statutory fiscal restraint,
Fed	share of local from the sum of cantonal and local spending,
Taxcomp	inverse of the weighted average of the competing cantons’ tax burden in the highest income tax bracket of 1 million SFr annual taxable income (logarithms),
grants	federal unconditional grants per capita (logarithms),
Ideol	ideological position of the cantonal government,
inc	disposable income per capita (logarithms),
pop	population (logarithms),
Urban	share of urban population,

7. Because these variables might have an impact on government expenditure and revenue, we have to include these variables in order to get unbiased estimates for the coefficients of the other variables. – Due to space limitations, we restrict the discussion of our results to the interesting institutional and political variables.

Latin	dummy variable = 1, for cantons with a French or Italian speaking population,
Young	share of population younger than 20,
Old	share of population older than 65,
DAR96	dummy variable = 1, for the canton of Appenzell a.Rh. in 1996,
e	stochastic term.

The analysis uses annual data for the 26 cantons from 1980 to 1998, deflated to the year 1980. The empirical analysis is performed using a pooled cross-section time-series model. We follow FELD and KIRCHGÄSSNER (2001), who argue that despite the panel structure of the data the inclusion of fixed effects in the cross-section domain is inappropriate because the institutional variables vary only very little or remain constant over time in some cantons. Accordingly, cantonal intercepts do not make sense as the captured impact on fiscal outcomes is either solely driven by the time variation or in case of time invariant variables, fixed effects are likely to hide the effect of institutional variables and render them insignificant. Cantonal dummies are however used as instruments in order to cope with possible endogeneity of the decentralisation variable. Moreover, year dummies to circumvent time dependency are included, and the standard errors are corrected by a GMM method (Newey-West). With the exception of the deficit equation, the model is estimated in logs.

3 Empirical Results

For total cantonal and local expenditure we got the following results:⁸

$$\begin{aligned}
 (2) \quad \text{exp} &= 0.829 - 0.039 \text{Dem} - 0.009 \text{Constr} - 0.504 \text{Fed} - 0.108 \text{taxcomp} \\
 &\quad (0.91) \quad (-1.96) \quad (-0.61) \quad (-3.08) \quad (-1.82) \\
 &\quad + 0.113 \text{grants} + 0.132 \text{Ideol} + 0.199 \text{inc} + 0.002 \text{pop} + 0.161 \text{Urban} \\
 &\quad (2.25) \quad (1.49) \quad (1.78) \quad (0.11) \quad (1.74) \\
 &\quad - 0.009 \text{Latin} + 0.020 \text{Old} - 0.005 \text{Young} + 0.089 \text{D(AR-96)} + \varepsilon \\
 &\quad (-0.15) \quad (2.42) \quad (-0.52) \quad (2.43) \\
 \bar{R}^2 &= 0.736, \quad \text{SER} = 0.118, \quad \text{J.-B} = 15.026.
 \end{aligned}$$

The impact of the index for direct democracy is significant at the 10 percent, the impact of the decentralisation variable even at the 1 percent level; both lead to a reduction of public expenditure. Tax competition also reduces public expenditure, while unconditional grants increase them. The variable for the constraints also has a negative coefficient, but its impact is far from being significant. A left-wing orientation of the cantonal government increases (as expected) public expenditure, but this effect is not significant. Contrary to what is usually assumed, expenditures are not larger in those cantons where French or Italian is the dominant language.

It might be objected against these results that, according to the result of the Jarque-Bera test, the estimated residuals are not at all normally distributed. This might impair the validity of the

8. The estimates have been performed with EViews, Version 4.1. The numbers in parentheses are the estimated t-statistics, based on the Newey-West autocorrelation-consistent standard errors. SER is the standard error of the regression, and J.-B. the value of the Jarque-Bera test for normality of the residuals.

results. Due to the large number of observations this should not be that much of a problem. However, to consider this argument we re-estimated the model excluding three outliers. Then, the null hypothesis that the estimated residuals are normally distributed can no longer be rejected even at the 5 percent significance level, while the results show only minor changes.⁹

The important question is, however, whether these impacts are not only statistically significant but also economically important. To address the economic significance, we calculated how large the difference in cantonal and local expenditure is between those cantons where the corresponding variables take on their maximum value in our sample and those cantons where they have their minimum. To calculate these partial effects we assumed that all other variables take on their mean, and we used the price level of the year 2000.¹⁰

<i>Table 1: Quantitative Impacts of the Explanatory Variables (per capita)</i>				
Explanatory Variables	Public Expenditure	Public Revenue	Taxes	Deficit
fiscal decentralisation	-1'652 CHF (15.61)	-1'723 CHF (16.65)	-327 CHF (5.90)	8 CHF (0.07)
direct democracy	-1'642 CHF (15.51)	-1468 CHF (14.19)	-860 CHF (15.49)	-95 CHF (0.89)
fiscal constraints	-296 CHF (2.80)	19 CHF (0.18)	189 CHF (3.40)	-329 CHF (3.11)
tax competition	-1'502 CHF (14.19)	-1'744 CHF (16.86)	-1'452 CHF (26.16)	198 CHF (1.87)
unconditional grants	1'505 CHF (14.22)	2'002 CHF (19.35)	-478 CHF (8.61)	-424 CHF (4.01)
ideology of the government	-279 CHF (2.63)	-234 CHF (2.26)	-30 CHF (0.55)	-22 CHF (0.21)
French and Italian speaking population	-99 CHF (0.94)	-552 CHF (5.34)	-198 CHF (3.56)	529 CHF (5.00)
mean of the dependent variable	10'581 CHF	10'345 CHF	5'552 CHF	237 CHF

For public expenditure, revenue, and taxes, the numbers in parentheses are in percent of the mean of the dependent variable. In the case of budget deficits, it is in percent of expenditure. The amount in Swiss Francs is in prices of the year 2000.

The results are given in *Table 1*. It is shown that fiscal decentralisation, direct democracy and tax competition have strong dampening effects, while unconditional grants lead – ceteris pari-

9. We did the same with similar results for the revenue, tax and deficit equations. The results of these additional regressions are given in the Appendix.

10. Descriptive statistics of the political and institutional data are given in the Appendix.

bus – to considerably higher expenditure. Compared to this, the ideology of the government as well as the fiscal constraints have negligible effects.

For the total revenue of the cantons and the local communities we got the following results:

$$\begin{aligned}
 (3) \quad \text{rev} &= 0.860 - 0.035 \text{ Dem} + 0.001 \text{ Constr} - 0.537 \text{ Fed} - 0.129 \text{ taxcomp} \\
 &\quad (1.05) \quad (-2.02) \quad (0.04) \quad (-3.44) \quad (-2.35) \\
 &+ 0.153 \text{ grants} + 0.113 \text{ Ideol} + 0.171 \text{ inc} + 0.003 \text{ pop} + 0.114 \text{ Urban} \\
 &\quad (3.21) \quad (1.33) \quad (1.67) \quad (0.14) \quad (1.37) \\
 &- 0.053 \text{ Latin} + 0.014 \text{ Old} - 0.011 \text{ Young} + 0.349 \text{ D(AR-96)} + \varepsilon \\
 &\quad (-0.95) \quad (1.96) \quad (-1.24) \quad (11.05) \\
 \bar{R}^2 &= 0.744, \quad \text{SER} = 0.108, \quad \text{J.-B} = 34.040.
 \end{aligned}$$

With respect to both their significance and their quantitative impact, which is again demonstrated in Table 2, these results are close to those for total public expenditure. One major difference is that the variable for direct democracy is now significant at the 5 percent level. However, if we eliminate some observations to ensure the normality of the estimated residuals, the coefficient of this variable is again only significantly different from zero at the 10 percent level¹¹. Another difference is that fiscal constraints now have a positive impact, whereas their impact on expenditure was negative. Thus, both coefficients have the expected signs, but they are far from being statistically significant. Finally, the language variable has now a much larger effect, but it is also far from being significant.

The results deviate more strongly from those of the expenditure equation if we only consider tax revenue:

$$\begin{aligned}
 (4) \quad \text{tax} &= 1.151 - 0.038 \text{ Dem} + 0.011 \text{ Constr} - 0.190 \text{ Fed} - 0.200 \text{ taxcomp} \\
 &\quad (2.06) \quad (-2.76) \quad (1.47) \quad (-2.17) \quad (-5.84) \\
 &- 0.068 \text{ grants} + 0.027 \text{ Ideol} + 0.364 \text{ inc} - 0.022 \text{ pop} + 0.388 \text{ Urban} \\
 &\quad (-1.88) \quad (0.61) \quad (4.57) \quad (-1.66) \quad (6.23) \\
 &- 0.036 \text{ Latin} - 0.006 \text{ Old} - 0.030 \text{ Young} + 0.145 \text{ D(AR-96)} + \varepsilon \\
 &\quad (-1.02) \quad (-1.15) \quad (-5.53) \quad (5.13) \\
 \bar{R}^2 &= 0.914, \quad \text{SER} = 0.078, \quad \text{J.-B} = 5.428.
 \end{aligned}$$

The impact for fiscal federalism is still significant but, as the figures in Table 2 show, comparatively small. By contrast, the impact of direct democracy is quantitatively much more important and strongly significant. As expected, tax competition has a strong dampening and very significant effect on tax revenue. In addition, unconditional grants also have a negative effect. This speaks against fiscal illusion, but is an interesting contrast to the result for total expenditure (and revenues) which suggested the existence of such an illusion. Fiscal constraints have a positive but again insignificant impact on tax revenue. Again, neither the ideology of the government nor the language region have a sizeable impact.

¹¹ For details see Table A2 in the Appendix.

Finally, we consider the deficit equation. As there are positive and negative values of this variable, we cannot apply the logarithmic transformation and, therefore, use a linear specification. The results are as follows:

$$\begin{aligned}
 (5) \quad \text{deficit} = & -2.961 - 0.023 \text{ Dem} - 0.110 \text{ Constr} - 0.025 \text{ Fed} + 0.726 \text{ taxcomp} \\
 & (-2.53) \quad (-0.32) \quad (-2.96) \quad (-0.06) \quad (1.41) \\
 & - 0.001 \text{ grants} + 0.111 \text{ Ideol} + 0.014 \text{ inc} + 0.000 \text{ pop} + 0.591 \text{ Urban} \\
 & (-2.72) \quad (0.56) \quad (2.02) \quad (0.63) \quad (2.25) \\
 & + 0.529 \text{ Latin} + 0.063 \text{ Old} + 0.080 \text{ Young} - 3.038 \text{ D(AR-96)} + \varepsilon \\
 & (2.75) \quad (3.59) \quad (3.01) \quad (-22.33) \\
 \bar{R}^2 = & 0.478, \quad \text{SER} = 0.434, \quad \text{J.-B} = 82.908.
 \end{aligned}$$

As the figures in Table 1 show, these results are consistent with those of the expenditure and revenue equations. While direct democracy has significant dampening effects on both, public expenditure and revenue, it has no significant impact on the deficit. The same holds for fiscal decentralisation. On the other hand, fiscal constraints have – as they should – a significant negative effect on the deficit, while the dampening effect on the expenditure as well as the increasing effect on the revenue side are not statistically significant. Unconditional grants had positive effects on both, the expenditure as well as the revenue side. However, because the expenditure effect was smaller, the deficit is also significantly reduced. Tax competition has a positive impact on the deficit: the stronger and the more difficult it is, correspondingly, to raise taxes, the more people are willing to accept deficits. This was already the picture of the expenditure and revenue equations: the dampening effect on the expenditure side was considerably smaller, which, necessarily, results in a larger deficit. However, the effect on the deficit is neither statistically significant nor especially strong. The ideology of the government plays – once again – no role at all, while the language variable now has a significant positive impact: The French and Italian speaking population seems to be accepting a deficit in the public budget more willingly than the German speaking Swiss, and the impact is not negligible: It is about twice the average deficit.

4 Putting the Results into Perspective

We have investigated the effects of fiscal restraints, competitive fiscal federalism and direct democracy on public spending, public revenue, tax revenue and budget deficits of the 26 Swiss cantons for the period 1980 to 1998. The results are unambiguous. If we want to achieve fiscal sustainability, the message of these results is clear: Fiscal federalism as well as direct democracy can effectively restrain government activity. Of these two factors, the effect of fiscal federalism is statistically much more significant and also more robust with respect to changes in the specification of the equations. It is, moreover, backed up by the impact of tax competition which can only come into effect if there is fiscal decentralisation not only on the expenditure but also on the revenue side of the public budget. Neither fiscal federalism nor direct democracy seems, however, to be able to prevent public deficits. In order to achieve this goal, additional institutional constraints are necessary, and the ‘debt breaks’ which have been introduced in several cantons seem to be well suited for this purpose. They are, however, not able to prevent public expenditure and revenue from increasing. Thus, to achieve fiscal

sustainability we need all three institutions: fiscal federalism, direct democracy as well as institutional constraints.

Concluding that these institutions actually serve as restrictions to fiscal policy does, however, not necessarily imply that they also serve the purposes of citizens. The effects of these fiscal instruments on the quality of the services which are provided are also interesting. While the pressure exerted by these fiscal instruments might increase the efficiency of the public bureaucracy, the quality of the services, might deteriorate.

In the U.S., where most of the studies have been conducted, this is especially relevant for educational expenditures. The empirical results with respect to the influence of formal fiscal restraints are however mixed and thus support the arguments by BESLEY and SMART (2003). In a first paper, DOWNES (1992) concludes that the performance of Californian students has improved between 1976 and 1985, i.e. comparing the situations before and after Proposition 13 passed which started the introduction of the most important fiscal constraints. In a second study, DOWNES, DYE and MCGUIRE (1998) also find no significant reduction in students' performance for about 1500 students in Illinois, except in mathematics. This is contrary to the result of FIGLIO (1997) in a study of 5'600 students from 49 states for the periods 1987/88 and 1990/91. He finds evidence that students in states with tax or expenditure limitations had – ceteris paribus – a worse performance in several areas, among others in core subjects like sciences and mathematics. These results have been corroborated by DOWNES and FIGLIO (1997, 1999). Comparing the performance of students from the years 1972 (8'672 observations) and 1992 (6'054 observations) it is shown that students in states with tax or expenditure limitations had significantly worse results in mathematics, but not in English. The reason for this deterioration might be, as FIGLIO (1998) shows in a study for 305 schooling districts in Oregon and 296 schooling districts in Washington, that the relation between teachers and students decreased after the introduction of the limitations and that the starting salaries of teachers have been reduced what – according to FIGLIO and RUEBEN (2001) – had the consequence that highly qualified teachers did not want to teach in districts with fiscal limitations. It is, moreover, highly questionable whether the production efficiency of the publicly provided services really increased. FIGLIO and O'SULLIVAN (1997) show for 5'150 U.S. local communities and the period from 1975 to 1986 that the expenditure for public security, i.e. for police and fire-brigades, decreased compared to expenditure for general administration. Similar evidence exists for the relation between teachers and administrative staff in schooling districts.

The evidence on the efficiency of fiscal competition and decentralisation is also inconclusive. BERGSTROM, ROBERTS, RUBINFELD and SHAPIRO (1988) are the first to provide evidence that fiscal competition leads to an efficient provision of public education. HOXBY (2000) compares the relative efficiency of school services of jurisdictions depending on the intensity of fiscal competition in which jurisdictions find themselves. She presents evidence that the performance of students per input unit is increased by fiscal competition although it leads to significantly less spending per student. FELD and KIRCHGÄSSNER (1997) neither find any strong evidence against the hypothesis that fiscal competition leads to efficient public goods supply for Switzerland. KIRCHGÄSSNER and POMMEREHNE (1996) and FELD (2000) report evidence on the impact of fiscal competition on income redistribution showing that the Swiss welfare state

did not break down under the threat of fiscal competition. On the other hand, international evidence on the impact of fiscal federalism on economic growth is very mixed (FELD, ZIMMERMANN and DÖRING 2003).

The record is quite different and much more unambiguous in the case of direct democracy. The systematic empirical analyses of the impact of referenda and initiatives on economic policy for Switzerland and the U.S. states provide strong support for the hypothesis that the WICKSELLIAN (1896) connection rather exists in direct than in representative democracy such that the tax prices citizens pay for public goods and services are linked to the benefits the citizens obtain from these public goods and services.¹² With respect to spending structure, the fiscal referendum mainly restricts welfare and administrative spending (SCHALTEGGER 2001, VATTER and FREITAG 2002). With respect to revenue structure both, the U.S. states with initiatives and the Swiss cantons with a fiscal referendum, rely more on user charges than on broad-based taxes.¹³ Moreover, MATSUSAKA (1995, 2002) and FELD, SCHALTEGGER and SCHNELLENBACH (2004) provide evidence that centralisation of spending and revenue is reduced by the referendum. However, this does not necessarily mean that direct democracy is associated with an erosion of the social welfare state. As FELD, FISCHER and KIRCHGÄSSNER (2003) show, direct democratic Swiss cantons redistribute less income if the income gap between the highest and lowest income decile is relatively low and redistribute significantly more income if the income gap between the highest and lowest income decile is relatively high. Income redistribution appears to be more targeted and more effective in direct democratic cantons such that less funds are necessary to achieve redistributive goals.

In addition, direct democracy also leads to a more efficient public sector. POMMEREHNE (1983) analysed costs and prices of local garbage collection in 103 Swiss cities in 1970. He found that average refuse collection costs (per household) were – *ceteris paribus* – lowest in cities with direct legislation and private garbage collection. For a panel of the Swiss cantons from 1970 to 1996, BARANKAY (2002) reports significantly lower infant mortality rates and a higher share of college degrees in more direct democratic cantons suggesting that this indicates a higher quality of public goods in the cantons. POMMEREHNE and WECK-HANNEMANN (1996), FELD and FREY (2002) and TORGLER (2002) show that in those Swiss cantons in which citizens have an impact on budgetary policy in direct legislation, tax morale is – *ceteris paribus* – higher compared to the cantons without such direct influence. If, however, the willingness to pay taxes is the higher the more satisfied citizens are with public services supplied, then these results are evidence for a higher satisfaction of citizens and, therefore, for greater efficiency of the provision of public services. Indeed, FREY and STUTZER (2000, 2002) present evidence that people in Switzerland perceive themselves as more satisfied with their life as a whole in direct democratic cantons keeping income levels and other controls constant. These studies lend support for the hypothesis that direct democratic systems are more efficient than representative democratic ones. A more efficient political system should also lead to better economic performance. FELD and SAVIOZ (1997) study the relationship between

12. See BRETON (1996) for the argument and POMMEREHNE (1978) and GERBER (1996, 1999) for evidence showing that direct democracy leads to policy outcomes that are closer to citizens' preferences.

13. See MATSUSAKA (1995) for the U.S. states and FELD and MATSUSAKA (2003a) for the Swiss cantons.

budgetary referenda and economic performance of Swiss cantons measured by GDP per employee. In a panel with annual data from 1984 to 1993 for the 26 Swiss cantons, they arrive at the conclusion that GDP per employee is – ceteris paribus – by about 5 percent higher in those cantons with budgetary referenda compared to cantons without those referenda. Again there is corroborating evidence by KIRCHGÄSSNER, FELD and SAVIOZ (1999), FREITAG and VATTER (2000) for Switzerland and by BLOMBERG, HESS and WEERAPANA (2004) for the U.S. states.

All in all, the empirical evidence from the U.S. and Switzerland supports the hypothesis that (economic) policy outcomes in jurisdictions with referenda and initiatives are more closely oriented towards the Wicksellian connection of spending and tax prices. Fiscal restraints effectively reduce budget deficits, but according to the existing evidence do not necessarily increase the efficiency of public goods supply. Fiscal decentralisation appears to increase the efficiency of public goods supply, but the long run impact on economic growth is unclear. Still, fiscal decentralisation is a precondition for direct democratic institutions to work properly in a federal state. Fiscal restraints on the other hand may serve as a means to reduce transaction costs, in particular in Swiss direct democracy if citizens do not want to veto government spending projects too frequently or want to bind themselves against future temptations for unsound fiscal policy. It looks like there is not much evidence against the Swiss mix of fiscal institutions.

References

- BARANKAY, I. (2002), Referenda, Citizens' Initiatives and the Quality of Public Goods: Theory and Evidence, mimeo, University of Warwick.
- BERGSTROM, TH.C., J.A. ROBERTS, D.L. RUBINFELD and P. SHAPIRO (1988), A Test for Efficiency in the Supply of Public Education, *Journal of Public Economics* 35 (1988), 289 – 307.
- BESLEY, T. and M. SMART (2003), Fiscal Restraints and Voter Welfare, mimeo, London School of Economics 2003.
- BLOMBERG, S.B. G.D. HESS and A. WEERAPANA (2004), The Impact of Voter Activity on Economic Activity, *European Journal of Political Economy* 20 (2004), 207 – 226.
- BOHN, H. and R.P. INMAN (1996), Balanced-Budget Rules and Public Deficits: Evidence from the U.S. States, *Carnegie-Rochester Conference Series on Public Policy* 45 (1996), 13 – 76.
- BRENNAN, G. and J.M. BUCHANAN (1980), *The Power to Tax, Analytical Foundations of a Fiscal Constitution*, Cambridge University Press, Cambridge 1980.
- BRETON, A. (1996), *Competitive Governments: An Economic Theory of Politics and Public Finance*, Cambridge University Press, Cambridge 1996.
- DOWNES, TH. A. (1992), Evaluating the Impact of School Finance Reform on the Provision of Public Education: The California Case, *National Tax Journal* 45 (1992), 405 – 419.
- DOWNES, TH. A., R.F. DYE and TH.J. MCGUIRE (1998), Do Limits Matter? Evidence on the Effects of Tax Limitations on Student Performance, *Journal of Urban Economics* 43 (1998), 401 – 417.
- DOWNES, TH. A. and D.N. FIGLIO (1997), School Finance Reform, Tax Limits, and Student Performance: Do Reforms Level Up or Dumb Down?, mimeo, University of Florida, Gainesville 1997.

- DOWNES, TH. A. and D.N. FIGLIO (1999), Do Tax and Expenditure Limits Provide a Free Lunch? Evidence on the Link between Limits and Public Sector Service Quality, *National Tax Journal* 52 (1999), 113 – 128.
- EIJFFINGER, S.C.W. and J. DE HAAN (2000), *European Monetary and Fiscal Policy*, Oxford University Press, Oxford 2000.
- FELD, L.P. (2000), Tax Competition and Income Redistribution: An Empirical Analysis for Switzerland, *Public Choice* 105 (2000), 125 – 164.
- FELD, L.P. and B.S. FREY (2002), The Tax Authority and the Taxpayer: An Exploratory Analysis, mimeo, University of St. Gallen 2002.
- FELD, L.P. and G. KIRCHGÄSSNER (1997), Die Kapitalisierung von Steuern und öffentlichen Leistungen in den Mietzinsen: Eine empirische Überprüfung der Tiebout-Hypothese für die Schweiz, in: H. SCHMID and T. SLEMBECK (eds.), *Finanz- und Wirtschaftspolitik in Theorie und Praxis*, Haupt, Bern et al. 1997, 64 – 92.
- FELD, L.P. and G. KIRCHGÄSSNER (1999), Public Debt and Budgetary Procedures: Top Down or Bottom Up? Some Evidence from Swiss Municipalities, in: J. POTERBA and J. VON HAGEN (eds.), *Fiscal Institutions and Fiscal Performance*, Chicago University Press and NBER, Chicago 1999, 151 – 179.
- FELD, L.P. and G. KIRCHGÄSSNER (2001), The Political Economy of Direct Legislation: The Role of Direct Democracy in Local and Regional Decision-Making, *Economic Policy* 16 (33) (2001), 329 – 367.
- FELD, L.P. and G. KIRCHGÄSSNER (2001a), Does Direct Democracy Reduce Public Debt? Evidence from Swiss Municipalities, *Public Choice* 109 (2001), 347 – 370.
- FELD, L.P. and J.G. MATSUSAKA (2003), Budget Referenda and Government Spending: Evidence from Swiss Cantons, *Journal of Public Economics* 87 (2003), 2703 – 2724.
- FELD, L.P. and J.G. MATSUSAKA (2003a), The Political Economy of Tax Structure: Some Panel Evidence for Swiss Cantons, mimeo, University of St. Gallen.
- FELD, L.P. and E. REULIER (2002), Strategic Tax Competition in Switzerland: Evidence from a Panel of the Swiss Cantons, Unpublished Manuscript, University of St. Gallen 2002.
- FELD, L.P. and M.R. SAVIOZ (1997), Direct Democracy Matters for Economic Performance: An Empirical Investigation, *Kyklos* 50 (1997), 507 – 538.
- FELD, L.P. and CH.A. SCHALTEGGER (2004), Voters as Hard Budget Constraints: On the Determination of Intergovernmental Grants, forthcoming in: *Public Choice*.
- FELD, L.P., J. FISCHER and G. KIRCHGÄSSNER (2003), The Effect of Direct Democracy on Income Redistribution: Evidence for Switzerland, Unpublished Manuscript, Philipps-University Marburg.
- FELD, L.P., G. KIRCHGÄSSNER and CH.A. SCHALTEGGER (2003), Decentralized Taxation and the Size of Government: Evidence from Swiss State and Local Governments, CESifo Working Paper No. 1087, December 2003.
- FELD, L.P., CH.A. SCHALTEGGER and J. SCHNELLENBACH (2004), On Government Centralization and Budget Referenda: A Model and Evidence from Switzerland, mimeo, Philipps-University Marburg.
- FELD, L.P., H. ZIMMERMANN and T. DÖRING (2003), Föderalismus, Dezentralität und Wirtschaftswachstum, *Vierteljahreshefte für Wirtschaftsforschung* 72 (2003), 361 – 377.

- FIGLIO, D.N. (1997), Did the 'Tax Revolt' Reduce School Performance?, *Journal of Public Economics* 65 (1997), 245 – 269.
- FIGLIO, D.N. (1998), Short-Term Effects of a 1990s-Era Property Tax Limit: Panel Evidence on Oregon's Measure 5, *National Tax Journal* 51 (1998), 55 – 70.
- FIGLIO, D.N. and A. O'SULLIVAN (1997), The Local Response to Tax Limitation Measures: Do Local Governments Manipulate Voters to Increase Revenues?, *Journal of Law and Economics* 44 (2001), 233 – 256.
- FIGLIO, D.N. and K.S. RUEBEN (2001), Tax Limits and the Qualifications of New Teachers, *Journal of Public Economics* 80 (2001), 49 – 61.
- FREITAG, M. and A. VATTER (2000), Direkte Demokratie, Konkordanz und Wirtschaftsleistung: Ein Vergleich der Schweizer Kantone, *Schweizerische Zeitschrift für Volkswirtschaft und Statistik* 136 (2000), 579 – 606.
- FREITAG, M., A. VATTER and CH. MÜLLER (2003), Bremse oder Gaspedal? Eine empirische Untersuchung zur Wirkung der direkten Demokratie auf den Steuerstaat, *Politische Vierteljahresschrift* 44 (2003), 348 – 369.
- FREY, B.S. and A. STUTZER (2000), Happiness, Economy and Institutions, *Economic Journal* 110 (2000), 918 – 938.
- FREY, B.S. and A. STUTZER (2002), *Happiness and Economics*, Princeton University Press, Princeton/Oxford 2002.
- GERBER, E.R. (1996), Legislative Response to the Threat of Initiatives, *American Journal of Political Science* 40 (1996), 99 – 128.
- GERBER, E.R. (1999), *The Populist Paradox: Interest Group Influence and the Promise of Direct Legislation*, Princeton University Press, Princeton 1999.
- GRAMLICH, E.M. (1990), U.S. Federal Budget Deficits and Gramm-Rudman-Hollings, *American Economic Review*, Papers and Proceedings 80.2 (1990), 75 – 80.
- HOXBY, C.M. (2000), Does Competition among Public Schools Benefit Students and Taxpayers?, *American Economic Review* 90 (2000), 1209 – 1238.
- KIEWIET, D.R. and K. SZAKALY (1996), Constitutional Limitations on Borrowing: An Analysis of State Bonded Indebtedness, *Journal of Law, Economics and Organization* 12 (1996), 62 – 97.
- KIRCHGÄSSNER, G. (2002), The Effects of Fiscal Institutions on Public Finance: A Survey of the Empirical Evidence, in: S.L. WINER and H. SHIBATA (eds.), *Political Economy and Public Finance: The Role of Political Economy in the Theory and Practice of Public Economics*, Edward Elgar, Cheltenham 2002, 145 – 177.
- KIRCHGÄSSNER, G. (2002a), Föderalismus und Staatsquote, in: U. WAGSCHAL and H. RENTSCH (eds.), *Der Preis des Föderalismus*, Zürich, Orell Füssli, 71 – 91.
- KIRCHGÄSSNER, G. and W.W. POMMEREHNE (1996), Tax Harmonization and Tax Competition in the European Union: Lessons from Switzerland, *Journal of Public Economics* 60 (1996), 351 – 371.
- KIRCHGÄSSNER, G., L.P. FELD and M.R. SAVIOZ (1999), *Die direkte Demokratie: Modern, erfolgreich, entwicklungs- und exportfähig*, Helbing and Lichtenhahn, Basel 1999.
- MATSUSAKA, J.G. (1995), Fiscal Effects of the Voter Initiative: Evidence from the Last 30 Years, *Journal of Political Economy* 103 (1995), 587 – 623.

- MATSUSAKA, J.G. (2002), *For the Many or the Few: How the Initiative Process Changes American Government*, forthcoming: University of Chicago Press, Chicago.
- O’SULLIVAN, A., T.A. SEXTON and ST.M. SHEFFRIN (1995), *Property Taxes and Tax Revolts: The Legacy of Proposition 13*, Cambridge University Press, Cambridge 1995.
- O’SULLIVAN, A., T.A. SEXTON and ST.M. SHEFFRIN (1999), Proposition 13: Unintended Effects and Feasible Reforms, *National Tax Journal* 52 (1999), 99 – 111.
- PELTZMAN, S. (1992), Voters as Fiscal Conservatives, *Quarterly Journal of Economics* 107 (1992), 327 – 361.
- POMMEREHNE, W.W. (1978), Institutional Approaches to Public Expenditure: Empirical Evidence from Swiss Municipalities, *Journal of Public Economics* 9 (1978), 255 – 280.
- POMMEREHNE, W.W. (1983), Private versus öffentliche Müllabfuhr – nochmals betrachtet, *Finanzarchiv* 41 (1983), 466 – 475.
- POMMEREHNE, W.W. and H. WECK-HANNEMANN (1996), Tax Rates, Tax Administration and Income Tax Evasion in Switzerland, *Public Choice* 88 (1996), 161 – 170.
- POMMEREHNE, W.W., A. HART and L.P. FELD (1997), Steuerhinterziehung und ihre Kontrolle in unterschiedlichen politischen Systemen, *Homo oeconomicus* 14 (1997), 469 – 487.
- POTERBA, J.M. (1997), Do Budget Rules Work?, in: A.J. AUERBACH (ed.), *Fiscal Policy: Lessons from Economic Research*, MIT Press, Cambridge (Mass.) 1997, 53 – 86.
- RODDEN, J. (2003), Reviving Leviathan: Fiscal Federalism and the Growth of Government, mimeo, Department of Political Science, MIT, Cambridge.
- ROUBINI, N. and J.D. SACHS (1989), Political and Economic Determinants of Budget Deficits in the Industrial Democracies, *European Economic Review* 33 (1989), 903 – 938.
- SCHALTEGGER, CH.A. (2001), The Effects of Federalism and Democracy on the Size of Government: Evidence from Swiss Sub-national Jurisdictions, *ifo Studien* 47 (2001), 145 – 162.
- SCHALTEGGER, CH.A. (2002), Budgetregeln und ihre Wirkung auf die öffentlichen Haushalte: Empirische Ergebnisse aus den US-Bundesstaaten und den Schweizer Kantonen, *Schmollers Jahrbuch* 122 (2002), 369 – 413.
- SHADBEGIAN, R.J. (1999), Fiscal Federalism, Collusion, and Government Size: Evidence from the States, *Public Finance Review* 27 (1999), 262 – 281.
- STAUFFER, TH.P. (2001), *Instrumente des Haushaltsausgleichs: Ökonomische Analyse und rechtliche Umsetzung*, Helbing und Lichtenhahn, Basel et al. 2001.
- STUTZER, A. and B.S. FREY (2000), Stärkere Volksrechte, zufriedener Bürger, eine mikroökonomische Untersuchung, *Swiss Political Science Review*, 6 (2000), 1 – 30.
- TORGLER, B. (2002), Tax Morale and Institutions, mimeo, University of Basel.
- TRECHSEL, A. and U. SERDÜLT (1999), *Kaleidoskop Volksrechte: Die Institutionen der direkten Demokratie in den schweizerischen Kantonen (1970-1996)*, Helbing and Lichtenhahn, Basel 1999.
- VATTER, A. and M. FREITAG (2002), Die Janusköpfigkeit von Verhandlungsdemokratien: Zur Wirkung von Konkordanz, direkter Demokratie und dezentraler Entscheidungsstrukturen auf den öffentlichen Sektor der Schweizer Kantone, *Swiss Political Science Review* 8 (2002), 53 – 80.
- WICKSELL, K. (1896), *Finanztheoretische Untersuchungen nebst Darstellung and Kritik des Steuerwesens Schwedens*, Gustav Fischer, Jena 1896.

Appendix

Source of the data

- cantonal and local public expenditure per capita,
- cantonal and local public revenue per capita,
- cantonal and local tax revenue per capita

Source: Swiss Federal Finance Administration

- disposable income per capita,
- cantonal population,
- share of population younger than 20,
- share of population older than 65,
- share of urban population, i.e. of people living in local communities with more than 10'000 inhabitants

Source: Swiss Federal Statistical Office

- federal unconditional grants per capita,
- tax burden in the highest income tax bracket of 1 million SFr annual taxable income, weighted with the inverse of the distances of the cantons' capitals,

Source: Own calculations on the basis of data of the Swiss Federal Finance Administration

- ideological position of the cantonal government

Source: Own calculations on the basis of data of the Swiss Federal Statistical Office

- index of direct democracy

Source: Own calculation of an index proposed by STUTZER and FREY (2000), using additional data from TRECHSEL and SERDULT (1999).

- index of constitutional constraints

Source: Own calculations, based on Stauffer (2001) and

All monetary data have been deflated using the implicit GDP deflator with basis 2000 = 100.

Table A1: Descriptive Statistics of the Explanatory Variables

Variables	Mean	Standard Deviation	Theoretical Range	Empirical Range
Fiscal decentralisation ¹	0.331	0.109	0 – 1	0.152 – 0.462
direct democracy	4.285	1.224	1 – 6	1.627 – 5.653
fiscal constraints	0.298	0.820	0 – 3	0.000 – 3.000
tax competition	0.237	0.079	0 – 1	0.101 – 0.373
unconditional grants	267.065	106.443	0 – ...	223.49 – 1'318.68
ideology of the government	-0.100	0.185	-1 – 1	-0.600 – 0.400

The empirical range is calculated for the average values of the cantons over the total observation period, with the exception of the ideology of the government. For this variable the empirical range is calculated for the most left-wing and the most right-wing government.

¹) The canton Basel-City is excluded from the empirical range, because its cantonal budget is nearly identical with the local budget.

Table A2: Expenditure, Revenue, and Deficit (per Capita), 1980 – 1998

Dependent Variable	Public Expenditure	Public Revenue	Tax Revenue	Deficit
constant	0.827 (0.94)	0.967 (1.45)	1.198* (2.16)	-3.053** (2.97)
direct democracy	-0.036(*) (-1.89)	-0.026(*) (-1.66)	-0.039** (-2.84)	-0.017 (0.26)
institutional constraints	-0.006 (-0.39)	0.012 (1.06)	-0.011 (-1.44)	-0.106** (-3.05)
fiscal decentralisation	-0.434** (2.81)	-0.300** (2.68)	-0.201* (2.33)	0.041 (0.11)
tax competition	-0.115* (-2.04)	-0.141** (-3.03)	-0.200*** (-5.87)	0.605 (1.26)
unconditional grants per capita	0.119* (2.37)	0.158*** (3.60)	0.067(*) (1.85)	-0.001* (2.56)
ideology of the government	0.145(*) (1.74)	0.159* (2.32)	0.024 (0.054)	0.034 (0.19)
disposable income per capita	0.194(*) (1.78)	0.167(*) (1.82)	0.359*** (4.53)	0.012* (1.96)
population	-0.000 (-0.01)	-0.008 (-0.54)	-0.022(*) (-1.68)	0.000 (0.95)
urbanisation	0.179* (1.97)	0.186** (2.60)	0.382*** (6.23)	0.564 (2.50)
dummy for French and Italian speaking population	-0.002 (-0.04)	-0.019 (-0.39)	-0.039 (-1.16)	0.498** (2.97)
share of old population	0.021** (2.62)	0.015* (2.53)	-0.006 (1.24)	0.064*** (3.81)
share of young population	-0.007 (-0.74)	-0.017* (-2.18)	-0.031*** (-5.68)	0.080** (3.29)
Dummy for Appenzell Ausserrhoden in 1996	0.085* (2.35)	0.331*** (11.16)	0.146*** (5.20)	-3.035*** (-23.97)
\bar{R}^2	0.758	0.810	0.916	0.504
number of observations	491	480	485	487
SER	0.113	0.093	0.077	0.390
J.-B.	3.815	4.059	1.982	4.471

The numbers in parentheses are the estimated t-statistics, based on the Newey-West autocorrelation-consistent standard errors. '***', '**', '*' or '(*)' show that the estimated parameter is significantly different from zero at the 0.1, 1, 5, or 10 percent level, respectively. SER is the standard error of the regression, and J.-B. the value of the Jarque-Bera-test for normality of the residuals.