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Do institutions of direct democracy tame the leviathan? : Swiss evidence on the structure of expenditure for public education

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DO INSTITUTIONS OF DIRECT DEMOCRACY TAME
THE LEVIATHAN? SWISS EVIDENCE ON THE
STRUCTURE OF EXPENDITURE FOR
PUBLIC EDUCATION

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DO INSTITUTIONS OF DIRECT DEMOCRACY TAME THE LEVIATHAN? SWISS EVIDENCE ON THE STRUCTURE OF EXPENDITURE FOR PUBLIC EDUCATION

Abstract

The deleterious impact of institutions of direct legislation on student performance found in studies for both the U.S. and Switzerland has raised the question of what its transmission channels are. For the U.S., an increase in the ratio of administrative to instructional spending and larger class sizes were observed, supporting the hypothesis of a Leviathan-like school administration. For Switzerland, using a cross-sectional time-series panel of sub-federal school expenditure and size of classes, no such effect is detected. This finding is in line with previous analyses in which efficiency gains in the provision of public goods for Switzerland have been found.

JEL Code: H72, H41, I22.

Keywords: direct democracy, median voter, bureaucracy, public education.

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1 Introduction

In general, recent research on the impact of institutions of direct legislation on student performance both for the U.S. and Switzerland has revealed that student performance is negatively affected by it. An important transmission channel of this institutional impact appears to be the induced cut in educational spending, which directly translates into a performance lowering influence. However, for the U.S. there exists evidence that this budgetary impact might be (partly) caused by the manipulative behavior of school administrators: It could be shown that the cuts carried out by school administrators as a response to the (new) budget constraint were such that administrative spending was relatively less reduced than spending designated for instructional purposes. This paper is the first to test whether such a Leviathan-like behavior of school bureaucrats is also present in Switzerland. Since Swiss cantons are heterogeneous with respect to the degree of direct democracy and quite autonomous in their policies on public education, Switzerland – besides the U.S. – appears especially suitable for such an analysis.

In anticipation of the empirical results, estimating a model of government expenditure direct democracy is first shown to considerably restrict the financial resources available for current expenses for public education in Swiss cantons for various types of institutions of education. Since the combined cantonal and local school expenses are the main source for financing public schooling in Switzerland, this limiting impact on the subfederal school budget can be considered crucial. In general, however, no such effect can be detected for investment expenditure. Subsequently, it is observed that if the ratio of instructional to administrative expenditure is employed as regressand in the identical model, the Leviathan-hypothesis has to be strongly rejected for both current and investment expenditure. A similar result is obtained for class sizes and student-teacher ratios. These findings are completely contrasting empirical results for the U.S., but they are in line with recent analyses of the institutional impact of direct legislation on student performance in Switzerland where it was conjectured that the performance-lowering impact of direct democracy occurs mainly through the qualification of teachers.¹

The rest of this paper is organized as follows. Section 2 provides a brief overview of the Swiss political and public educational system and presents related findings for the United

¹ It is conjectured that lower educational spending is driven by lower teachers' wages.

States. The third section discusses the empirical model and the Leviathan-hypothesis while the forth describes the data and estimation method. Section 5 presents the estimation results. Finally, section 6 evaluates the findings and concludes.

2 Context: Direct Democracy and Education Quality

2.1 Direct Democracy

In modern (semi)direct democracies, a representative political system is complemented by direct democratic institutions. The most prominent cases are Switzerland and the United States, which are both also shaped by a very strong fiscal decentralization, each state level having its own sources of tax revenue. Therefore, there exists a direct institutional link between the power to tax and direct legislative institutions so that citizens are able to politically influence both sides of the budget equally. In Switzerland, popular rights can be exerted at all three levels of the state (federal, cantonal, and communal). Since the 26 Swiss cantons differ with respect to the degree of direct democracy which is determined by their state constitutions, it is possible to analyze the impact of a change in the degree of direct democracy on a particular policy outcome (FELD and KIRCHGÄSSNER 2001), like the provision of schooling.

Table 1: Expenditure for Public Education in 2002 in Million Swiss Francs

	All levels		Levels of the state					
			Federal government		Cantons		Communes	
	absolute	in %	absolute	in %	absolute	in %	absolute	in %
Total costs of education	25,008.9	100.0	3,278.3	13.1	13,565.6	54.2	8,164.9	32.6
<i>Stage of education</i>								
Kindergarten	916.0	3.7	-	-	303.3	33.1	612.7	66.9
Compulsory education	10,944.5	43.8	19.4	0.2	4,374.1	40.0	6,551.0	59.9
Schools with special curricula	1,098.9	4.4	-	-	488.2	44.4	610.6	55.6
Professional schools	3,405.8	13.6	480.4	14.1	2,664.0	78.2	261.4	7.7
High schools	1,994.7	8.0	11.7	0.6	1,917.9	96.2	65.0	3.3
Advanced professional schools	247.6	1.0	31.6	12.8	214.4	86.6	1.5	0.6
Universities, Universities of Applied Sciences	5,977.1	23.9	2,696.2	45.1	3,267.4	54.7	13.6	0.2
Other costs of education	424.4	1.7	39.0	9.2	336.3	79.3	49.1	11.6
Source: Federal Statistical Office, T 15.2.4.1								

In Switzerland, cantons are not only responsible for public education but bear the financial burden for its provision. Table 1 displays how the costs of public education at its various stages are split between the three levels of the Swiss State for the year 2002. To the overall costs of compulsory education, the federal government contributes only 0.2%, whereas the cantons bear about 40% and the communes about 60%. The communes mostly finance primary school education. Compulsory education finishes with the end of secondary I education, usually at the age of about 15. In general, in all 26 Swiss cantons, two types of secondary II education can be distinguished: basic education in professional schools and education to meet advanced requirements in high schools (e.g. university preparation). Usually, the second type can only be entered on a selective basis. Tertiary education takes place at universities, of which cantonal and federal universities exist, and advanced professional schools preparing for higher professional diploma. Finally, most of the cantons support also the ongoing education of adults.

2.2 *Theoretical Background*

In some strands of political-economic theory it is argued that, in a representative system, resources are wasted and allocations of goods and resources occur that deviate strongly from the median voter's position. On the one hand, overspending is caused by (a) politicians who exploit the budget (and implicitly the tax base) to satisfy the needs of the electorate in their local districts ('pork-barrel legislation')²; (b) the forming of broad coalition governments that leads to an inefficient expansion of budgets by the spending ministers ('budget as a common pool')³; or (c) logrolling in the political decision-making process, which brings about the financing of minority projects that would otherwise not have gained support from the parliamentary majority⁴.

Most important, (d) government administrations are headed by bureaucrats who exercise monopoly power and aim at maximizing their budget and extracting rents (ROMER and ROSENTHAL 1978, 1979), which might lead to a preference for those expenditure projects that also cause an increase in administrative spending (e.g. through the foundation of new departments, etc.) (NISKANEN 1975). If the budget for governmental administrations is

² According to WEINGAST, SHEPSLE and JOHNSEN (1981), this leads to a preference of projects in districts of the winning party at the expense of those of the losing party.

³ See e.g. ROUBINI and SACHS (1989), DE HAAN and STURM (1997), VOLKERINK and DE HAAN (2001).

⁴ See also BESLEY and COATE (1997, 1998) on inefficiencies in representative democracies, particularly through allowing the politicians to pursue their own goals between elections and the activities of interest group.

constrained, bureaucrats are thought to aim at increasing their personal administrative staff at the expense of the resources available for carrying out their duties related to production as prescribed by law (WILLIAMSON 1964).⁵ When facing the decision to cut either administrative or instructional spending, a Leviathan-like administrator can be expected to choose the latter. Alternatively, FIGLIO and O'SULLIVAN (2001) propose a manipulative bureaucratic behavior in which the administrator deliberately allows student performances to decline by allocating fewer financial resources to instruction than to administration. The goal is to persuade the electorate that budget reductions have a deleterious impact on the quality of education so that it overrules its previous political decision.

Nevertheless, direct democratic institutions, many of their supporters argue, might serve as means to discipline the behavior of politicians and bureaucrats (TEMPLE 1996). Using a model of political economy, FELD and KIRCHGÄSSNER (2001) show that the mere existence of such institutions (playing the role of a 'credible threat') leads to an allocation of good and resources that is closer to the median voter's preferences than otherwise. Therefore, three characteristics should be expected in direct democracies: (a) less money should be wasted on undesired projects because voters veto them through fiscal referenda and initiatives⁶; (b) governmental budgets should be smaller because fewer financial projects and laws triggering new expenses are approved by the electorate if voters are fiscally conservative⁷; and (c) public goods might be provided more efficiently as bureaucrats' discretionary power is also limited⁸.

2.3 *U.S. Empirical Evidence on Public Schooling*

In the last two decades, so-called tax revolts – for example, California's famous Proposition 13 in 1978 – have taken place in about 20 U.S. states⁹, many of them pushed through by means of direct legislation, particularly statutory initiatives at the state level. These revolts aimed mostly at reducing the level and growth of property taxes that create important revenue at the local level (CARD and PAYNE 2002, DOWNES et al. 1998, DYE and MCGUIRE 1997), particularly for school budgets (BRADBURY et al. 2001, SHADBEGIAN 2003). But such a cut in

⁵ The rationale is that a large personal staff creates a feeling of importance and power (DOWNS 1967).

⁶ For theoretical arguments, see e.g. BESLEY and COATE 2001.

⁷ For theoretical arguments, see FELD and KIRCHGÄSSNER 2001.

⁸ See e.g. POMMERHNE 1983; see also KIRCHGÄSSNER (2000, 2001, 2002) and KIRCHGÄSSNER et al. (1999) for a review of ample empirical evidence, FELD and SAVIOZ (1997) for a perspective on growth, and HUG (2004) for a corroborating meta-analysis.

⁹ The source ACIR (1995) provides a catalogue of existing tax limits.

school budget is not necessarily translated into an equally large cut (in relative terms) in the teaching and administration components of school spending (e.g. DYE and MCGUIRE 1997).

During the 1990s, empirical multivariate analyses of the impact of newly introduced tax limits on student performance were carried out to test an educational production function, finding evidence for a performance lowering impact (e.g. FIGLIO 1997, DOWNES and FIGLIO 1997, DOWNES et al. 1998, FIGLIO and RUEBEN 2001). To identify the channels through which this deleterious impact occurred, the influence of these tax limits on various revenue-driven input factors of the educational production function has also been analyzed. Significant evidence was found that tax limits brought about less educational spending per student (BRADBURY et al. 2001, SHADBEGIAN 2003), and lower wages for beginning instructors (FIGLIO 1997, POTERBA and RUEBEN 1995)¹⁰ that cause potentially well-qualified teachers to leave the profession (FIGLIO and RUEBEN 2001, FIGLIO 1997a). Furthermore, it was also shown that tax limits can be associated with larger class sizes and higher student-teacher ratios (SHADBEGIAN 2003, FIGLIO 1998). Most important for this analysis, it was revealed that tax limits lead to a spending shift from instruction to administration (FIGLIO 1997, 1998). More precisely, administrators' preferences were shown to have remained unchanged: they still overstaffed their administrations (DOWNES 1996), reduced instructional expenses relative to administrative expenses (FIGLIO 1998), or failed to reduce administrative spending at all (FIGLIO 1997). In addition, using expenditure data from 5,150 U.S. cities, FIGLIO and O'SULLIVAN (2001) observed a decrease of the teacher-administrator ratio in school districts with an override option. In sum, all these findings for the U.S. seem to provide evidence that the rent-seeking behavior of school bureaucrats is not limited by initiative-induced cuts in local school budgets.

3 Model and Hypothesis

In order to test the impact of direct democracy on the rent-seeking behavior of school bureaucrats in Switzerland, a two step strategy is followed. First, the components of public expenditure on education at public schools are analyzed as a function of the degree of direct democracy and other important determinants. Second, the impact of direct legislation on the

¹⁰ SHADBEGIAN (2003) found no significant effect of tax limits on teachers' average wages but provided no analysis of wages of starting teachers. In an older contribution, however, he showed that stringent tax limits had a decreasing effect on the wages of teachers (SHADBEGIAN 2000).

Leviathan-like behavior of bureaucrats is investigated, measured by (a) the ratio of instructional spending to administrative spending and (b) class size. Thus, the following basic model is proposed:

$$ID_{it} = \beta_0 + \beta_1 DIRDEM_{it} + \beta_2 V_{it} + u_{it} \quad (1)$$

where ID_{it} stands for the different dependent variables that are of interest in this study. The subscript $i = 1, \dots, 26$ indicates cantons and $t = 1990, \dots, 2001$ indexes years. The model implies that ID_{it} is a function of direct democracy ($DIRDEM_{it}$) and a vector of control variables V_{it} . β_1 is the parameter of interest while u_{it} denotes the error term.

In previous empirical work by FELD and KIRCHGÄSSNER (1999, 2001), FELD and MATSUSAKA (2003, 2000), and VATTER and FREITAG (2002), a negative, spending limiting impact of direct democracy on sub-federal public spending was found. For total educational expenses in Swiss cantons, such a negative effect has been detected by FISCHER (2005) and SCHALTEGGER (2001), and similarly for the U.S. for the effect of (stringent) local tax limits on the local (school) budget by SHADBEGIAN (1999, 2003). Regarding the appropriation effort for the financing of higher education, ARCHIBALD and FELDMAN (2004) also found a considerable lowering impact at the U.S. state level. Based on these findings, it is here hypothesized that direct democracy should have a spending restraint impact on the various components of the subfederal budget for schooling in Switzerland.

The impact of direct democracy on the adaptive behavior of school administrators to a budget constraint is, however, more ambiguous. Analogously to previous empirical findings for the U.S., a (relative) increase in administrative spending at the expense of means available for instruction, leading to larger class sizes and higher student-teacher ratios, should be expected; on the other hand, based on the relevant empirical literature for Switzerland it may well be that the efficiency gains in the provision of public goods observed by POMMEREHNE (1983) and conjectured by FELD and SAVIOZ (1997) prevail. But, based on the U.S. results, the expected sign of the direct democracy variable on the ratio coefficient should be negative.

V_{it} consists of variables capturing the structure of fiscal federalism such as fiscal decentralization measured by the share of local in total subfederal (i.e. cantonal and local) spending, tax competition measured by the inverse of the average of all other cantons income tax rates in the highest income tax bracket, weighted by the inverse of geographical distance

between cantonal capitals, and unconditional grants which address the impact of vertical transfer payments from the federal government to cantonal governments. The more fiscally decentralized a canton the less leeway exists for diverging educational policies because of migration incentives. Similarly, the intensity of tax competition restricts educational expenditure at the cantonal level. Finally, unconditional grants help finance additional spending and relax cantonal budget constraints.

Among the economic determinants, the log of national income disaggregated to the cantonal level is included according to the interpretation of WAGNER'S Law (1892) of a possible income effect on the demand for public goods such as public education. The log of population takes into account economies of scale: Larger cantons might be able to benefit from economies of scale reaching a lower level of public (educational) expenditures while achieving an identical level of supply.¹¹ In addition, a variable incorporating fiscal constraints at the cantonal level is included, which can be seen as a supplementary instrument to limit the taxing power of policymakers and hence their ability to finance public education (SCHALTEGGER 2002).

In order to control for political factors, a coalition variable is employed in order to empirically evaluate the effect of broad based coalition governments on the exploitation of the budget as a fiscal commons by too many spending ministers (see section 2). Moreover, the 'net' share of conservative parties in the cantonal government is considered in order to control for the ideological disposition to finance public education. In line with the literature, we expect this variable to have a positive impact on educational expenditure, particularly for higher education.

Finally, the share of persons holding a high school or university degree might exert an influence on the political decision-making process in favor of an increase in educational expenditure. The ratio of urban population in a canton reflects the impact of population density on fiscal policy decisions of governments. In agglomerations, a concentration of people demanding higher or more specialized education occurs often such that additional school spending has to be undertaken. Moreover, the shares of the young (below the age of 20) and the senior population (above 60) in total population are controlled for in order to

¹¹ The logarithm of the total population and logarithm of the various age groups who are supposed to attend specific institutions of education are correlated with $\rho = 0.99$.

reveal the influence of the two groups which (supposedly) most strongly benefit or disbenefit from schooling expenditure. Finally, a French-or-Italian-language dummy is included which takes into account systematic differences driven by cantonal culture.

4 Data and Methodology

At my disposal are budget data on sub-federal educational expenditure from 1990 to 2001.¹² Among the various budget components, the following important ones have been selected for investigation: expenditure on pre-school education (*Kindergarten*), primary schools, and secondary I education. The last two institutions form the compulsory part of public education in Switzerland. Furthermore, also included is expenditure on secondary II institutions such as professional schools (*Berufsbildungsschule*) and high schools (whose degree allows entering a University, *Gymnasium*), as well as institutions of tertiary education like advanced professional schools (*Fachschulen*), cantonal universities¹³, and education of adults (*Erwachsenenbildung*). Most important, there is a budget component 'expenses for administration' which allows us to test the Leviathan-hypothesis developed above. For all these budget components, investment expenditure and current expenditure can be differentiated. In general, investment expenditure is related to the erection and renovation of facilities while current expenditure comprises expenses for the employment of personnel and the annual maintenance costs of the buildings.

For this analysis, educational expenditure should be defined per student. The number of students is proxied by the absolute number of permanent residents in the specific age group by which usually a particular type of school is attended.¹⁴ Since education is compulsory from the age of 6 until the age of 15, at least the per student numbers of primary and secondary I educational expenditure should be close to their true values. Absolute investment expenditure of 0 Swiss Francs has been replaced by a symbolic expenditure of 1 Swiss Franc. Based on these values of instructional and administrative spending, expenditure ratios have been calculated. In the expenditure regressions (levels), logs have been taken so that only

¹² Since the costs of public education are split between the communes and the cantons the combined expenditure has to be employed as dependent variable.

¹³ These are not financially borne by the federal government, in contrast to the so-called Federal Universities (*Eidgenössische Hochschulen*).

¹⁴ These data are collected and made publicly available only from 1999 on.

observations with positive spending levels remain in the sample.¹⁵ All monetary variables have been deflated to the base year 1980. The budgetary, economic, and sociodemographic control variables were obtained from the Federal Statistical Office (BFS) (see also table A1 of the Appendix).

Information on class sizes is available for some stages of public education from 1999 on. For this analysis, class sizes from 1999 until 2001 in primary schools, secondary I schools, and three types of institutions of secondary II education (*Mittelschule* and *Gymnasium*) could be obtained. Student-teacher ratios are difficult to calculate as the sole data on teachers available are for 1998. Based on these data, student-teacher ratios have been proxied for the years 1999 and 2000.

The estimations employ a composite index of direct democracy that measures the degree of direct legislation at the cantonal level in Switzerland (STUTZER 1999). This index takes on values between 1 and 6, with 6 indicating the highest degree of empowerment of the cantonal electorate. It is an unweighted average of four subindices that evaluate the power of the constitutional initiative, the statutory initiative, the fiscal referendum, and the statutory referendum in cantonal constitutions. Nevertheless, this index measures the presence of these institutions rather than their actual use¹⁶. Its exact construction is demonstrated in STUTZER (1999) for the year 1996. A detailed description of all variables can be found in table A1 of the Appendix.

The empirical analysis is performed using a pooled cross-section time-series model. FELD and KIRCHGÄSSNER (2001) 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 reflecting the extent of direct democracy vary only very little or remain constant over time in most 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, are likely to hide the effect of the institutional variables and render them insignificant. The consistency of OLS estimates depends on the exogeneity of the regressands. In this case, the decentralization variable is assumed to be exogenous as the single expenditure on a particular institution of education does not form a decisive part of the total

¹⁵ Only a very small number of observations is excluded by using this procedure.

¹⁶ See FELD and KIRCHGÄSSNER (2001).

cantonal spending, whereas the ideology of the elected government might be influenced by their educational policy. The endogenous variable has been instrumented with cantonal overnight stays per capita as a measure of tourist inflow and the birthrate of illegitimate children as a proxy for single parent families which account for important social determinants of voting left or right. For the major part of the regression models these variables appear to be valid instruments as indicated by the F-value of the excluded instruments of the first stage regression and the Hansen J-test of overidentification. In small samples, the Jarque-Bera test for normality is reported to indicate the presence of outliers. Finally, in all regressions year effects to circumvent time dependency are included and the heteroscedasticity and autocorrelation consistent standard errors according to the Newey-West method are calculated.

5 Results

As already stated above, the analysis is carried out in two steps. First, the impact of direct democracy on educational expenditure per student will be investigated and, second, the Leviathan-hypothesis will be tested.

5.1 *Impact of Direct Democracy on Expenditure Levels*

Table 2 displays the results for current educational expenditure per student for various institutions of education. For the majority of the educational expenditure components, a significant spending dampening impact of direct democracy can be observed (at the 1 percent level). This occurs, in particular, for pre-school education (column (1)), secondary I education and secondary II education in professional schools (columns (3) and (4)), and education of adults (column (8)). Interestingly, sub-federal expenses for primary school (column (2)), high school and tertiary education are not significantly affected by institutions of direct legislation (columns (5) through (7)). Most important, also administrative spending, that is expenses for the cantonal and local school administrations, is significantly dampened through direct democracy (column (9)). The (centered) R² indicates a quite good fit of the model, except for primary schools whose financing structure depends more on determinants at the local level. As regards the remaining controls, which are not in the main focus of this paper, the reader is advised to consult table 2.

Table 2: Current Expenditure of Public Education per Student 1990 – 2001

	1	2	3	4	5	6	7	8	9
	Pre-school	Primary School	Sec. I school	Professional school (Sec. II)	High school (Sec. II)	Professional school (Tertiary)	Cantonal university (Tertiary)	Adult Education	School admin.
Direct democracy	-0.329** (4.10)	-0.001 (0.03)	-0.119** (3.92)	-0.074** (2.84)	0.007 (0.20)	0.110 (0.93)	0.012 (0.18)	-0.337** (2.73)	-0.360** (3.63)
Fiscal dec.	0.446 (1.24)	-0.105 (0.59)	-0.045 (0.22)	0.396* (2.47)	-0.465* (2.10)	1.266* (2.28)	-0.432 (1.32)	0.302 (0.52)	-0.907 (1.52)
Tax comp.	-2.140** (3.05)	-2.242** (4.21)	-1.699** (3.43)	-0.515 (1.40)	-0.52 (1.25)	1.311 (0.92)	0.883 (1.09)	-1.135 (0.54)	-0.816 (0.60)
Fisc. constraint	0.057(*) (1.75)	0.030(*) (1.75)	-0.033(*) (1.79)	0.025 (1.50)	0.067** (3.36)	-0.060 (0.59)	0.111** (2.76)	-0.380** (4.75)	-0.104* (2.09)
Coalition	0.337** (4.32)	-0.023 (0.63)	-0.009 (0.35)	-0.081** (3.03)	-0.04 (1.39)	-0.365** (3.36)	-0.239** (3.95)	-0.051 (0.50)	-0.046 (0.48)
Ideology	-1.548** (4.03)	-1.204** (4.95)	-0.405(*) (1.80)	-0.301 (1.49)	0.372(*) (1.86)	-0.976 (0.69)	-0.023 (0.05)	-0.265 (0.30)	-1.977** (3.04)
Transfers	-0.590** (3.57)	0.189* (2.46)	-0.167* (2.30)	0.059 (0.90)	0.07 (1.07)	-0.102 (0.35)	-0.044 (0.30)	0.313 (0.99)	-0.030 (0.12)
High edu.	0.108** (4.36)	0.017 (1.51)	0.003 (0.38)	0.044** (6.16)	0.009 (1.20)	0.031 (1.13)	0.112** (6.26)	0.062 (1.56)	0.064* (2.36)
Urbanization	-0.014** (3.46)	-0.004(*) (1.85)	-0.002 (1.43)	-0.007** (4.23)	0.003 (1.54)	-0.014(*) (1.86)	-0.006 (1.25)	-0.007 (0.86)	-0.014(*) (1.69)
Income	-1.108* (2.34)	-0.811** (3.42)	0.415(*) (1.96)	0.103 (0.58)	0.171 (0.81)	0.93 (1.19)	1.059* (2.58)	-1.676 (1.56)	-1.095 (1.58)
Population	-0.427** (4.74)	0.036 (0.96)	-0.013 (0.53)	0.088** (3.25)	-0.128** (3.92)	0.264** (2.74)	0.265** (4.12)	-0.021 (0.14)	-0.309** (3.08)
Res. > 60	-0.049 (1.42)	-0.058** (2.68)	0.006 (0.36)	-0.004 (0.23)	-0.021 (0.96)	-0.043 (0.71)	0.147** (3.64)	-0.023 (0.29)	-0.057 (0.82)
Res. < 20	-0.152** (3.60)	-0.059* (2.30)	-0.027(*) (1.67)	-0.090** (4.40)	-0.083** (3.20)	-0.168* (2.14)	-0.016 (0.32)	-0.231* (2.59)	-0.261** (2.75)
Latin	-1.737** (4.67)	-0.619** (3.22)	0.044 (0.32)	-0.192 (1.40)	-0.158 (1.01)	0.494 (0.88)	0.357 (1.23)	-1.229(*) (1.88)	-1.358** (2.78)
Constant	23.920** (5.69)	13.014** (5.84)	9.376** (6.40)	8.744** (5.12)	10.689** (5.24)	5.285 (0.85)	-3.068 (0.75)	12.77 (1.53)	21.382** (3.14)
Obs.	312	312	312	312	312	312	303	298	312
Centered R2	0.6329	-0.1470	0.752	0.8226	0.5967	0.4479	0.8293	0.4500	0.4596
F-test (instr.)	58.86	58.86	58.86	58.86	58.86	58.86	53.03	62.98	58.86
Partial R2	0.2604	0.2604	0.2604	0.2604	0.2604	0.2604	0.2515	0.3053	0.2604
Hansen J	0.060	0.000	0.796	2.810	0.000	0.958	0.721	1.202	1.028
(p-value)	(0.807)	(0.992)	(0.373)	(0.094)	(0.990)	(0.328)	(0.396)	(0.273)	(0.311)

2SLS with autocorrelation and heteroscedasticity robust standard errors; absolute values of t-statistics are given in brackets. Endogenous variable: ideology of government instrumented with measures of tourist inflow and broken families, both lagged by two periods. **, * and (*) indicate significances at the 1 percent, 5 percent and 10 percent levels, respectively. J-B is the Jarque-Bera statistics, Hansen J the Hansen's J statistics which is distributed chi-squared in the number of overidentifying restrictions.

The size of the coefficient on direct democracy in the administrative spending regression (column (9)) appears quantitatively bigger than the ones observed in the relevant spending regressions for instructional purposes (columns (1), (3), (4), and (8)). Based on these estimation outcomes it might well be that a higher level of direct democracy is associated

with a relatively bigger cut in administrative spending than in instructional spending. Thus, for current educational spending in Switzerland, a rejection of the Leviathan-bureaucracy-hypothesis seems to be likely.

Table 3: Investment Expenditure for Public Education per Student 1990 – 2001

	1	2	3	4	5	6	7	8	9
	Pre-School	Primary school	Sec. I school	Professional school (Sec. II)	High school (Sec. II)	Professional school (Tertiary)	Cantonal university (Tertiary)	Adult Education	School admin.
Direct									
Democracy	1.489* (2.26)	-2.188* (2.52)	-0.911 (1.10)	0.497 (1.02)	1.195* (2.16)	1.400* (2.05)	-2.687** (3.49)	-1.221* (2.41)	-1.045 (1.01)
Fiscal dec.	3.471 (1.05)	-7.382(*) (1.84)	-5.242 (1.52)	-0.612 (0.22)	1.951 (0.76)	-3.34 (1.19)	-0.111 (0.04)	-1.93 (0.98)	-1.443 (0.28)
Tax comp.	-13.845 (1.41)	-24.391* (1.99)	12.773 (1.24)	28.360** (3.09)	20.169* (2.27)	-15.535(*) (1.84)	2.067 (0.23)	-15.161** (3.06)	-1.491 (0.11)
Fisc. constraint	0.913* (2.05)	-0.576 (1.03)	-1.345* (2.57)	-0.431 (1.01)	-0.556(*) (1.73)	0.671 (1.22)	0.324 (0.61)	-0.562* (2.27)	-0.082 (0.12)
Coalition	0.635 (0.92)	1.635* (2.16)	1.337(*) (1.78)	0.042 (0.08)	1.491** (2.87)	-1.171(*) (1.66)	-0.195 (0.28)	-1.024** (3.14)	-0.66 (0.78)
Ideology	-3.136 (0.68)	-19.131** (3.76)	-7.870(*) (1.72)	11.630** (2.75)	-0.662 (0.12)	-2.708 (0.47)	-4.915 (1.10)	-7.338** (2.99)	-9.121 (1.54)
Transfers	2.606 (1.55)	-0.247 (0.13)	2.083 (1.33)	4.183** (3.23)	0.967 (0.71)	3.749* (2.43)	0.229 (0.16)	0.255 (0.26)	2.156 (0.99)
High edu.	0.167 (0.96)	-0.061 (0.32)	0.126 (0.70)	-0.145 (0.90)	-0.168 (1.44)	-0.036 (0.23)	0.413* (2.05)	0.427** (3.88)	0.056 (0.25)
Urbanization	-0.026 (0.60)	-0.047 (1.08)	-0.041 (1.10)	0.047 (1.20)	0.096** (2.97)	-0.042 (1.01)	-0.015 (0.36)	-0.090** (3.32)	-0.029 (0.47)
Income	-6.33 (1.35)	-11.964* (1.99)	-9.125(*) (1.71)	5.869 (1.39)	-1.846 (0.49)	-0.97 (0.18)	3.332 (0.76)	-5.434* (2.27)	-3.261 (0.56)
Population	1.684** (2.74)	0.26 (0.32)	1.802* (2.27)	2.298** (4.63)	1.865** (3.46)	3.604** (5.96)	1.975** (3.00)	-0.158 (0.37)	-0.313 (0.33)
Res. > 60	-0.137 (0.34)	-0.35 (0.75)	0.307 (0.66)	0.197 (0.59)	0.477 (1.41)	-0.539 (1.35)	1.313** (3.75)	-0.380(*) (1.85)	-0.344 (0.61)
Res. < 20	-0.809(*) (1.74)	-0.687 (1.26)	-0.019 (0.04)	0.024 (0.06)	0.806* (2.16)	-1.032* (2.23)	0.716(*) (1.77)	-0.474* (2.06)	-1.005 (1.60)
Latin	-3.715 (1.16)	-5.337 (1.23)	1.488 (0.38)	7.589** (2.92)	5.797* (1.98)	1.119 (0.31)	-2.595 (0.96)	-7.819** (3.48)	-1.957 (0.45)
Constant	5.386 (0.14)	79.639(*) (1.68)	-10.619 (0.23)	-80.331* (2.35)	-69.856* (2.03)	-20.002 (0.49)	-78.121* (2.20)	41.773* (2.14)	39.477 (0.73)
Obs.	312	312	311	302	308	300	306	310	300
Centered R2	0.2767	0.3433	0.444	0.3673	0.3341	0.4459	0.5923	0.0946	0.1581
F-test (instr.)	58.86	58.86	59.04	55.14	58.63	59.10	60.49	58.79	51.99
Partial R2	0.2604	0.2604	0.2615	0.2573	0.2590	0.2688	0.2632	0.2614	0.2823
Hansen J	2.086	0.340	1.392	0.449	1.317	0.869	0.124	3.734	0.006
(p-value)	(0.149)	(0.560)	(0.238)	(0.503)	(0.251)	(0.351)	(0.725)	(0.053)	(0.940)
See table 2.									

The estimation results for investment spending are displayed in table 3. In columns (1) through (8) investment for the purpose of instruction is employed as dependent variable while

investment for school administration is the regressand in column (9). The estimation outcomes show that investment spending is considerably restrained by institutions of direct democracy for universities run by the canton, for adult education, and for primary schools (columns (2), (7) and (8)). Non-recurring expenses on pre-school, secondary II education in high schools and tertiary education in professional schools (columns (1), (5) and (6)) are unexpectedly higher in more direct democratic cantons than in more representative democratic ones. Investments in school administration do not appear to be affected at all (column (9)). Given that the impact of direct democracy on administrative investment spending does not appear decisive, it is difficult to make a prediction about how that ratio of instructional to administrative investment spending might be influenced. This question will be investigated in the next section.

5.2 *Testing the Efficiency of School Provision*

The Leviathan-hypothesis is tested through analyzing the determinants of the ratio of the spending designated for teaching to the one for administrative purposes, for current as well as investment expenditure. The hypothesis of a Leviathan-like school administration could not be rejected if the cut in instructional expenditure were larger than the cut in administrative expenditure, so that the ratio would appear negatively affected by institutions of direct legislation.

Table 4 shows the estimation results for the ratio of current schooling expenditure for various types of institutions of education, defined as the current expense for instruction for a particular institution of education divided by total current expenditure for school administration. Hence, in all regression models the denominator of the dependent variable is identical.¹⁷ The estimation results show that for almost all types of institutions of education the Leviathan-hypothesis can be rejected: In Switzerland, in more direct democratic cantons cuts in administrative expenditure appear to be significantly larger than cuts in instructional expenditure than in more representative democratic cantons. This observation is true for all positive estimates of direct legislation reported in columns (1) through (7). Significance levels of the coefficients vary between the 10 percent and 1 percent levels. Thus, for most of the stages of public education under investigation, in fact, even an efficiency increasing influence of direct democracy appears to be present. A contrasting result can be observed for spending on education of adults, however, on which a significant ratio-decreasing influence of direct

¹⁷ The data do not allow splitting administrative expenses according to level or institutions of education.

democracy is revealed (column (8)). The negative coefficient indicates that the cut in expenses for instruction is relatively bigger than the cut in administrative spending (significant at the 5 percent level). In sum, except this very last regression for adult education, the Leviathan-hypothesis cannot be supported by the Swiss data.

Table 4: Ratio of Instructional to Administrative Current Expenditure 1990 - 2001

	1	2	3	4	5		7	8
	Pre- school	Primary school	Sec. I School	Professional school (Sec. II)	High school (Sec. II)	Professional school (Tertiary)	Cantonal university (Tertiary)	Adult education
Direct								
Democracy	0.920(*) (1.74)	8.253** (2.95)	4.876* (2.34)	4.157** (2.60)	4.558** (3.01)	1.276** (3.49)	1.590** (2.67)	-0.044* (1.98)
Fiscal dec.	0.041 (0.02)	-32.953(*) (1.68)	-12.318 (1.16)	3.517 (0.55)	-4.861 (0.74)	0.998 (0.79)	-0.252 (0.07)	0.104 (1.05)
Tax comp.	-6.548 (1.13)	-141.088* (2.16)	-30.024 (0.91)	6.833 (0.37)	-8.914 (0.45)	5.919 (1.29)	9.25 (1.15)	0.392 (1.40)
Fisc. constraint	0.596(*) (1.87)	4.850** (3.29)	1.669 (1.47)	2.568* (2.56)	2.822** (2.92)	0.277 (1.15)	0.836* (2.30)	-0.038** (3.23)
Coalition	0.846 (1.61)	-0.127 (0.04)	-0.093 (0.04)	-1.267 (0.94)	-0.772 (0.56)	-0.381 (1.12)	-0.108 (0.18)	-0.014 (0.77)
Ideology	5.955 (1.58)	10.29 (0.40)	39.244* (2.51)	40.500** (3.17)	42.164** (3.33)	5.932* (2.19)	10.992* (2.57)	0.338* (2.43)
Transfers	-1.586 (1.14)	8.725 (1.15)	-0.19 (0.04)	3.351 (0.98)	5.236 (1.54)	0.768 (0.78)	-0.323 (0.25)	0.057 (1.24)
High edu.	-0.18 (1.44)	-0.78 (1.09)	-1.145* (2.10)	-0.469 (1.35)	-0.456 (1.31)	-0.164* (2.41)	0.159 (1.08)	0.000 (0.07)
Urbanization	0.000 (0.00)	0.383 (1.59)	0.259(*) (1.72)	0.082 (0.86)	0.172(*) (1.77)	0.028 (1.24)	0.05 (1.35)	0.001 (1.12)
Income	7.189(*) (1.92)	5.778 (0.25)	36.271** (2.61)	22.423** (2.80)	16.802* (1.99)	5.248* (2.10)	11.953** (3.33)	-0.310* (2.16)
Population	0.364 (0.70)	6.267* (2.55)	5.066** (2.67)	4.456** (3.36)	1.733 (1.30)	1.518** (5.16)	2.733** (5.41)	-0.01 (0.37)
Res. > 60	0.218 (0.73)	2.261 (1.11)	2.772* (2.03)	1.061 (1.23)	0.924 (1.12)	0.315 (1.44)	1.120** (3.31)	-0.011 (0.87)
Res. < 20	0.419 (1.12)	7.567* (2.43)	5.239** (2.88)	1.557 (1.58)	1.610 (1.58)	0.463(*) (1.67)	1.329** (3.32)	-0.024 (1.49)
Latin	2.527 (1.03)	-5.066 (0.28)	23.664* (2.05)	17.493* (2.39)	12.266(*) (1.67)	5.138** (2.73)	9.618** (3.37)	-0.043 (0.50)
Constant	-32.984 (1.06)	-357.161* (2.07)	-362.698** (2.91)	-208.912** (2.69)	-171.419* (2.28)	-62.194** (2.93)	-137.131** (4.37)	1.869 (1.34)
Obs.	312	312	312	312	312	312	312	312
Centered R2	0.2597	0.354	0.2152	0.137	0.1661	0.2416	0.4019	0.2463
F-test (instr.)	58.86	58.86	58.86	58.86	58.86	58.86	58.86	58.86
Partial R2	0.2604	0.2604	0.2604	0.2604	0.2604	0.2604	0.2604	0.2604
Hansen J	0.003	1.034	0.027	0.237	0.027	0.054	1.054	1.491
(p-value)	(0.956)	(0.309)	(0.869)	(0.626)	(0.871)	(0.817)	(0.305)	(0.222)

See table 2

Table 5: Ratio of Instructional to Administrative Investment Expenditure 1990

	1	2	3	4	5	6	7	8
	Pre-school	Primary School	Sec. I School	Professional school (Sec. II)	High school (Sec. II)	Professional school (Tertiary)	Cantonal university (Tertiary)	Adult Education
Direct								
Democracy	-23,182 (0.18)	-616,295 (1.07)	-122,243 (0.50)	707,648 (1.57)	-8,185 (0.03)	372,836* (2.36)	468,825 (1.10)	-144 (0.77)
Fiscal dec.	1,071,675 (1.55)	3,944,235 (1.42)	2,490,631 (1.36)	2,794,612 (1.54)	2,207,744(*) (1.83)	676,555 (1.29)	11,369,127** (2.64)	-1,916 (0.58)
Tax comp.	-2,321,933 (1.61)	843,930 (0.12)	2,273,541 (0.67)	8,659,162 (1.45)	115,018 (0.03)	768,146 (0.50)	10,366,332 (1.57)	-2,246 (0.81)
Fisc. constraint	80,072 (0.97)	-435,157 (1.14)	-385,945* (2.35)	-352,165 (1.17)	-267,807(*) (1.69)	9,709 (0.12)	-667,263* (2.42)	123 (0.70)
Coalition	450,295* (2.57)	1,743,797* (2.30)	989,035* (2.19)	1,185,134* (2.20)	944,120** (2.99)	93,464 (0.79)	1,488,084(*) (1.76)	-578 (0.64)
Ideology	-670,458 (0.98)	-1,323,540 (0.39)	-465,439 (0.31)	7,870,978* (2.38)	419,336 (0.23)	1,726,525(*) (1.68)	5,190,864 (1.61)	-1,679 (1.00)
Transfers	-391,543 (1.31)	-352,939 (0.30)	413,049 (0.63)	-172,961 (0.13)	-858,311 (1.39)	77,737 (0.35)	1,021,149 (0.82)	-557 (0.49)
High edu.	-13,214 (0.49)	-37,957 (0.36)	-50,546 (0.94)	26,969 (0.27)	-68,906 (1.42)	21,511 (0.94)	-105,719 (1.03)	57 (0.86)
Urbanization	5,283 (0.70)	29,121 (0.93)	17,483 (1.08)	59,823* (2.26)	29,920* (2.11)	4,139 (0.72)	65,705(*) (1.90)	-33 (1.02)
Income	-953,136 (1.32)	-1,893,956 (0.53)	-907,234 (0.49)	3,756,368 (0.89)	858,786 (0.49)	95,490 (0.14)	4,813,125 (1.58)	-531 (0.25)
Population	121,318 (1.12)	516,098 (0.91)	398,253 (1.41)	759,652 (1.53)	482,791* (2.08)	246,866* (2.27)	1,131,884* (2.35)	-324 (1.05)
Res. > 60	-87,000 (1.59)	92,933 (0.28)	69,923 (0.43)	616,854(*) (1.71)	108,483 (0.66)	-8,319 (0.10)	699,579* (2.34)	-249 (1.22)
Res. < 20	13,846 (0.23)	411,931 (1.09)	170,939 (0.92)	960,492* (2.22)	458,795* (2.39)	9,850 (0.18)	669,080(*) (1.88)	-316 (1.27)
Latin	-1,085,827* (2.06)	-1,219,274 (0.40)	58,215 (0.04)	5,122,642(*) (1.70)	131,317 (0.09)	678,506 (1.51)	3,499,519 (1.52)	-687 (0.54)
Constant	4,726,225 (0.84)	-1.14e+07 (0.33)	-1.25e+07 (0.76)	-7.08e+07* (2.01)	-2.12e+07 (1.35)	-6,623,167 (1.27)	-8.05e+07** (2.65)	27,879 (1.28)
Obs.	312	312	312	312	312	312	312	312
Centered R2	0.2957	0.1817	0.1822	0.1569	0.2619	0.1229	0.2252	0.0447
F-test (instr.)	58.86	58.86	58.86	58.86	58.86	58.86	58.86	58.86
Partial R2	0.2604	0.2604	0.2604	0.2604	0.2604	0.2604	0.2604	0.2604
Hansen J	0.976	1.988	2.836	5.820	2.588	1.048	3.467	0.986
(p-value)	(0.323)	(0.156)	(0.092)	(0.016)	(0.108)	(0.306)	(0.063)	(0.321)
See table 2								

The investment expenditure ratio is employed as regressand in table 5. Again, the denominator of the dependent variable, total investments in school administration, is identical for all regressions while the numerator measures the investment expenditure for the various institutions of education. For almost all stages of education the coefficient of direct democracy appears to be insignificant, which means that this ratio is not affected by the

degree of cantonal direct democracy. For advanced professional education, however, even a positive impact of direct legislation can be observed (column (6)), indicating a relative rise in instructional expenses. To sum up, again, regarding investment expenditure on public education, the Leviathan-hypothesis has to be strongly rejected.

5.3 *Impact of Direct Democracy on Class Size*

Another important transmission channel of a deleterious impact of direct democracy on educational performance might be the class size and/or the student-teacher ratio. Table 6 reports the estimation results for Swiss class sizes in primary schools, secondary I schools, and three types of secondary II schools (columns (1) through (5)), as well as for student-teacher ratios for the compulsory stages of public education and in professional secondary II schools (columns (6) and (7)).

The finding is that direct democracy does not significantly impact class sizes in the institutions of public education under investigation, except the two types of middle schools (at the 5 percent level) in columns (3) and (4). But an exclusion of outliers in table 7, indicated by the Jarque-Bera test for normality of the residuals, yields that class sizes in secondary I schools are even smaller in more direct democratic cantons than otherwise (table 7 column (5)). The estimate lets suggest that a one point increase in the index of direct democracy leads to a reduction in class size by 0.3 students. For the middle schools, however, the coefficients in table 6 indicate that an increase in the composite index of direct legislation by one point increases class size on average by about 1.5 and 1.3 students, respectively. The reader should note, however, that the chosen instruments do not perform well for these two regression models and that the number of observations is by far smaller than the one for the other three school types. Table 7 reports estimation results for the class sizes in the two middle schools employing a different set of instruments and also using OLS. Obviously, the class size increasing impact of direct democracy is only supported for middle schools with a focus on trade and business (columns (3) and (4)), but not for the other type (columns (1) and (2)). In columns (3) and (4), the coefficient on direct democracy is lower in magnitude than the one reported in table 6 and indicates that a rise by one point is associated with one more student in class. The maximum increase in class size is then by 5 students caused by a jump of the index from 1 (minimum) to 6 points (maximum).

Table 6: Educational Inputs

	Class size 1999 – 2002					Student-teacher ratio 1999 - 2000	
	1	2	3	4	5	6	7
	Primary school	Sec. I School	Middle school (Diploma) (Sec. II)	Middle school (Trade) (Sec. II)	High school (Maturity) (Sec. II)	Compulsory Education	Professional Schools (Sec II)
Direct							
Democracy	-0.008 (0.04)	-0.006 (0.02)	1.450* (2.02)	1.267* (2.12)	-0.038 (0.13)	0.436(*) (1.76)	-0.444 (0.28)
Fiscal dec.	3.608* (2.47)	5.573* (2.44)	-0.37 (0.07)	12.585 (1.56)	1.797 (0.76)	-6.435* (2.22)	4.136 (0.29)
Tax comp.	-0.909 (0.46)	3.107 (1.15)	27.511* (2.20)	21.125 (1.28)	-0.121 (0.04)	-6.001 (1.58)	0.471 (0.03)
Fisc. constraint	-0.015 (0.08)	-0.459* (2.48)	0.916(*) (1.99)	0.111 (0.34)	-0.156 (0.81)	0.021 (0.12)	-0.113 (0.08)
Coalition	0.258 (0.70)	0.546 (1.14)	0.003 (0.00)	-1.445 (1.29)	0.005 (0.01)	0.181 (0.55)	1.755 (0.59)
Ideology	-0.774 (0.31)	-3.714 (1.64)	11.869 (1.37)	10.509 (0.88)	1.611 (0.63)	-0.759 (0.37)	6.876 (0.42)
Transfers	0.04 (0.13)	0.554 (1.52)	2.049 (1.55)	0.924 (0.77)	-0.342 (0.72)	-0.28 (0.44)	2.045 (0.75)
High edu.	-0.034 (0.59)	-0.109 (1.39)	-0.238 (1.33)	-0.002 (0.02)	-0.217** (2.73)	0.027 (0.51)	-0.059 (0.14)
Urbanization	0.044** (6.99)	0.047** (4.81)	0.059 (1.17)	0.069** (3.02)	0.034** (3.63)	0.028 (1.57)	0.159 (1.60)
Income	-1.503 (0.93)	-5.293* (2.24)	7.213 (1.46)	7.118 (0.69)	3.655(*) (1.85)	-0.502 (0.20)	-2.465 (0.16)
Population	0.439* (2.60)	0.724** (3.80)	2.428** (4.45)	2.709* (2.20)	1.028** (4.16)	0.482(*) (1.84)	2.024 (1.45)
Res. > 60	0.136 (1.59)	0.125 (0.81)	0.532 (1.06)	0.963 (1.66)	0.12 (0.83)	0.333* (2.61)	1.679(*) (1.78)
Res. < 20	0.520** (7.36)	0.391* (2.62)	0.034 (0.06)	1.18 (1.54)	0.446** (3.71)	0.885** (5.03)	4.451** (3.09)
Latin	-0.868 (0.83)	-0.1 (0.08)	9.986* (2.53)	7.841 (1.19)	2.209(*) (1.98)	0.423 (0.38)	-10.367 (1.56)
Constant	-0.224 (0.02)	5.867 (0.40)	-67.548(*) (1.68)	-105.008 (1.25)	-14.104 (1.15)	-13.493 (1.16)	-142.972* (2.13)
Obs.	104	104	80	72	104	52	50
Centered R2	0.600	0.5489	0.4604	0.5022	0.4712	0.7597	0.7979
J.-B. (p-value)	3.039 (0.22)	10.5 (0.01)	1.623 (0.44)	0.6076 (0.74)	0.6379 (0.73)	11.3 (0.00)	1.77 (0.41)
F-test (instr.)	11.53	11.53	3.49	2.95	11.53	9.13	13.60
Partial R2	0.2201	0.201	0.1304	0.0895	0.2201	0.2705	0.3468
Hansen J (p-value)	0.669 (0.413)	0.891 (0.345)	0.046 (0.830)	0.007 (0.931)	2.472 (0.116)	0.154 (0.695)	0.503 (0.478)
See table 2							

Table 7: Educational Inputs: Special Cases

	Class Size				Student- teacher ratio	
	1	2	3	4	5	6
	Middle school (Diploma) (Sec. II)		Middle school (Trade) (Sec. II)		Sec. I School	Compulsory Education.
	2SLS	OLS	2SLS	OLS	Outliers excl.	Outliers excl.
Direct						
Democracy	0.495 (0.98)	0.462 (0.95)	1.069* (2.17)	1.069* (2.21)	-0.322(*) (1.84)	0.559* (2.72)
Fiscal dec.	0.433 (0.11)	0.461 (0.11)	8.043* (2.07)	8.052* (2.13)	9.795** (7.55)	-3.400(*) (1.93)
Tax comp.	16.658* (2.35)	16.280* (2.53)	10.471(*) (1.78)	10.491(*) (1.83)	4.385* (2.38)	-7.509* (2.26)
Fisc. constraint	0.172 (0.49)	0.146 (0.41)	0.137 (0.50)	0.137 (0.50)	-0.628** (5.10)	0.074 (0.49)
Coalition	1.774** (2.90)	1.836** (3.44)	-0.639 (1.44)	-0.64 (1.65)	0.871* (2.64)	0.296 (0.95)
Ideology	-2.300 (0.61)	-2.795 (1.00)	1.803 (0.54)	1.819 (0.70)	(4.944** (3.15)	(1.161 (0.61)
Transfers	1.764(*) (1.84)	1.754(*) (1.82)	0.277 (0.35)	0.278 (0.34)	0.248 (0.72)	0.065 (0.12)
High edu.	-0.423** (3.61)	-0.430** (3.70)	0.034 (0.36)	0.034 (0.36)	-0.233** (4.03)	0.019 (0.34)
Urbanization	-0.001 (0.04)	-0.003 (0.12)	0.059** (3.65)	0.059** (3.71)	0.037** (3.59)	0.043** (4.03)
Income	-0.921 (0.25)	-1.205 (0.32)	-0.704 (0.18)	-0.69 (0.21)	-6.228** (3.50)	-2.663 (1.41)
Population	2.366** (5.68)	2.364** (5.62)	1.846** (3.06)	1.847** (3.16)	0.567** (3.87)	0.345 (1.65)
Res. > 60	-0.314 (1.11)	-0.344 (1.25)	0.584* (2.05)	0.585* (2.15)	-0.081 (0.75)	0.296** (3.39)
Res. < 20	-0.898* (2.45)	-0.931** (2.84)	0.654(*) (1.96)	0.655* (2.13)	0.152 (1.24)	0.925** (9.95)
Latin	3.705(*) (1.81)	3.486* (2.03)	2.977 (1.31)	2.986 (1.55)	-0.593 (0.73)	0.288 (0.29)
Constant	4.635 (0.19)	7.155 (0.31)	-43.017 (1.42)	-43.132 (1.59)	22.102* (2.13)	-10.73 (1.34)
Obs.	80	80	72	72	99	50
Centered R2	0.6745	0.6747	0.5993	0.5993	0.7196	0.8836
J.-B. (p-value)	0.569 (0.75)	0.509 (0.77)	3.434 (0.18)	3.425 (0.18)	2.622 (0.27)	1.915 (0.38)
F-test (instr.)	16.98	-	24.58	-	10.60	8.68
Partial R2	0.4469	-	0.5483	-	0.2120	0.2734
Hansen J (p-value)	4.355 (0.113)	-	3.396 (0.183)	-	0.548 (0.459)	1.411 (0.235)

See table 2. Ideology of government is instrumented with the cantonal unemployment rate, the cantonal theft rate, and the share of seasonal workers in regressions (1) and (3). All instruments are lagged by two periods.

As regards the student-teacher ratio, table 6 shows for the compulsory part of education a weak ratio increasing impact of direct legislation (at the 10 percent level), which is not the case for (non-compulsory) secondary II education at professional schools (columns (6) and (7)). Results for compulsory education when outliers are excluded are reported in table 7. Here the significance level of the positive coefficient on direct democracy rises to the 5 percent level (column (6)), indicating that more students have to be taken care of by one teacher in more direct democratic cantons. The size of the coefficient, however, is quite small as an increase in the index by two points lets the student-teacher ratio rise by only about one student per teacher. Hence, the maximum increase in the relative number of students is 2.5. These findings for the student-teacher ratio, however, have to be taken with caution as the underlying data are only proxies and student-teacher ratios measure something different from class size.

Since the positive institutional influence on student-teacher ratios occurs only for very few school types and is then quantitatively small compared to e.g. the impact of fiscal decentralization or tax competition, the Leviathan-hypothesis can be viewed as not convincingly corroborated in these cases. In sum, the tendency in tables 6 and 7 is rather to reject the Leviathan-hypothesis for Switzerland for these transmission channels.

5 Conclusion

Based on previous empirical evidence from the U.S, this paper started with the hypothesis that direct democracy might not be able to restrict the Leviathan-like behavior of bureaucracy for schooling issues. In particular, for the U.S. an increase in the administrative component of the school budget at the expense of its instructional component has been observed as a reaction to budget limits. In addition, larger class sizes appeared to be caused by the introduction of tax limits.

Estimating a model of government expenditure using a panel of Swiss sub-federal school expenditure and student-teacher ratios, however, no such behavior of the Swiss school bureaucracy can be detected. In contrast, the impact of direct legislation on the ratio of instructional to administrative spending of current expenses rather appear to indicate efficiency gains in the provision of public schooling in Switzerland. This result contradicts

expectations which have been developed before, but corroborates previous empirical findings on the provision of public goods by Swiss cantons and communes.

As explanation for these contrasting estimation outcomes, it might be that the initiative-induced tax limit in the U.S. and the institutions of direct democracy in Switzerland are not fully comparable institutions. Furthermore, it is also possible that differences in model specification drive the empirical results. Finally, unobserved cultural, political or institutional factors might also lead to this variation in outcome. These open questions call for future research on this issue.

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Appendix

Table A1: Description of Variables

Variable	Description	Source
<i>Dependent Variable</i>		
<i>Current or Investment School Expenditure 1990-2001</i>		
Pre-School	Cantonal and Communal Educational Expenditure category 200 / cantonal population aged 1 – 4 years	BFS
Primary School	Category 210 / population aged 5 – 9 years	BFS
Secondary I school	Categories 211 – 213 / population aged 10 – 14 years	BFS
Professional school (Sec II)	Categories 230 - 233, 239, / population aged 15 – 19 years	BFS
High school (Sec II)	Category 250 / population aged 15 – 19 years	BFS
Professional school (Tertiary)	Categories 260 – 263, 269 / population aged 20 – 24 years	BFS
Cantonal University (Tertiary)	Category 271 / population aged 20 – 24 years	BFS
Adult education	Category 292 / population aged 20 – 24 years	BFS
School Administration	Category 290 / population aged 1 – 24 years	BFS
<i>Class Size 1999-2002</i>		
Primary School	Class size in primary schools	BFS
Secondary I School	Class size in secondary I schools	BFS
Sec II Middle School (Diploma)	Class size in secondary II schools leading to a diploma	BFS
Sec II Middle School (Trade)	Class size in secondary II schools with a focus on commerce and trade	BFS
Sec II high school (Maturity)	Class size in secondary II schools leading to university admission (high school)	BFS
<i>Student-teacher ratio 1999-2000</i>		
Compulsory education.	Number of teachers / number of students in primary and secondary I stages of education	BFS
Professional schools (Sec II)	Number of teachers / number of students in professional schools	BFS

Table A1: Description of Variables (cont.)

Variable	Description	Source
<i>Independent Variables</i>		
Direct democracy	Index from 1 (minimum) to 6 (maximum)	Own calculations / STUTZER (1999)
Fiscal decentralization	1-(cantonal total expenditure /cantonal + local expenditure)	Own calculations, BFS
Tax competition	Tax competition for canton i = [Sum (tax(j)* inverse distance (ij))]/ 25	Own calculations, FTA
Constitutional constraint	Index from 1 to 4 (strictest)	G. KIRCHGÄSSNER
Size of coalition	Number of parties in government	Own calculations based on issues of Année Politique Suisse
Conservative ideology	Share of rightist parties in executive – share of leftist parties	Own calculations based on issues of Année Politique Suisse
Federal transfers	Log (deflated federal transfers / population)	BFS, SECO (deflator)
High education	Persons above 15 holding a High school degree or higher / total population > 15 years	Values available for 1990 and 2000. Values for the years 1994 – 1997 are averages of both. Volkszählung
Urbanization	Residents in urbanized areas (>10,000 inhabitants)/ population	BFS
Income	Log(deflated national income in a canton in 1000 Sfr/ population)	BFS;
Cantonal population	Log(permanent residential population at the end of the year ¹⁸)	BFS
Residents 0 – 20 years	Residents aged 0 – 20 years / residential population	BFS
Residents over 60 years	Residents aged over 60 years / residential population	BFS
Latin	Canton with either Italian or French as main language	Own calculation

¹⁸ The BFS defines permanent residents as Swiss people and foreigners holding a C- or B-permit. Seasonally admitted residents are excluded.

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