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Do Institutions of Direct Democracy Tame the Leviathan?

Swiss Evidence on the Structure of Expenditure for Public Education *[1]

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Abstract

Identification of a deleterious impact of institutions of direct legislation on student performance by studies for both the U.S. and Switzerland has raised the question of the exact transmission channels for this impact. Studies for the U.S. that find an increase in the ratio of administrative to instructional spending and larger class sizes support the hypothesis of a Leviathan-like school administration. However, research for Switzerland using a time-series panel of sub-federal school expenditure and class size detects no such effect. These findings are in line with previous analyses that identify efficiency gains in the provision of public goods for Switzerland.

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Keywords

Direct Democracy, Median Voter, Bureaucracy, Public Education

JEL Classification

H72, H41, I22

1 Introduction

In general, recent research on the impact of institutions of direct legislation on student performance for both the U.S. and Switzerland shows student performance to be negatively affected by such institutions. One important transmission channel for this institutional impact appears to be induced cuts in educational spending, which translate directly into a performance-lowering influence. However, for the U.S., evidence suggests that this budgetary impact might be partly caused by the manipulative behavior of school administrators. For example, some studies indicate that the cuts carried out by school administrators in response to new budget constraints tend to be greater for instructional spending than administrative spending (e.g. FIGLIO 1997, 1998). This paper is the first to test whether such Leviathan-like behavior by school bureaucrats also occurs in Switzerland. Since Swiss cantons are heterogeneous with respect to degree of direct democracy and quite autonomous in their policies on public education, Switzerland appears especially suitable for such comparative analysis.

The model of government expenditure estimated for this investigation shows that direct democracy considerably restricts the financial resources available for current public education expenses in Swiss cantons for various types of educational institutions. Since the combined cantonal and local school expenses are the main source for public schooling in Switzerland, this limiting impact on the sub-federal school budget can be considered crucial. In general, however, no such effect can be detected for investment expenditure. Moreover, if the ratio of instructional to administrative expenditure is employed as a regressand in this model, the Leviathan hypothesis must be strongly rejected for both current and investment expenditure. A similar result is obtained for class size and student-teacher ratio. These findings contrast totally with the empirical results for the U.S., but are in line with the conjecture by recent

analyses of direct legislation's institutional impact on student performance in Switzerland that the performance-lowering impact of direct democracy transmits primarily through the level of teacher qualification (FISCHER, 2005; FISCHER, 2005a)[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 U.S. The third section discusses the empirical model and the Leviathan hypothesis, while the fourth describes the data and estimation method. Section 5 presents the estimation results. Finally, section 6 evaluates the findings and concludes the paper.

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 of such systems are Switzerland and the U.S., which are both also shaped by very strong fiscal decentralization in which each level of the state has its own sources of tax revenue. Therefore, because of the direct institutional link between the power to tax and direct legislative institutions, citizens can politically influence both sides of the budget equally. In Switzerland, popular rights can be exerted at all three state levels (federal, cantonal and communal); however, since the 26 Swiss cantons differ with respect to the degree of direct democracy 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) such as the provision of schooling.

[1] It is conjectured that lower educational spending is driven by lower teacher wages.

In Switzerland, cantons are not only responsible for public education but bear the financial burden for its provision. Table 1 displays various stages of the distribution of public education costs between the three levels of the Swiss state for the year 2002. To the overall costs of compulsory education, which finishes at the end of secondary I education at about age 15, the federal government contributes only 0.2%, whereas the cantons bear about 40% and the communes, who primarily finance primary school education, about 60%. As regards secondary II education, in general, two types 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 into on a selective basis. Tertiary education takes place at universities (which may be either cantonal or federal) and in advanced professional schools that prepare students for higher professional diplomas. Finally, most cantons also support ongoing adult education.

2.2 Theoretical Background

In some strands of political-economic theory, it is argued that in a representative political system resources are wasted and allocations of goods and resources occur that deviate strongly from the median voter's position. From this perspective, overspending may be 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 leading to inefficient expansion of budgets by the spending ministers ('budget as a common pool')[3]; (c) logrolling in the political decision-making process, which brings about the financing of minority projects that would otherwise not have

[2] According to WEINGAST, SHEPSLE and JOHNSEN (1981), this pooling leads to projects in the winning party's districts being preferred over projects in those of the losing party.

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

gained support from the parliamentary majority,[4] or most important, (d) government administrations headed by bureaucrats who exercise monopoly power and aim at maximizing their budget and extracting rents (ROMER and ROSENTHAL 1978, 1979). This latter may lead to a preference for expenditure projects that cause increased administrative spending (e.g. through the founding of new departments) (NISKANEN 1975).

If the budget for governmental administrations is constrained, bureaucrats are thought to aim at increasing their personal administrative staff at the expense of the resources available for carrying out their legally prescribed production duties (WILLIAMSON 1964).[5] That is, 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 voters overrule their previous political decision.

Nevertheless, many supporters of direct democratic institutions argue that they serve as a means for disciplining the behavior of politicians and bureaucrats (TEMPLE 1996). For example, using a model of political economy, FELD and KIRCHGÄSSNER (2001) show that when such institutions are present, their mere existence (as 'credible threats') leads to an allocation of goods and resources that is closer to the median voter's preferences. Therefore, three characteristics are anticipated for direct democracies: first, less money will be wasted on

[4] See also BESLEY and COATE (1997, 1998) on inefficiencies in representative democracies, particularly those arising from politicians being at liberty to pursue their own goals and the activities of interest groups between elections.

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

undesired projects because voters will veto them through fiscal referenda and initiatives[6]; second, governmental budgets will be smaller because fiscally conservative voters will approve fewer financial projects and laws triggering new expenses[7]; and third, because of bureaucrats' limited discretionary power, public goods will be provided more efficiently[8].

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. states[9], 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). However, such school budget cuts do not (in relative terms) necessarily translate into equally large cuts for the teaching and administration components of school spending (e.g. DYE and MCGUIRE 1997).

Recent multivariate analyses of the impact of newly introduced tax limits on student performance, as measured by an educational production function, provide evidence of a performance-lowering impact (e.g. FIGLIO 1997, DOWNES and FIGLIO 1997, DOWNES et al. 1998, FIGLIO and RUEBEN 2001). Further analyses to identify the channels through which this deleterious impact occurs has focused on the influence of these tax limits on various revenue-

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

[7] For theoretical arguments, see FELD and KIRCHGÄSSNER 2001.

[8] See e.g. POMMEREHNE 1983; see also KIRCHGÄSSNER (2000, 2001, 2002) and KIRCHGÄSSSNER 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.

driven input factors of the educational production function. These studies find significant evidence that tax limits bring 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). They further show an association between tax limits and larger class sizes and higher student-teacher ratios (SHADBEGIAN 2003, FIGLIO 1998). Most important for this analysis, they find that tax limits lead to a spending shift from instruction to administration (FIGLIO 1997, 1998). More precisely, administrators' preferences seemingly remain unchanged: they still overstaff their administrations (DOWNES 1996) and reduce instructional expenses relative to administrative expenses (FIGLIO 1998) or fail to reduce administrative spending at all (FIGLIO 1997). In addition, FIGLIO and O'SULLIVAN (2001), using expenditure data from 5,150 U.S. cities, observe a decrease in the teacher-administrator ratio in school districts with an override option. All these findings for the U.S. provide evidence that initiative-induced cuts in local school budgets probably fail to limit the rent-seeking behavior of school bureaucrats.

3 Model and Hypothesis

This analysis uses a two-step strategy to asses the impact of direct democracy on the rent-seeking behavior of school bureaucrats in Switzerland. The first phase analyzes the components of public expenditure on education at public schools as a function of the degree of direct democracy and other important determinants. The second investigates the impact of direct legislation on the Leviathan-like behavior of bureaucrats as measured by (a) the ratio of

[10] SHADBEGIAN (2003) finds no significant effect of tax limits on teachers' average wages but provides no analysis of starting teachers' wages. In an earlier contribution, however, he shows that stringent tax limits have a decreasing effect on teacher wages (SHADBEGIAN 2000).

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 of interest to this study, the subscript $i = 1, ..., 26$ indicates cantons, and $t = 1990, ..., 2001$ indexes the years.

The model implies that ID_{it} is a function of direct democracy ($DIRDEM_{it}$) and a vector of the control variables V_{it}. β_1 is the parameter of interest, while u_{it} denotes the error term. Previous empirical work by FELD and KIRCHGÄSSNER (1999, 2001), FELD and MATSUSAKA (2003, 2000), and VATTER and FREITAG (2002) finds a negatively limiting impact of direct democracy on sub-federal public spending. Such a negative effect for total educational expenses in Swiss cantons is also detected by FISCHER (2005) and SCHALTEGGER (2001), while SHADBEGIAN (1999, 2003) identifies a similar effect for stringent local tax limits on local school budgets in the U.S. Regarding the appropriation effort for financing higher education, ARCHIBALD and FELDMAN (2004) find a considerable lowering impact at the U.S. state level. Based on these findings, it is here hypothesized that direct democracy will have a spending-restraint impact on the various components of the sub-federal budget for schooling in Switzerland.

The impact of direct democracy on the adaptive behavior of school administrators faced with a budget constraint, however, is more ambiguous. In light of the previous empirical findings for the U.S., this research anticipates a relative increase in administrative spending at the expense of means available for instruction, leading to larger class sizes and higher student-teacher ratios. On the other hand, based on the relevant empirical literature for Switzerland, the efficiency gains in the provision of public goods observed by POMMEREHNE (1983) and

conjectured by FELD and SAVIOZ (1997) may well prevail. However, based on the U.S. results, the sign for direct democracy on the ratio coefficient is expected to be negative.

V_{it} consists of variables that capture the structure of fiscal federalism, including (a) fiscal decentralization measured by the share of local in total sub-federal (i.e. cantonal and local) spending; (b) 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 (c) unconditional grants that 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 like public education. At the same time, the log of population takes into account economies of scale. For example, larger cantons may benefit from economies of scale, reaching a lower level of public (educational) expenditures while achieving an identical level of supply.[11] Also included is a variable incorporating fiscal constraints at the cantonal level, 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).

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

To control for political factors, a coalition variable is included that evaluates 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). Also considered to control for the ideological disposition to finance public education is the 'net' share of conservative parties in the cantonal government. In line with the literature, this variable is expected to have a positive impact on educational expenditure, particularly for higher education.

Finally, the model includes several demographic variables. First, the share of persons holding a high school diploma or university degree may influence the political decision-making process in favor of increased educational expenditure. Second, the ratio of urban to rural population in a canton reflects the impact of population density on governmental fiscal policy decisions. For example, in agglomerations, a concentration of people demanding higher or more specialized education often leads to additional school spending. Third, spending may be influenced by the number of young (below 20) and senior (above 60) citizens, who assumedly benefit or disbenefit most strongly from schooling expenditure. This influence is controlled for by inclusion of the proportion of these two groups to the total population. Lastly, systematic differences in cantonal culture are accounted for by a French-or-Italian-language dummy.

4 Data and Methodology

The dataset consists of available sub-federal budgetary data on educational expenditure from 1990 to 2001[12], from whose various components are selected expenditures for pre-school institutions (*Kindergarten*), primary schools and secondary I education (which two latter form

[12] Since the costs of public education are split between the communes and the cantons, the combined expenditure must be employed as the dependent variable.

the compulsory stages of Swiss public education). Also included are expenditure on secondary II institutions such as professional schools (*Berufsbildungsschule*), high schools (*Gymnasium,* whose diploma allows university entrance), advanced professional schools leading to a tertiary degree (*Fachschulen*), cantonal universities[13] and adult education (*Erwachsenenbildung*). Most important, a budget component, 'expenses for administration', allows testing of the Leviathan hypothesis developed above. For all these budget components, investment expenditure, generally related to the erection and renovation of facilities, can be differentiated from current expenditure, which encompasses spending for personnel and the annual maintenance of buildings.

For this analysis, educational expenditure is defined per student, and the number of students is proxied by the absolute number of permanent residents in the specific age group usually attending a particular type of school.[14] Since education is compulsory between the ages of 6 and 15, the per capita numbers of primary and secondary I educational expenditures should be close to their true values. The absolute investment expenditure of 0 Swiss francs is replaced by a symbolic expenditure of 1 Swiss franc, and expenditure ratios are then calculated based on these values. In addition, logs taken in the expenditure regressions ensure that only observations with positive spending levels remain in the sample. All monetary variables are deflated to the base year, 1980. All budgetary, (macro)economic and socio-demographic controls were obtained from the Federal Statistical Office (BFS).

Information on class sizes is available for some stages of public education from 1999 on. Therefore, this analysis includes class sizes from 1999 until 2002 in primary schools, secondary I schools, and three types of secondary II educational institutions (*Mittelschule* –

[13] In contrast to the so-called federal universities *(Eidgenössische Hochschulen*), cantonal universities are not financially supported by the federal government.

[14] These data have been collected and made publicly available only from 1999 on.

for either (a) diploma or (b) trade and business – and *Gymnasium*). Student-teacher ratios are difficult to calculate because teacher data are only available for 1998, student data from 1999 on. Therefore, student-teacher ratios for the years 1999 and 2000 are proxied based on these data.

The estimations employ a composite index of direct democracy that measures the degree of direct legislation at the cantonal level (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 use[15]. 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-sectional time-series model. FELD and KIRCHGÄSSNER (2001) argue that even when a panel structure is used, the inclusion of fixed effects in a cross-sectional domain is inappropriate because the institutional variables reflecting the extent of direct democracy in most cantons vary only very little or remain constant over time. Accordingly, cantonal intercepts make no sense because the captured impact on fiscal outcomes is either solely driven by the time variation, or, in the case of time invariant variables, fixed effects are likely to hide the effect of institutional variables and render them insignificant. Rather, the consistency of OLS estimates depends on the exogeneity of the regressands. In this case, the decentralization variable is assumed to be exogenous because the single expenditure on a particular educational institution forms no decisive part of the total sub-federal spending, whereas the ideology of the elected

[15] See FELD and KIRCHGÄSSNER (2001).

government might be influenced by its educational policy. Thus, the endogenous variable is 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 that account for important social determinants of voting left or right.[16] For the majority 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 over-identification. For small samples, the Jarcque-Bera test for normality is reported to indicate the presence of outliers. Finally, all regressions include year effects to circumvent time dependency, and the consistent standard errors for heteroscedasticity and autocorrelation are calculated using the Newey-West method.

5 Results

As outlined earlier, the analysis consists of two phases: an investigation into the impact of direct democracy on educational expenditure per student and a test of the Leviathan hypothesis.

5.1 Impact of Direct Democracy on Expenditure Levels

Table 2 displays the results for current educational expenditure per student for various educational institutions. For most educational expenditure components, a significant dampening impact of direct democracy on spending is observed (at the 1 percent level), particularly for pre-school education (column (1)), secondary I and secondary II education in

[16] A Durbin-Wu-Hausman test for endogeneity showed that for a considerable portion of the regressions an OLS regression for the same model would not have yielded consistent estimates.

professional schools (columns (3) and (4)) and adult education (column (8)). Interestingly, sub-federal expenses for primary schools (column (2)), high schools and tertiary education (columns (5) through (7)) are not significantly affected by institutions of direct legislation. Most important, administrative spending – that is, expenses for the cantonal and local school administrations – is significantly dampened by direct democracy (column (9)). The centered R2 indicates a good fit for 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 the main focus of this paper), the reader is advised to consult table 2.

The size of the coefficient on direct democracy in the administrative spending regression (column (9)) appears quantitatively bigger than those observed in the relevant spending regressions for instructional purposes (columns (1), (3), (4), and (8)). These estimation outcomes suggest that a higher level of direct democracy is associated with a relatively larger cut in administrative spending than in instructional spending, which would lead to a rejection of the Leviathan bureaucracy hypothesis.

The estimation results for investment spending are displayed in table 3. In columns (1) through (8), investment for instruction is employed as a 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 cantonal universities, adult education and primary schools (columns (2), (7) and (8)). Non-recurring expenses for pre-schools, 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. However, investments in school administration do not appear at all affected (column (9)). Given that no clear impact of direct democracy on administrative investment spending can be identified, it is difficult to

make a prediction about how the ratio of instructional to administrative investment spending might be influenced. Rather, this question will be investigated in the next section.

5. 2 Testing the Efficiency of School Provision

The hypothesis of a Leviathan-like school administration is tested by analyzing the determinants of the ratio of spending for teaching to that for administration, using current as well as investment expenditure. For the hypothesis not to be rejected, the cut in instructional expenditure must be larger than the cut in administrative expenditure, indicating that the ratio is negatively affected by institutions of direct legislation.

Table 4 shows the estimation results for the ratio of current schooling expenditure for various types of educational institutions, defined as the current expense for instruction for a particular educational institution divided by total current expenditure for school administration. Hence, the denominator of the dependent variable is identical in all regression models.[17] Again, the R2 indicates an acceptable fit between the model and the data.

The estimation results indicate that the Leviathan hypothesis can be rejected for virtually all types of educational institutions. That is, in more direct democratic Swiss cantons, as compared to more representative democratic ones, cuts in administrative expenditure appear significantly larger than cuts in instructional expenditure. This observation is true for all positive estimates of direct legislation reported in columns (1) through (7). Significance levels for the coefficients vary between the 10 percent and 1 percent levels. Thus, for most stages of

[17] The data do not allow administrative expenses to be split according to level or educational institution.

public education under investigation, direct democracy appears even to have an efficiency-increasing influence.

In contrast, a significant ratio-decreasing influence of direct democracy is observed for spending on adult education (column (8)). The negative coefficient indicates that the cut in expenses for instruction is relatively larger than the cut in administrative spending (significant at the 5 percent level). Overall, except for this very last regression for adult education, the Swiss data fail to support the Leviathan hypothesis. As regards the remaining controls, the reader is again advised to consult the output table.

In table 5, the investment expenditure ratio is employed as a regressand. 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 insignificant, meaning that this ratio is unaffected by the degree of cantonal direct democracy. However, for advanced professional education, a positive impact of direct legislation is observed (column (6)), indicating a relative rise in instructional expenses. Thus, as regards investment expenditure on public education, the Leviathan hypothesis must again be strongly rejected.

5. 3 Impact of Direct Democracy on Class Size

Other important transmission channels for the deleterious impact of direct democracy on educational performance are class size and 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 professional secondary II schools (columns (6) and (7)).

Direct democracy does not appear to significantly impact class sizes in the public education institutions investigated except for the two types of middle schools (at the 5 percent level) in columns (3) and (4). For these middle schools, the coefficients in table 6 indicate that a one-point increase in the composite index of direct legislation increases class size on average by about 1.5 (diploma) and 1.3 students (trade), respectively. Nevertheless, it should be noted that the chosen instruments do not perform well for these two regression models, as indicated by the low F-value of the excluded instruments, and the number of observations is far smaller than that for the other three school types. As regards the student-teacher ratio, table 6 shows a weak ratio-increasing impact of direct legislation (at the 10 percent level) on compulsory education (column (6)), in contrast to that on non-compulsory secondary II education at professional schools (column (7)).

To estimate the impact on class sizes in the two types of middle schools, table 7 employs a different set of instruments as well as OLS. As table 7 shows, 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)), not for those granting diplomas (columns (1) and (2)). In columns (3) and (4), the coefficient on direct democracy is lower than that reported in table 6, indicating that a one-point rise is associated with one more student in class. Thus, the maximum possible increase in class size is 5 students, which reflects an index jump from the minimum 1 point to the maximum 6 points.

Table 7 also reports results for class sizes and for student-teacher ratios when outliers are excluded, indicated by the Jarcque-Bera test for normality of residuals. Class sizes in

secondary I schools appear even smaller in more direct democratic cantons than others (column (5)). This result suggests that a one-point increase in the index of direct democracy leads to a reduction in class size of 0.3 students. For compulsory education, the significance level of the positive coefficient on direct democracy rises to 5 percent (column (6)), indicating that in more direct democratic cantons, one teacher must take care of more students. However, the size of the coefficient is quite small: a two-point increase in the index raises the student-teacher ratio by only about one student per teacher. Hence, the maximum increase in the relative number of students is 2.5. Nevertheless, these findings for the student-teacher ratio must be interpreted with care because these student-teacher ratios are potentially bad proxies for actual class sizes. [18]

Since a detrimental institutional influence on class sizes occurs basically only for one school type and is quantitatively small compared to, for example, the impact of fiscal decentralization or tax competition, the Leviathan hypothesis is not convincingly supported in these cases. Overall, based on the results reported in tables 6 and 7, the tendency is rather to reject the Leviathan hypothesis for these transmission channels in Switzerland.

5 Conclusion

This article contributes to the discussion on whether strong popular rights lead to intended efficiency gains in the provision of public goods by empirically assessing their impact on the factors of an educational production function. Most particularly, the study addresses the administrative and instructional budget components for public education, as well as class

[18] Student-teacher ratios are based on so-called full time equivalents, but not on the factual number of all teachers working at a particular school. Furthermore, these data disregard whether the teachers actually do teach or even preside over a class of students or not.

sizes and student-teacher ratios. As regards the potential for untamed Leviathan-like bureaucratic behavior, contrary to previous empirical evidence from the U.S. that direct legislation might not restrict Leviathan-like bureaucratic behavior for schooling issues, this present study observes no Leviathan-type behavior on the part of school administrators. Rather, these findings for Switzerland clearly identify efficiency gains. Specifically, whereas U.S. studies identify an increase in the administrative component of school budgets at the expense of their instructional component in reaction to the introduction of tax limits through initiatives, this current analysis reveals that the ratio of instructional to administrative expenses is positively associated with the degree of cantonal direct democracy. Moreover, whereas in the U.S., tax limits seemingly lead to larger class sizes, in more direct democratic Swiss cantons, no larger class sizes are found for most school types investigated.

These contrasting outcomes may be explainable by three factors. First, the initiative-induced property tax limit in the U.S. is incompatible with institutions of direct democracy in Switzerland. Second, differences in the model specifications may have driven the empirical results: in most U.S. studies, the range of fiscal and political controlling variables employed is far less complete. Finally, these variations may have been produced by hidden cultural, political, or institutional differences between Switzerland and the U.S. that could only be accounted for in an international comparison. Thus, future research might profitably compare like institutions in both countries, which would also mean additional research on the effect of the initiative or referendum on schooling issues in the U.S.

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Appendix

Table A1: Description of Variables

Variable	Description	Source
Dependent variable		
Current or investment school expenditure 1990-2001		
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
Class Size 1999-2002		
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
Student-teacher ratio 1999-2000		
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
Independent variables		
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[19])	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

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

Tables

Table 1: Expenditure for Public Education in 2002 in Millions of 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
Stage of education								
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

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**	−0.001	−0.119**	−0.074**	0.007	0.110	0.012	−0.337**	−0.360**
	(4.10)	(0.03)	(3.92)	(2.84)	(0.20)	(0.93)	(0.18)	(2.73)	(3.63)
Fiscal dec.	0.446	−0.105	−0.045	0.396*	−0.465*	1.266*	−0.432	0.302	−0.907
	(1.24)	(0.59)	(0.22)	(2.47)	(2.10)	(2.28)	(1.32)	(0.52)	(1.52)
Tax comp.	−2.140**	−2.242**	−1.699**	−0.515	−0.52	1.311	0.883	−1.135	−0.816
	(3.05)	(4.21)	(3.43)	(1.40)	(1.25)	(0.92)	(1.09)	(0.54)	(0.60)
Fisc. constraint	0.057(*)	0.030(*)	−0.033(*)	0.025	0.067**	−0.060	0.111**	−0.380**	−0.104*
	(1.75)	(1.75)	(1.79)	(1.50)	(3.36)	(0.59)	(2.76)	(4.75)	(2.09)
Coalition	0.337**	−0.023	−0.009	−0.081**	−0.04	−0.365**	−0.239**	−0.051	−0.046
	(4.32)	(0.63)	(0.35)	(3.03)	(1.39)	(3.36)	(3.95)	(0.50)	(0.48)
Ideology	−1.548**	−1.204**	−0.405(*)	−0.301	0.372(*)	−0.976	−0.023	−0.265	−1.977**
	(4.03)	(4.95)	(1.80)	(1.49)	(1.86)	(0.69)	(0.05)	(0.30)	(3.04)
Transfers	−0.590**	0.189*	−0.167*	0.059	0.07	−0.102	−0.044	0.313	−0.030
	(3.57)	(2.46)	(2.30)	(0.90)	(1.07)	(0.35)	(0.30)	(0.99)	(0.12)
High edu.	0.108**	0.017	0.003	0.044**	0.009	0.031	0.112**	0.062	0.064*
	(4.36)	(1.51)	(0.38)	(6.16)	(1.20)	(1.13)	(6.26)	(1.56)	(2.36)
Urbanization	−0.014**	−0.004(*)	−0.002	−0.007**	0.003	−0.014(*)	−0.006	−0.007	−0.014(*)
	(3.46)	(1.85)	(1.43)	(4.23)	(1.54)	(1.86)	(1.25)	(0.86)	(1.69)
Income	−1.108*	−0.811**	0.415(*)	0.103	0.171	0.93	1.059*	−1.676	−1.095
	(2.34)	(3.42)	(1.96)	(0.58)	(0.81)	(1.19)	(2.58)	(1.56)	(1.58)
Population	−0.427**	0.036	−0.013	0.088**	−0.128**	0.264**	0.265**	−0.021	−0.309**
	(4.74)	(0.96)	(0.53)	(3.25)	(3.92)	(2.74)	(4.12)	(0.14)	(3.08)
Res. > 60	−0.049	−0.058**	0.006	−0.004	−0.021	−0.043	0.147**	−0.023	−0.057
	(1.42)	(2.68)	(0.36)	(0.23)	(0.96)	(0.71)	(3.64)	(0.29)	(0.82)
Res. < 20	−0.152**	−0.059*	−0.027(*)	−0.090**	−0.083**	−0.168*	−0.016	−0.231*	−0.261**
	(3.60)	(2.30)	(1.67)	(4.40)	(3.20)	(2.14)	(0.32)	(2.59)	(2.75)
Latin	−1.737**	−0.619**	0.044	−0.192	−0.158	0.494	0.357	−1.229(*)	−1.358**
	(4.67)	(3.22)	(0.32)	(1.40)	(1.01)	(0.88)	(1.23)	(1.88)	(2.78)
Constant	23.920**	13.014**	9.376**	8.744**	10.689**	5.285	−3.068	12.77	21.382**
	(5.69)	(5.84)	(6.40)	(5.12)	(5.24)	(0.85)	(0.75)	(1.53)	(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. Hansen J is Hansen's J statistic, which is distributed chi-squared in the number of overidentifying restrictions.

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*	−2.188*	−0.911	0.497	1.195*	1.400*	−2.687**	−1.221*	−1.045
	(2.26)	(2.52)	(1.10)	(1.02)	(2.16)	(2.05)	(3.49)	(2.41)	(1.01)
Fiscal dec.	3.471	−7.382(*)	−5.242	−0.612	1.951	−3.34	−0.111	−1.93	−1.443
	(1.05)	(1.84)	(1.52)	(0.22)	(0.76)	(1.19)	(0.04)	(0.98)	(0.28)
Tax comp.	−13.845	−24.391*	12.773	28.360**	20.169*	−15.535(*)	2.067	−15.161**	−1.491
	(1.41)	(1.99)	(1.24)	(3.09)	(2.27)	(1.84)	(0.23)	(3.06)	(0.11)
Fisc. constraint	0.913*	−0.576	−1.345*	−0.431	−0.556(*)	0.671	0.324	−0.562*	−0.082
	(2.05)	(1.03)	(2.57)	(1.01)	(1.73)	(1.22)	(0.61)	(2.27)	(0.12)
Coalition	0.635	1.635*	1.337(*)	0.042	1.491**	−1.171(*)	−0.195	−1.024**	−0.66
	(0.92)	(2.16)	(1.78)	(0.08)	(2.87)	(1.66)	(0.28)	(3.14)	(0.78)
Ideology	−3.136	−19.131**	−7.870(*)	11.630**	−0.662	−2.708	−4.915	−7.338**	−9.121
	(0.68)	(3.76)	(1.72)	(2.75)	(0.12)	(0.47)	(1.10)	(2.99)	(1.54)
Transfers	2.606	−0.247	2.083	4.183**	0.967	3.749*	0.229	0.255	2.156
	(1.55)	(0.13)	(1.33)	(3.23)	(0.71)	(2.43)	(0.16)	(0.26)	(0.99)
High edu.	0.167	−0.061	0.126	−0.145	−0.168	−0.036	0.413*	0.427**	0.056
	(0.96)	(0.32)	(0.70)	(0.90)	(1.44)	(0.23)	(2.05)	(3.88)	(0.25)
Urbanization	−0.026	−0.047	−0.041	0.047	0.096**	−0.042	−0.015	−0.090**	−0.029
	(0.60)	(1.08)	(1.10)	(1.20)	(2.97)	(1.01)	(0.36)	(3.32)	(0.47)
Income	−6.33	−11.964*	−9.125(*)	5.869	−1.846	−0.97	3.332	−5.434*	−3.261
	(1.35)	(1.99)	(1.71)	(1.39)	(0.49)	(0.18)	(0.76)	(2.27)	(0.56)
Population	1.684**	0.26	1.802*	2.298**	1.865**	3.604**	1.975**	−0.158	−0.313
	(2.74)	(0.32)	(2.27)	(4.63)	(3.46)	(5.96)	(3.00)	(0.37)	(0.33)
Res. > 60	−0.137	−0.35	0.307	0.197	0.477	−0.539	1.313**	−0.380(*)	−0.344
	(0.34)	(0.75)	(0.66)	(0.59)	(1.41)	(1.35)	(3.75)	(1.85)	(0.61)
Res. < 20	−0.809(*)	−0.687	−0.019	0.024	0.806*	−1.032*	0.716(*)	−0.474*	−1.005
	(1.74)	(1.26)	(0.04)	(0.06)	(2.16)	(2.23)	(1.77)	(2.06)	(1.60)
Latin	−3.715	−5.337	1.488	7.589**	5.797*	1.119	−2.595	−7.819**	−1.957
	(1.16)	(1.23)	(0.38)	(2.92)	(1.98)	(0.31)	(0.96)	(3.48)	(0.45)
Constant	5.386	79.639(*)	−10.619	−80.331*	−69.856*	−20.002	−78.121*	41.773*	39.477
	(0.14)	(1.68)	(0.23)	(2.35)	(2.03)	(0.49)	(2.20)	(2.14)	(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.

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(*)	8.253**	4.876*	4.157**	4.558**	1.276**	1.590**	−0.044*
	(1.74)	(2.95)	(2.34)	(2.60)	(3.01)	(3.49)	(2.67)	(1.98)
Fiscal dec.	0.041	−32.953(*)	−12.318	3.517	−4.861	0.998	−0.252	0.104
	(0.02)	(1.68	(1.16)	(0.55)	(0.74)	(0.79)	(0.07)	(1.05)
Tax comp.	−6.548	−141.088*	−30.024	6.833	−8.914	5.919	9.25	0.392
	(1.13)	(2.16)	(0.91)	(0.37)	(0.45)	(1.29)	(1.15)	(1.40)
Fisc. constraint	0.596(*)	4.850**	1.669	2.568*	2.822**	0.277	0.836*	−0.038**
	(1.87)	(3.29)	(1.47)	(2.56)	(2.92)	(1.15)	(2.30)	(3.23)
Coalition	0.846	−0.127	−0.093	−1.267	−0.772	−0.381	−0.108	−0.014
	(1.61)	(0.04)	(0.04)	(0.94)	(0.56)	(1.12)	(0.18)	(0.77)
Ideology	5.955	10.29	39.244*	40.500**	42.164**	5.932*	10.992*	0.338*
	(1.58)	(0.40)	(2.51)	(3.17)	(3.33)	(2.19)	(2.57)	(2.43)
Transfers	−1.586	8.725	−0.19	3.351	5.236	0.768	−0.323	0.057
	(1.14)	(1.15)	(0.04)	(0.98)	(1.54)	(0.78)	(0.25)	(1.24)
High edu.	−0.18	−0.78	−1.145*	−0.469	−0.456	−0.164*	0.159	0.000
	(1.44)	(1.09)	(2.10)	(1.35)	(1.31)	(2.41)	(1.08)	(0.07)
Urbanization	0.000	0.383	0.259(*)	0.082	0.172(*)	0.028	0.05	0.001
	(0.00)	(1.59)	(1.72)	(0.86)	(1.77)	(1.24)	(1.35)	(1.12)
Income	7.189(*)	5.778	36.271**	22.423**	16.802*	5.248*	11.953**	−0.310*
	(1.92)	(0.25)	(2.61)	(2.80)	(1.99)	(2.10)	(3.33)	(2.16)
Population	0.364	6.267*	5.066**	4.456**	1.733	1.518**	2.733**	−0.01
	(0.70)	(2.55)	(2.67)	(3.36)	(1.30)	(5.16)	(5.41)	(0.37)
Res. > 60	0.218	2.261	2.772*	1.061	0.924	0.315	1.120**	−0.011
	(0.73)	(1.11)	(2.03)	(1.23)	(1.12)	(1.44)	(3.31)	(0.87)
Res. < 20	0.419	7.567*	5.239**	1.557	1.610	0.463(*)	1.329**	−0.024
	(1.12)	(2.43)	(2.88)	(1.58)	(1.58)	(1.67)	(3.32)	(1.49)
Latin	2.527	−5.066	23.664*	17.493*	12.266(*)	5.138**	9.618**	−0.043
	(1.03)	(0.28)	(2.05)	(2.39)	(1.67)	(2.73)	(3.37)	(0.50)
Constant	−32.984	−357.161*	−362.698**	−208.912**	−171.419*	−62.194**	−137.131**	1.869
	(1.06)	(2.07)	(2.91)	(2.69)	(2.28)	(2.93)	(4.37)	(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	−616,295	−122,243	707,648	−8,185	372,836*	468,825	−144
	(0.18)	(1.07)	(0.50)	(1.57)	(0.03)	(2.36)	(1.10)	(0.77)
Fiscal dec.	1,071,675	3,944,235	2,490,631	2,794,612	2,207,744(*)	676,555	11,369,127**	−1,916
	(1.55)	(1.42)	(1.36)	(1.54)	(1.83)	(1.29)	(2.64)	(0.58)
Tax comp.	−2,321,933	843,930	2,273,541	8,659,162	115,018	768,146	10,366,332	−2,246
	(1.61)	(0.12)	(0.67)	(1.45)	(0.03)	(0.50)	(1.57)	(0.81)
Fisc. constraint	80,072	−435,157	−385,945*	−352,165	−267,807(*)	9,709	−667,263*	123
	(0.97)	(1.14)	(2.35)	(1.17)	(1.69)	(0.12)	(2.42)	(0.70)
Coalition	450,295*	1,743,797*	989,035*	1,185,134*	944,120**	93,464	1,488,084(*)	−578
	(2.57)	(2.30)	(2.19)	(2.20)	(2.99)	(0.79)	(1.76)	(0.64)
Ideology	−670,458	−1,323,540	−465,439	7,870,978*	419,336	1,726,525(*)	5,190,864	−1,679
	(0.98	(0.39)	(0.31)	(2.38)	(0.23)	(1.68)	(1.61)	(1.00)
Transfers	−391,543	−352,939	413,049	−172,961	−858,311	77,737	1,021,149	−557
	(1.31)	(0.30)	(0.63)	(0.13)	(1.39)	(0.35)	(0.82)	(0.49)
High edu.	−13,214	−37,957	−50,546	26,969	−68,906	21,511	−105,719	57
	(0.49)	(0.36)	(0.94)	(0.27)	(1.42)	(0.94)	(1.03)	(0.86)
Urbanization	5,283	29,121	17,483	59,823*	29,920*	4,139	65,705(*)	−33
	(0.70)	(0.93)	(1.08)	(2.26)	(2.11)	(0.72)	(1.90)	(1.02)
Income	−953,136	−1,893,956	−907,234	3,756,368	858,786	95,490	4,813,125	−531
	(1.32)	(0.53)	(0.49)	(0.89)	(0.49)	(0.14)	(1.58)	(0.25)
Population	121,318	516,098	398,253	759,652	482,791*	246,866*	1,131,884*	−324
	(1.12)	(0.91)	(1.41)	(1.53)	(2.08)	(2.27)	(2.35)	(1.05)
Res. > 60	−87,000	92,933	69,923	616,854(*)	108,483	−8,319	699,579*	−249
	(1.59)	(0.28)	(0.43)	(1.71)	(0.66)	(0.10)	(2.34)	(1.22)
Res. < 20	13,846	411,931	170,939	960,492*	458,795*	9,850	669,080(*)	−316
	(0.23)	(1.09)	(0.92)	(2.22)	(2.39)	(0.18)	(1.88)	(1.27)
Latin	−1,085,827*	−1,219,274	58,215	5,122,642(*)	131,317	678,506	3,499,519	−687
	(2.06)	(0.40)	(0.04)	(1.70)	(0.09)	(1.51)	(1.52)	(0.54)
Constant	4,726,225	−1.14e+07	−1.25e+07	−7.08e+07*	−2.12e+07	−6,623,167	−8.05e+07**	27,879
	(0.84)	(0.33)	(0.76)	(2.01)	(1.35)	(1.27)	(2.65)	(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.

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	−0.006	1.450*	1.267*	−0.038	0.436(*)	−0.444
	(0.04)	(0.02)	(2.02)	(2.12)	(0.13)	(1.76)	(0.28)
Fiscal dec.	3.608*	5.573*	−0.37	12.585	1.797	−6.435*	4.136
	(2.47)	(2.44)	(0.07)	(1.56)	(0.76)	(2.22)	(0.29)
Tax comp.	−0.909	3.107	27.511*	21.125	−0.121	−6.001	0.471
	(0.46)	(1.15)	(2.20)	(1.28)	(0.04)	(1.58)	(0.03)
Fisc. constraint	−0.015	−0.459*	0.916(*)	0.111	−0.156	0.021	−0.113
	(0.08)	(2.48)	(1.99)	(0.34)	(0.81)	(0.12)	(0.08)
Coalition	0.258	0.546	0.003	−1.445	0.005	0.181	1.755
	(0.70)	(1.14)	(0.00)	(1.29)	(0.01)	(0.55)	(0.59)
Ideology	−0.774	−3.714	11.869	10.509	1.611	−0.759	6.876
	(0.31)	(1.64)	(1.37)	(0.88)	(0.63)	(0.37)	(0.42)
Transfers	0.04	0.554	2.049	0.924	−0.342	−0.28	2.045
	(0.13)	(1.52)	(1.55)	(0.77)	(0.72)	(0.44)	(0.75)
High edu.	−0.034	−0.109	−0.238	−0.002	−0.217**	0.027	−0.059
	(0.59)	(1.39)	(1.33)	(0.02)	(2.73)	(0.51)	(0.14)
Urbanization	0.044**	0.047**	0.059	0.069**	0.034**	0.028	0.159
	(6.99)	(4.81)	(1.17)	(3.02)	(3.63)	(1.57)	(1.60)
Income	−1.503	−5.293*	7.213	7.118	3.655(*)	−0.502	−2.465
	(0.93)	(2.24)	(1.46)	(0.69)	(1.85)	(0.20)	(0.16)
Population	0.439*	0.724**	2.428**	2.709*	1.028**	0.482(*)	2.024
	(2.60)	(3.80)	(4.45)	(2.20)	(4.16)	(1.84)	(1.45)
Res. > 60	0.136	0.125	0.532	0.963	0.12	0.333*	1.679(*)
	(1.59)	(0.81)	(1.06)	(1.66)	(0.83)	(2.61)	(1.78)
Res. < 20	0.520**	0.391*	0.034	1.18	0.446**	0.885**	4.451**
	(7.36)	(2.62)	(0.06)	(1.54)	(3.71)	(5.03)	(3.09)
Latin	−0.868	−0.1	9.986*	7.841	2.209(*)	0.423	−10.367
	(0.83)	(0.08)	(2.53)	(1.19)	(1.98)	(0.38)	(1.56)
Constant	−0.224	5.867	−67.548(*)	−105.008	−14.104	−13.493	−142.972*
	(0.02)	(0.40)	(1.68)	(1.25)	(1.15)	(1.16)	(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.	3.039	10.5	1.623	0.6076	0.6379	11.3	1.77
(p-value)	(0.22)	(0.01)	(0.44)	(0.74)	(0.73)	(0.00)	(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	0.669	0.891	0.046	0.007	2.472	0.154	0.503
(p-value)	(0.413)	(0.345)	(0.830)	(0.931)	(0.116)	(0.695)	(0.478)

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 statistic, and Hansen J is Hansen's J statistic, which is distributed chi-squared in the number of overidentifying restrictions.

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	0.462	1.069*	1.069*	−0.322(*)	0.559*
	(0.98)	(0.95)	(2.17)	(2.21)	(1.84)	(2.72)
Fiscal dec.	0.433	0.461	8.043*	8.052*	9.795**	−3.400(*)
	(0.11)	(0.11)	(2.07)	(2.13)	(7.55)	(1.93)
Tax comp.	16.658*	16.280*	10.471(*)	10.491(*)	4.385*	−7.509*
	(2.35)	(2.53)	(1.78)	(1.83)	(2.38)	(2.26)
Fisc. constraint	0.172	0.146	0.137	0.137	−0.628**	0.074
	(0.49)	(0.41)	(0.50)	(0.50)	(5.10)	(0.49)
Coalition	1.774**	1.836**	−0.639	−0.64	0.871*	0.296
	(2.90)	(3.44)	(1.44)	(1.65)	(2.64)	(0.95)
Ideology	−2.300	−2.795	1.803	1.819	(4.944**	(1.161
	(0.61)	(1.00)	(0.54)	(0.70)	(3.15)	(0.61)
Transfers	1.764(*)	1.754(*)	0.277	0.278	0.248	0.065
	(1.84)	(1.82)	(0.35)	(0.34)	(0.72)	(0.12)
High edu.	−0.423**	−0.430**	0.034	0.034	−0.233**	0.019
	(3.61)	(3.70)	(0.36)	(0.36)	(4.03)	(0.34)
Urbanization	−0.001	−0.003	0.059**	0.059**	0.037**	0.043**
	(0.04)	(0.12)	(3.65)	(3.71)	(3.59)	(4.03)
Income	−0.921	−1.205	−0.704	−0.69	−6.228**	−2.663
	(0.25)	(0.32)	(0.18)	(0.21)	(3.50)	(1.41)
Population	2.366**	2.364**	1.846**	1.847**	0.567**	0.345
	(5.68)	(5.62)	(3.06)	(3.16)	(3.87)	(1.65)
Res. > 60	−0.314	−0.344	0.584*	0.585*	−0.081	0.296**
	(1.11)	(1.25)	(2.05)	(2.15)	(0.75)	(3.39)
Res. < 20	−0.898*	−0.931**	0.654(*)	0.655*	0.152	0.925**
	(2.45)	(2.84)	(1.96)	(2.13)	(1.24)	(9.95)
Latin	3.705(*)	3.486*	2.977	2.986	−0.593	0.288
	(1.81)	(2.03)	(1.31)	(1.55)	(0.73)	(0.29)
Constant	4.635	7.155	−43.017	−43.132	22.102*	−10.73
	(0.19)	(0.31)	(1.42)	(1.59)	(2.13)	(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.	0.569	0.509	3.434	3.425	2.622	1.915
(p-value)	(0.75)	(0.77)	(0.18)	(0.18)	(0.27)	(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	4.355	–	3.396	–	0.548	1.411
(p-value)	(0.113)	–	(0.183)	–	(0.459)	(0.235)

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. In regressions (1) and (3), ideology of government is instrumented with the cantonal unemployment rate, the cantonal theft rate, and the share of seasonal workers. All instruments are lagged by two periods. **, *, and (*) indicate significances at the 1 percent, 5 percent, and 10 percent levels, respectively. J.–B. is the Jarque-Bera statistic, and Hansen J is Hansen's J statistic, which is distributed chi-squared in the number of overidentifying restrictions.