Online Appendix

The Effects of Voting Costs on the Democratic Process and Public Finances

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Content

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1 Income-dependent voting costs

We assume in Section I of our article that voting costs are the same for all citizens. However, higher skills and incomes may increase the opportunity costs of voting (at least, if high and low skilled individuals require the same amount of time for reading the information material and voting instructions). Hence, we show how the model's predictions change if voting costs increase in the citizens' skills α^i. In particular, we assume that the benefits and costs associated with voting are $\beta q_i - \gamma \alpha^i - \kappa$, where $\beta > 0$ and $\gamma > 0$. Hence, the benefits increase in the voters' political knowledge q_i, and the costs in their skills α^i. In addition, some costs (and benefits) κ are shared by all voters.

In this revised model, citizens who abstain from voting still choose $q_i = 0$, and citizens who vote still $q_i = \alpha^i$. Therefore, citizens vote (with $q_i = \alpha^i$) if and only if

$$\beta \alpha^i - \gamma \alpha^i - \frac{(\alpha^i)^2}{2\alpha^i} = \left(\beta - \gamma - \frac{1}{2} \right) \alpha^i \geq \kappa. \tag{1}$$

This condition is equivalent to $\alpha^i \geq \frac{\kappa}{\beta - \gamma - 1/2}$ if $\beta > \gamma + \frac{1}{2}$, i.e., if the effect of political knowledge on voter satisfaction is high relative to the effect of skills on voting costs. In this case, primarily higher skilled citizens vote, and lower voting costs γ reduce the average skills of the voting population (since $\frac{\kappa}{\beta - \gamma - 1/2}$ increases in γ). Hence, the effects of lower voting costs γ shown in Propositions 1 and 2 and all other results presented in Section I also hold in this revised model as long as $\beta > \gamma + \frac{1}{2}$.

Condition (1) is however equivalent to $\alpha^i \leq \frac{\kappa}{\beta - \gamma - 1/2}$ if $\beta < \gamma + \frac{1}{2}$, i.e., if the effect of political knowledge on voter satisfaction were low relative to the effect of skills on voting costs. In this case, primarily lower skilled citizens would vote, and lower voting costs γ would increase the average skills of the voting population, which in turn would reverse all our results.

There is a large literature documenting that citizens with better education and higher socio-economic status are more likely to vote (see the opening paragraph in the Introduction). The same holds true also in our data, where citizens who vote have on average a 10 percent higher income and are more educated than citizens who abstain from voting (and these differences are statistically significant). Hence, it is reasonable to assume that the positive effect of political knowledge on voter satisfaction is high relative to any negative effect of skills on voting costs. Results are qualitatively identical when using the above setup with $\beta > \gamma + \frac{1}{2}$ as when using the slightly simpler setup with homogenous voting costs introduced in Section I.A.

2 Introduction of postal voting in Swiss cantons

Table A1: Introduction dates of unrestricted postal voting in Swiss cantons

Canton	Date	Canton	Date
Aargau	01.01.1993	Nidwalden	29.06.1994
Appenzell Innerrhoden	11.06.1979	Obwalden	01.12.1995
Appenzell Ausserrhoden	24.05.1988	St. Gallen	01.05.1979
Bern	01.07.1991	Schaffhausen	01.08.1995
Basel-Landschaft	01.07.1978	Solothurn	01.01.1985
Basel-Stadt	30.12.1994	Schwyz	01.01.2000
Fribourg	23.05.1995	Thurgau	01.08.1985
Genève	01.01.1995	Ticino	15.04.2005
Glarus	01.07.1995	Uri	01.01.1995
Graubünden	01.01.1995	Vaud	25.03.2002
Jura	01.05.1999	Valais	01.01.2005
Luzern	01.10.1994	Zug	01.04.1997
Neuchâtel	01.01.2001	Zürich	01.10.1994

Source: Luechinger et al. (2007).

3 Postal voting and other institutional reforms

Table A2: Introduction of postal voting and institutional reforms in Swiss cantons, 1980-2007

Institutional reforms	Introduction of institutional reforms relative to introduction of postal voting				
	prev. year	same year	following year	different year	total
Fiscal rule index	0	1	1	11	13
Mand. fiscal referendum	1	0	2	5	8
Signature req. initiative	0	0	2	10	12
Cabinet size	0	0	0	6	6
Parliament size	0	0	0	19	19

Data sources: Année politique Suisse, BAK Basel, cantonal constitutions, Feld et al. (2011), Funk and Gathmann (2011), Luechinger et al. (2007), Swiss Federal Finance Administration, Swiss Federal Statistical Office, and Swiss State Secretariat for Economic Affairs.

4 Covariates of the introduction of postal voting

Table A3: Survival analysis for the introduction of postal voting in Switzerland, 1980-2005
Cox proportional hazard rate model with time-variant factors

	(I)	(II)	(III)
Population in 1,000,000	0.667	1.425	1.338
	(-0.274)	(0.182)	(0.154)
Share under 20 in %	1.196	1.336	1.282
	(0.636)	(0.743)	(0.643)
Share over 64 in %	1.305	1.415	1.299
	(0.958)	(0.964)	(0.697)
GDP p.c. in 1,000	1.065*	1.057	1.040
	(1.824)	(1.527)	(0.934)
Unemployment rate	0.661	0.813	0.764
	(-0.971)	(-0.551)	(-0.672)
Election year	2.964**	2.570*	2.503*
	(2.447)	(1.900)	(1.819)
Fiscal rule index	1.565	1.711	1.758
	(1.010)	(1.185)	(1.292)
Mandatory fiscal referendum	2.205	1.731	1.312
	(1.096)	(0.673)	(0.342)
Signature requirement initiative, relative	0.770	1.002	0.911
	(-0.828)	(0.003)	(-0.182)
Cabinet size	0.992	0.972	0.963
	(-0.025)	(-0.084)	(-0.110)
Parliament size	1.009	1.007	1.004
	(1.037)	(0.845)	(0.407)
Latin language in %		0.237	0.203
		(-0.835)	(-0.955)
Seat share of left-wing parties in % (lagged)			1.031
			(0.900)
No. of obs.	383	383	383
No. of events	23	23	23
Likelihood ratio test (p)	0.114	0.130	0.154

Notes: Exponentiated coefficients of Cox proportional hazards models. Standard errors are clustered at the cantonal level. Z-values of the coefficients are in parentheses. ***, **, and * indicate significance level at 1%, 5%, and 10%, respectively. Seat share of left-wing parties is lagged by one year to avoid capturing a reverse effect of the introduction of postal voting on relative party strength. No. of observations reflects total state year observations at risk.
Data sources: Année politique Suisse, BAK Basel, cantonal constitutions, Feld et al. (2011), Funk and Gathmann (2011), Luechinger et al. (2007), Swiss Federal Finance Administration, Swiss Federal Statistical Office, and Swiss State Secretariat for Economic Affairs.

5 Postal voting and other socio-demographic characteristics

We explore whether postal voting attracts people with a lower household income to the poll. In addition, we test whether postal voting affects the relative turnout of elderly citizens, men, and people living in rural areas.

Household income like years of education is captured on the basis of post-vote surveys (VOX surveys). Respondents' monthly household income is recorded in bands. Assuming a log-normal distribution of income, we estimate the income distribution for each year and then calculate the mean for each income band (in 2010 CHF). Information on household income is only available since 1993. Voters have a slightly higher income than the general population. The difference amounts to CHF 216 (or 3.3%) (with the mean level of household income per month being CHF 6,566).

We use specifications analogous to the ones for education in Section II.C to estimate the effects of postal voting on voters' household income and other socio-demographic characteristics. The results in Table A4 suggest that the average household income of participants tends to be lower with postal voting. The effect is imprecisely measured though. There are two reasons why we would expect imprecise estimates. First, we construct the household income variable on the basis of categorized income information. Thus, household income is measured with an error, which reduces the precision of the coefficient estimates. Second, survey information on household income is only available since 1993. Therefore, the household income regressions are based on both a smaller sample size and less identifying variation in the postal voting variable. The later start of the sample period probably also explains the sensitivity of the results to the inclusion of canton-specific linear and quadratic time trends. No clear pattern related to the introduction of postal voting is visible from Figure A1.

The regression results in Tables A5–A7 indicate no differential effects of postal voting on the participation behavior of citizens with age 65 or older, men, and people from rural areas.

Table A4: Postal voting and the difference in household income between participants and the general population in federal ballots in Switzerland for 1993 to 2010

Dependent variable: Difference in average household income [CHF per month]

	(I)	(II)	(III)
Postal voting	−22.337	−73.297	5.112
	(37.931)	(55.727)	(64.844)
	[0.564]	[0.213]	[0.940]
Population in 1,000,000	1685.669***	2582.607	1248.253
	(298.385)	(2832.901)	(6232.693)
Share under 20	−2437.073	−1.13e+04	−2.40e+04
	(2475.864)	(11662.035)	(25782.286)
Share over 64	1486.675	−1.23e+04	−582.231
	(4181.588)	(26716.577)	(51334.881)
GDP p.c. in 100,000	−269.178	174.765	259.972
	(454.238)	(1197.637)	(1200.678)
Unemployment rate	−58.079*	−38.363	77.751
	(28.650)	(36.953)	(66.208)
Canton-specific effects	Yes	Yes	Yes
Ballot date-specific effects	Yes	Yes	Yes
Canton-specific time trends	No	linear	quadratic
No. of obs.	1291	1291	1291
No. of clusters	26	26	26
R^2	0.10	0.12	0.14

Notes: Weighted LS estimations. The mean monthly income amounts to CHF 6,566. Weights are proportional to the number of observations used to calculate the dependent variable. Standard errors in parentheses are adjusted for clustering at the level of cantons. P-values based on wild cluster bootstrap are reported in square brackets. ***, **, and * indicate significance level at 1%, 5%, and 10%, respectively.

Data sources: BAK Basel, Brunner et al. (2013), Luechinger et al. (2007), Swiss Federal Statistical Office, and Swiss State Secretariat for Economic Affairs.
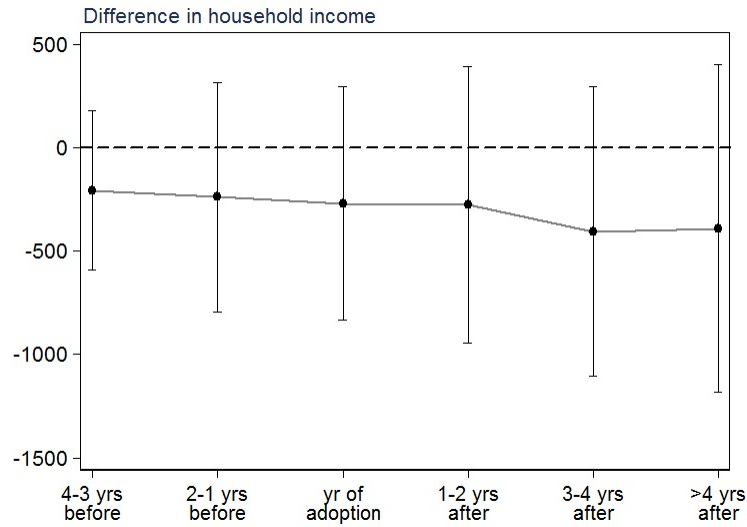
Figure A1: Postal voting and the difference in monthly household income between participants and the general population

Notes: Coefficients (dots) and 95%-confidence intervals (vertical lines) from a weighted LS regression of the difference in average monthly household income (in 2010 CHF) between voters and the general population on dummies for six different time periods relative to the introduction of postal voting and a set of controls for the years 1993 to 2010. The dummies have the value one for the time period indicated on the x-axis and zero otherwise, with the time period five or more years prior to the introduction of postal voting normalized to zero (dashed line). The set of controls is the same as in specification III of Table A4. Weights are proportional to the number of observations used to calculate the dependent variable. Confidence intervals are based on a cluster-robust estimator for the variance-covariance matrix with clustering allowed at the cantonal level. Based on a Wald test, it cannot be rejected that the mean of the two coefficients capturing the four years prior to the adoption of postal voting are equal to the mean of the two coefficients for the four years after (p=0.374).

Data sources: BAK Basel, Brunner et al. (2013), Luechinger et al. (2007), Swiss Federal Statistical Office, and Swiss State Secretariat for Economic Affairs.

Table A5: Postal voting and the difference in the fraction of the elderly among participants and the general population in federal ballots in Switzerland for 1981 to 2010

Dependent variable: Difference in the fraction of elderly people

	(I)	(II)	(III)
Postal voting	0.001	0.007	0.007
	(0.005)	(0.005)	(0.008)
	[0.870]	[0.226]	[0.495]
Population in 1,000,000	−0.003	−0.098	0.323
	(0.040)	(0.115)	(0.470)
Share under 20	0.080	−0.617	−2.089
	(0.319)	(0.710)	(1.773)
Share over 64	0.128	1.824	1.724
	(0.332)	(1.455)	(3.381)
GDP p.c. in 100,000	0.027	−0.064	0.045
	(0.041)	(0.083)	(0.116)
Unemployment rate	0.000	−0.002	−0.003
	(0.003)	(0.004)	(0.004)
Canton-specific effects	Yes	Yes	Yes
Ballot date-specific effects	Yes	Yes	Yes
Canton-specific time trends	No	linear	quadratic
No. of obs.	1780	1780	1780
No. of clusters	26	26	26
R^2	0.17	0.18	0.19

Notes: Weighted LS estimations. The mean fraction of elderly in the sample population amounts to 0.199. Weights are proportional to the number of observations used to calculate the dependent variable. Standard errors in parentheses are adjusted for clustering at the level of cantons. P-values based on wild cluster bootstrap are reported in square brackets. ***, **, and * indicate significance level at 1%, 5%, and 10%, respectively.

Data sources: BAK Basel, Brunner et al. (2013), Luechinger et al. (2007), Swiss Federal Statistical Office, and Swiss State Secretariat for Economic Affairs.

Table A6: Postal voting and the difference in the fraction of men among participants and the general population in federal ballots in Switzerland for 1981 to 2010

Dependent variable: Difference in the fraction of men

	(I)	(II)	(III)
Postal voting	−0.005	−0.006	−0.005
	(0.006)	(0.007)	(0.008)
	[0.445]	[0.397]	[0.545]
Population in 1,000,000	0.048	−0.431**	−0.891*
	(0.073)	(0.162)	(0.465)
Share under 20	0.540*	2.410***	3.063
	(0.297)	(0.573)	(2.000)
Share over 64	0.043	1.079	−2.313
	(0.323)	(2.131)	(3.368)
GDP p.c. in 100,000	−0.070	−0.237*	−0.167
	(0.047)	(0.127)	(0.208)
Unemployment rate	0.006	0.007*	0.004
	(0.004)	(0.004)	(0.005)
Canton-specific effects	Yes	Yes	Yes
Ballot date-specific effects	Yes	Yes	Yes
Canton-specific time trends	No	linear	quadratic
No. of obs.	1780	1780	1780
No. of clusters	26	26	26
R^2	0.17	0.18	0.20

Notes: Weighted LS estimations. The mean fraction of men in the sample population amounts to 0.494. Weights are proportional to the number of observations used to calculate the dependent variable. Standard errors in parentheses are adjusted for clustering at the level of cantons. P-values based on wild cluster bootstrap are reported in square brackets. ***, **, and * indicate significance level at 1%, 5%, and 10%, respectively.

Data sources: BAK Basel, Brunner et al. (2013), Luechinger et al. (2007), Swiss Federal Statistical Office, and Swiss State Secretariat for Economic Affairs.

Table A7: Postal voting and the difference in the fraction of people living in a rural environment among participants and the general population in federal ballots in Switzerland for 1981 to 2010

Dependent variable: Difference in the fraction of rural people

	(I)	(II)	(III)
Postal voting	0.011	0.010	0.010
	(0.007)	(0.008)	(0.008)
	[0.171]	[0.310]	[0.263]
Population in 1,000,000	0.022	0.146	0.031
	(0.051)	(0.112)	(0.484)
Share under 20	−0.112	0.290	0.887
	(0.295)	(0.560)	(1.319)
Share over 64	0.559	2.254	0.415
	(0.424)	(1.776)	(2.785)
GDP p.c. in 100,000	0.057	0.073	−0.004
	(0.035)	(0.107)	(0.140)
Unemployment rate	−0.002	−0.002	−0.002
	(0.003)	(0.004)	(0.005)
Canton-specific effects	Yes	Yes	Yes
Ballot date-specific effects	Yes	Yes	Yes
Canton-specific time trends	No	linear	quadratic
No. of obs.	1694	1694	1694
No. of clusters	26	26	26
R^2	0.12	0.13	0.14

Notes: Weighted LS estimations. The mean fraction of people living in a rural environment in the sample population amounts to 0.344. Weights are proportional to the number of observations used to calculate the dependent variable. Standard errors in parentheses are adjusted for clustering at the level of cantons. P-values based on wild cluster bootstrap are reported in square brackets. ***, **, and * indicate significance level at 1%, 5%, and 10%, respectively.

Data sources: BAK Basel, Brunner et al. (2013), Luechinger et al. (2007), Swiss Federal Statistical Office, and Swiss State Secretariat for Economic Affairs.

6   Postal voting and government expenditures

We explore the statistical relationship between postal voting and public expenditures in general. Annual data on total expenditures and specific categories (including welfare expenditures) in cantons are from the annual publications of the Swiss Federal Finance Administration (FFA) on public finances (Öffentliche Finanzen der Schweiz, various years). The data is available until 2007. Expenditure data is based on new accounting standards thereafter and, therefore, not comparable to the earlier data. On average, total cantonal expenditures amount to 15% of GDP (with a standard deviation of 4.76).

Table A8 presents the results for the effects of postal voting on total government expenditures in percent of cantonal GDP. All the estimations include canton- and year-specific effects as well as a large set of political and institutional variables that have been studied in previous work on public finances in Swiss cantons. Specifications II and III further include canton-specific linear and quadratic time trends. We find no systematic partial correlation between postal voting and total government expenditures across our specifications. Figure A2 confirms that there exists no systematic relationship between the introduction of postal voting and the development of total cantonal expenditures.

In a series of additional estimations, we test whether the introduction of postal voting is systematically related to changes in specific categories of government expenditures (not repeating the estimations for the category public welfare included in the main paper). Table A9 reports the respective results based on estimations like in specifications I to III of Table A8. We do not find statistically significant effects but in one of the eight other categories. For the smallest category, i.e. environment and land-use planning, we find a small negative effect that is statistically significant in specification III. Our model does not predict an effect and we abstain from ex post speculations for its occurrence.
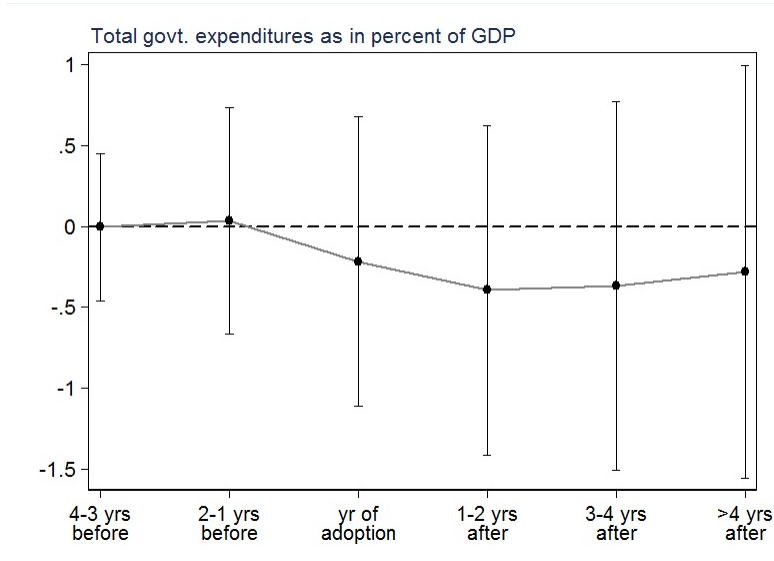
Total govt. expenditures as in percent of GDP

Figure A2: Postal voting and total government expenditures of Swiss cantons

Notes: Coefficients (dots) and 95%-confidence intervals (vertical lines) from an OLS regression of cantonal expenditures in percent of cantonal GDP on dummies for six different time periods relative to the introduction of postal voting and a set of controls for the years 1980 to 2007. The dummies have the value one for the time period indicated on the x-axis and zero otherwise, with the time period five or more years prior to the introduction of postal voting normalized to zero (dashed line). The set of controls is the same as in specification III of Table A.8. Confidence intervals are based on a cluster-robust estimator for the variance-covariance matrix with clustering allowed at the cantonal level. Based on a Wald test, it cannot be rejected that the mean of the two coefficients capturing the four years prior to the adoption of postal voting are equal to the mean of the two coefficients for the four years after (p=0.252).

Data sources: Année politique Suisse, BAK Basel, cantonal constitutions, Feld et al. (2011), Funk and Gathmann (2011), Luechinger et al. (2007), Swiss Federal Finance Administration, Swiss Federal Statistical Office, and Swiss State Secretariat for Economic Affairs.

Table A8: Postal voting and total government expenditures of Swiss cantons for 1980 to 2007
Dependent variable: Total expenditures in percent of GDP

	(I)	(II)	(III)
Postal voting	0.016	−0.434	−0.354
	(0.253)	(0.295)	(0.255)
	[0.945]	[0.168]	[0.192]
Population	−14.229	−0.519	14.742
in 1,000,000	(8.971)	(9.128)	(24.202)
Share under 20	−7.087	39.348	64.580
	(15.897)	(30.201)	(64.530)
Share over 64	4.008	6.467	−67.092
	(21.185)	(88.962)	(87.594)
GDP p.c.	−13.258***	−16.522**	−15.567***
in 100,000	(1.651)	(6.953)	(5.202)
Unemployment rate	0.639**	0.525**	0.226
	(0.283)	(0.246)	(0.226)
Election year	0.133	0.114*	0.122*
	(0.086)	(0.066)	(0.062)
Fiscal rule index	0.042	−0.329*	0.064
	(0.190)	(0.183)	(0.160)
Mandatory fiscal	0.058	0.782	0.204
referendum	(0.364)	(0.573)	(0.384)
Signature requirement	0.462**	0.209	−0.201
initiative, relative	(0.207)	(0.734)	(0.588)
Cabinet size	0.057	−0.252	−0.125
	(0.299)	(0.343)	(0.181)
Parliament size	−0.002	−0.004	−0.005
	(0.007)	(0.012)	(0.009)
Canton-specific effects	Yes	Yes	Yes
Year-specific effects	Yes	Yes	Yes
Canton-specific time trends	No	linear	quadratic
No. of obs.	728	728	728
No. of clusters	26	26	26
R^2	0.70	0.80	0.88

Notes: OLS estimations. Average total expenditures in % of GDP amount to 15.168. Standard errors in parentheses are adjusted for clustering at the level of cantons. P-values based on wild cluster bootstrap are reported in square brackets. ***, **, and * indicate significance level at 1%, 5%, and 10%, respectively.

Data sources: Année politique Suisse, BAK Basel, cantonal constitutions, Feld et al. (2011), Funk and Gathmann (2011), Luechinger et al. (2007), Swiss Federal Finance Administration, Swiss Federal Statistical Office, and Swiss State Secretariat for Economic Affairs.

Table A9: Postal voting and spending for different categories of government expenditures for 1980 to 2007
Summary table
Dependent variables: Specific expenditures in percent of GDP
Coefficients reported (from 9×3 separate estimations): Partial correlations for postal voting

Dependent variable	(I)	(II)	(III)
General administration	0.023	0.001	−0.021
	(0.031)	(0.027)	(0.022)
	[0.474]	[0.976]	[0.325]
Law and order	0.026	−0.002	0.013
	(0.024)	(0.023)	(0.025)
	[0.327]	[0.944]	[0.595]
Education	−0.018	−0.060	−0.005
	(0.074)	(0.063)	(0.069)
	[0.840]	[0.352]	[0.943]
Culture	−0.016	−0.010	0.002
	(0.015)	(0.011)	(0.011)
	[0.349]	[0.335]	[0.867]
Health	0.020	−0.015	−0.017
	(0.104)	(0.088)	(0.086)
	[0.880]	[0.875]	[0.857]
Transportation	0.005	−0.129	0.024
	(0.193)	(0.195)	(0.141)
	[0.981]	[0.515]	[0.862]
Environment and land-use planning	−0.020	−0.043	−0.055**
	(0.031)	(0.031)	(0.026)
	[0.567]	[0.198]	[0.056]
Economy	−0.006	−0.115	−0.111
	(0.074)	(0.074)	(0.083)
	[0.941]	[0.180]	[0.213]
Public finances	0.105	0.011	−0.040
	(0.086)	(0.065)	(0.055)
	[0.309]	[0.880]	[0.487]
Control variables (see Table A8)	Yes	Yes	Yes
Canton-specific effects	Yes	Yes	Yes
Year-specific effects	Yes	Yes	Yes
Canton-specific time trends	No	linear	quadratic
No. of obs.	728	728	728
No. of clusters	26	26	26

Notes: OLS estimations. Mean values for the different categories amount to 0.828 (general administration), 1.275 (law and order), 3.247 (education), 0.278 (culture), 2.387 (health), 2.156 (transport), 0.533 (environment), 1.420 (economy), and 0.988 (public finances). Standard errors in parentheses are adjusted for clustering at the level of cantons. P-values based on wild cluster bootstrap are reported in square brackets. ***, **, and * indicate significance level at 1%, 5%, and 10%, respectively.

Data sources: Année politique Suisse, BAK Basel, cantonal constitutions, Feld et al. (2011), Funk and Gathmann (2011), Luechinger et al. (2007), Swiss Federal Finance Administration, Swiss Federal Statistical Office, and Swiss State Secretariat for Economic Affairs.

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