HAPPINESS, ECONOMY AND INSTITUTIONS*

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Institutional factors in the form of direct democracy (via initiatives and referenda) and federal structure (local autonomy) systematically and sizeably raise self-reported individual well-being in a cross-regional econometric analysis. This positive effect can be attributed to political outcomes closer to voters' preferences, as well as to the procedural utility of political participation possibilities. Moreover, the results of previous microeconometric well-being functions for other countries are generally supported. Unemployment has a strongly depressing effect on happiness. A higher income level raises happiness, however, only to a small extent.

To discover the sources of people's well-being is a major concern in the social sciences. Many inquiries have been undertaken to identify the determinants of individual happiness. This paper analyses data on reported subjective well-being in order to directly assess the role of *democratic* and *federal institutions* on people's satisfaction with life. Thus, a new set of determinants is considered, which expands previous research results showing the effects on happiness of individual income and unemployment, as well as of aggregate unemployment, inflation and income growth (see Oswald, (1997) for a survey).[1]

We argue that institutional conditions with regard to the extent and form of democracy have systematic and sizeable effects on individual well-being, in addition to demographic and economic factors. Using recent interview data from 6,000 residents of Switzerland, we show that individuals are *ceteris paribus* happier, the better developed the institutions of direct democracy are in their area of residence. This also applies to a second institution, the degree of government decentralisation (federalism). Finally, we are able to support some of the earlier results for other countries and periods with new data also based on a survey with a large sample size. In particular, we find that the unemployed are much less happy than employed persons, and that a higher household income level only raises happiness to a small extent.

[1] 'Happiness' is, for simplicity's sake, in the following interchangeably used with the terms 'satisfaction with life' and 'reported subjective well-being'. We are aware that subjective well-being is a scientific concept rather than a specific measure of well-being, and that it contains affective components i.e. mood and emotions like joy, happiness or depression as well as cognitive evaluations of life satisfaction (see e.g. Lucas *et al.*, 1996). However, most of these measures are substantially correlated. In the current study we use a measure of satisfaction with life.

1. Determinants of Happiness

It is useful to differentiate three sets of sources of individual well-being:

(1) *Personality and demographic factors.* These factors have for many decades been extensively studied by psychologists. Diener *et al.* (1999) provide a survey, extending and bringing up to date the earlier surveys by Wilson (1967) and Diener (1984). Monographs are by Argyle (1987) and Myers (1993).

(2) *Micro- and macroeconomic factors.* An early study of the effect of income on happiness is due to Easterlin (1974, see also 1995), but psychologists have also undertaken substantial work in this direction (see the survey by Diener and Oishi, 2000). In most nations, individuals belonging to the upper income groups report somewhat higher subjective well-being than persons with low income. The often dramatic increase in per capita incomes in recent decades has not raised happiness in general; the national indices for subjective well-being have virtually remained flat over time (see Blanchflower and Oswald, 2000). In contrast to these longitudinal findings for single nations, per capita income levels and happiness are more strongly positively related across nations (for further discussion see also Kenny, 1999).

The influence of the other two major economic variables, unemployment and inflation, is clear-cut. Unemployment is correlated with substantial unhappiness (Clark and Oswald, 1994; Winkelmann and Winkelmann, 1998). As the income level is kept constant, that influence is not due to lower revenue, but to non-pecuniary stress. In terms of a trade-off, 'most regression results imply that an enormous amount of extra income would be required to compensate people for having no work' (Oswald, 1997, p. 1821). Individuals also have a strong aversion towards inflation and are prepared to carry significant cost to evade it: 'one percentage point of inflation corresponds to a well-being cost of approximately two per cent of the level of income per capita' (Di Tella *et al.* 1997, p. 18).[2]

(3) The third set of influences on happiness relates to the *institutional* (or constitutional) *conditions* in an economy and society, of which democracy and federalism are of greatest importance. To our knowledge, the impact of the extent and design of democratic and federal institutions on subjective well-being has, at best, been alluded to, but has not been empirically analysed.

The determinants of happiness are usually investigated under the assumptions that subjective well-being is cardinally measurable and interpersonally

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[2] These results provide welcome and important insights into a broader effort to measure empirically individuals' reaction to, and therewith evaluation of, the influence of macro-economic variables. Other approaches are (see more extensively Frey (1991)): (i) retreat from society, or at least from the official economy, e.g. by working in the shadow sector (e.g. Cowell, 1990; Thomas, 1992); (ii) popularity and election functions (surveys are given e.g. in Nannestad and Paldam (1994), Schneider and Frey (1988)); (iii) political preference functions derived from the behaviour of governments and central banks (see the survey and critique in Makin (1976)); (iv) non-conventional political participation ranging from demonstrations to publicly motivated strikes (see e.g. Hibbs, 1976; Opp, 1989); and (v) use of force, i.e. all sorts of revolutions and coups d'état (e.g. Hibbs, 1973; Opp *et al.*, 1995). The well-being functions, together with popularity and election functions, belong to the best defined and statistically most advanced efforts to measure the absolute and relative importance of macro-economic conditions for individuals.

comparable; i.e. two claims economists are likely to be sceptical about. To avoid problems in regard to a cardinal interpretation of subjective variables, it is often possible to treat the subjective data qualitatively in econometric analyses. In contrast, whether people associate the same degree of subjective experience with a certain score on a ladder for life satisfaction is more difficult to assess. However, there is a lot of indirect evidence that cardinalism and interpersonal comparability are much less of a problem practically than theoretically. The measures of subjective well-being have high consistency, reliability and validity. Happy people are e.g. more often smiling during social interactions (Fernández-Dols and Ruiz-Belda, 1995), are rated as happy by friends and family members (Sandvik *et al.*, 1993), as well as by spouses (Costa and McCrae, 1988). Furthermore, the measures of subjective well-being have a high degree of stability over time (Headey and Wearing, 1989) and are not systematically biased with regard to social desirability (Konow and Earley, 1999). But there is, of course, room for methodological concerns (e.g. Diener *et al.*, 1999, pp. 277–8). Moreover, as will be demonstrated in this paper, the main use of happiness measures is not to compare levels, but rather to seek to identify the determinants of happiness.

2. Effects of Institutions on Happiness

Most political *institutions* tend to be stable over time, so that a cross-sectional analysis of subjective well-being is appropriate. This has been done between countries (e.g. by Veenhoven (1993) on the basis of the World Values Survey, and by Diener *et al.*, (1995)).[3] It is, of course, difficult to isolate the effect of particular institutions on reported individual well-being because the countries differ in a great variety of aspects. This problem is less acute for institutional variations *within* a (federal) country. Therefore, we study the case of Switzerland and its institutions of direct democracy. Their wide dissemination is unique for a European country. As far as we know, this is the first paper using cross-regional variations in a happiness study. Cross-regional procedures have been used with good results to account for the share of government expenditures between governmental units with different degrees of direct participation possibilities for its citizens (as done for the United States,[4] as well as for Switzerland[5]).

There are two major reasons why a higher extent of direct political participation possibilities, or more strongly developed institutions of *direct democracy* (in

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[3] The study of institutional differences is methodologically closely related to cross-country growth analysis (see e.g. Barro, 1997). However, this literature has not yet been incorporated into happiness research. There is also a relation to well-being measurement in research on economic development. Dasgupta (1993), for example, provides a measure of well-being that includes standard of living as well as indices of political and civil liberties.

[4] See e.g. Matsusaka (1995) or Rueben (2000) for general government expenditure, or Santerre (1989; 1993) for public education expenditures.

[5] See e.g. Schneider and Pommerehne (1983) and Feld and Kirchgässner (1999) for general government expenditures. The latter also study the effect on self-financing ratios, taxes, and debt. Pommerehne and Weck (1996) and Frey (1997) analyse the effect on tax evasion, and Feld and Savioz (1997) on per capita gross domestic product.

particular via popular referenda and initiatives) can be expected to raise citizens' subjective well-being (Cronin (1989), Budge (1996) or for an economic analysis Frey (1994)).

Firstly, due to the more active role of the citizens, (professional) politicians are better monitored and controlled. Government activity, i.e. public outlays as well as the many other decisions by the government, are closer to the wishes of the citizenry.[6] As a consequence, satisfaction with government output is reflected in a higher level of overall well-being.

Secondly, the institutions of direct democracy extend the citizens' possibilities to get involved in the political process. Experimental evidence (e.g. Tyler, 1990; Bohnet and Frey, 1999) suggests that this procedural effect is independent of the outcome of the political activity itself.

Federal decentralisation, and, in particular, local autonomy, is another constitutional element which can be hypothesised to positively affect citizens' happiness. Political decision making in municipalities is closer to relevant information about residents' preferences and also closer to direct control by its citizens (Frey and Eichenberger, 1999).

3. Data for Econometric Analysis

Our empirical work is based on the survey results of more than 6,000 residents of Switzerland, collected by Leu *et al.* (1997).[7] The dependent variable called 'happiness' is based on the answers to the following question: 'How satisfied are you with your life as a whole these days?' Simultaneously, the respondents were shown a table with a 10 point scale of which only the two extreme values ('completely dissatisfied' and 'completely satisfied') were verbalised. The survey found a high general life satisfaction in Switzerland with an average of 8.2 out of 10 points. No fewer than 29% of the interviewees reported a satisfaction level of 10 ('completely satisfied'), 17% of 9, and 27% of 8. The lower end of the happiness-scale, 'completely dissatisfied' (score 1), score 2 and score 3, were indicated only by 0.4%, 0.5%, and 0.9%, respectively. As these categories of great unhappiness are thinly populated, they are aggregated, leaving us with eight happiness categories.[8]

In this paper, the major explanatory variable focused on is the institutionalised rights of individual political participation, which vary considerably between the 26 Swiss cantons. Due to the federal structure of Switzerland, major areas of competence are kept by the cantons (states). As on the national level, there exist direct democratic instruments besides representative democratic parliaments and governments. The most important direct democratic instruments in cantons are the popular initiative to change the canton's constitution

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[6] This statement is supported by considerable empirical (econometric) evidence, e.g. Pommerehne (1978; 1990) or Gerber (1999).

[7] The survey data were collected between 1992 and 1994 in order to investigate the problem of poverty in Switzerland. The information contained in the data set is based on personal interviews and tax statistics.

[8] The regrouping of the lowest categories does not change the qualitative results.

or laws, a compulsory and optional referendum to prevent new laws, or the changing of existing laws, and optional financial referenda to prevent new state expenditure. Citizens' access to these instruments differ from canton to canton. Thus, for example, the number of signatures required to launch an initiative or an optional referendum, or the time span within which the signatures have to be collected, varies. The referendum on public expenditures may be launched at different levels of additional outlays. For the 26 cantons, we constructed an index designed to reflect the extent of direct democratic participation possibilities (for details of the index construction, see the Appendix). This index is defined using a six point scale with 1 indicating the lowest, and 6 the highest degree of participation possibilities for the citizens. Fig. 1 provides an overview.

The purpose of our estimate is to show that the extent of direct democratic participation possibilities exerts a statistically significant, robust and sizeable effect on happiness *over and above* the demographic and economic determinants so far taken into account in the literature.

We also intend to demonstrate that institutional factors are relevant for happiness in general by analysing the impact of federalism. The division of competence between communities and the cantonal government reflects the federal structure of a canton or, from the municipalities' point of view, their autonomy. The extent of local autonomy is measured by an index (due to Ladner, 1994). The index over the 26 cantons is based on survey results. Chief local administrators in 1856 Swiss municipalities were asked to report how they perceive their local autonomy on a 10 point scale, with one indicating 'no autonomy at all', and 10 'very high' communal autonomy.
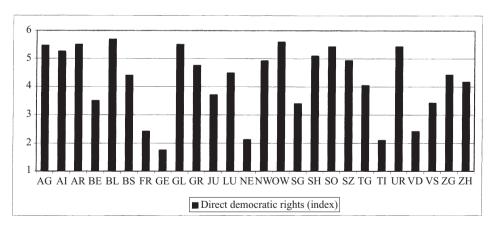

Fig. 1. *Direct Democracy in Swiss Cantons*
The figure shows the degree of direct democratic participation possibilities in the 26 Swiss cantons, namely Aargau (AG), Appenzell i. Rh. (AI), Appenzell a. Rh. (AR), Bern (BE), Basel Land (BL), Basel Stadt (BS), Fribourg (FR), Genève (GE), Glarus (GL), Graubünden (GR), Jura (JU), Luzern (LU), Neuchâtel (NE), Nidwalden (NW), Obwalden (OW), St. Gallen (SG), Schaffhausen (SH), Solothurn (SO), Schwyz (SZ), Thurgau (TG), Ticino (TI), Uri (UR), Vaud (VD), Valais (VS), Zug (ZG) and Zürich (ZH).

The estimation equations regress the indices of individual happiness on three sets of determinants:

(1) *Demographic variables*
They describe the personal attributes of the respondents and comprise

- age. Six age groups are explicitly accounted for, ranging from 30 years to 80 years and older (the constant term includes the reference group 'people younger than 30');
- gender (male/female);
- citizenship (national/foreigner);
- extent of formal education (middle/high education) (in the reference group are 'people with low education');
- family setting (single woman or man; couple with children; single parent, other, collective household) (in the reference group are 'couples') and
- individual employment status (self-employed or employee in one's own firm; housewife or houseman; other) (in the reference group are 'employed persons').

(2) *Economic variables*
Two influences are considered:

- Individual unemployment (the constant term includes the reference group 'employed persons');
- Income situation of the household (equivalence income). Total household income after taxes, social security expenditure, interest on debts and maintenance is divided through the equivalence scale of the Swiss Conference for Public Assistance. Four income groups are explicitly distinguished, ranging from Sfr. 2,000 to Sfr. 5,000 per month and more (in the reference group are 'people with a lower equivalence income than Sfr. 2,000').

The above two sets of variables are used as *controls*.[9] While they are of obvious interest in themselves, they mainly serve to isolate the unbiased influence of the third set of variables.

(3) *Political institutions*
The variables included in the estimation models are

- an index for direct democratic rights and
- an index for the extent of local (communal) autonomy.

The latter variables refer to the 26 cantons in Switzerland. The structure of Swiss cantons, however, does not only differ in respect of direct democracy and federal organisation, but also in other respects, such as the degree of urbanisation. Therefore, to control for further regional differences, we include five

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[9] We cannot address the issue of how inflation affects reported subjective well-being, as our data set is a cross-section of individuals.

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variables for the size of community and seven variables for the type of community in the estimation equations.

4. Results and Discussion of the Econometric Analysis

We present the results of our econometric analysis in seven separate sections. In Sections 4.1 to 4.4, we discuss the effects of the three sets of demographic, economic and institutional variables on happiness. In Section 4.5 we perform several tests of robustness. Finally, Sections 4.6 and 4.7 indicate who benefits from direct democracy and that the benefits can be attributed to a favourable outcome as well as to a favourable direct democratic process itself.

4.1. *Microeconometric Happiness Functions*

Table 1 presents the estimated coefficients and marginal effects of two micro-econometric happiness functions, taking into account demographic and economic determinants as well as the institutional variable direct democratic rights. In the first equation, a weighted least squares model is estimated. In the second one, a weighted ordered probit model is used in order to exploit the ranking information contained in the originally scaled dependent variable. The weighting variable that is applied allows representative results on the subject level for Switzerland.[10] Throughout the paper, we use a robust estimator of variance because random disturbances are potentially correlated within groups or clusters. Here, dependence refers to residents of the same canton.[11]

The estimation results show statistically significant effects of several demographic factors, all the economic variables and, most importantly, the institutional determinant on individual happiness. The least squares estimation that treats happiness as a cardinal variable offers qualitatively very similar results to the ordered probit model, i.e the results are robust in regard to the estimation method. The coefficients of the former model can be interpreted in a simple way: people belonging to a certain category on average report happiness scores deviating from that of the reference group on the scale of the coefficient.[12] (For example, people of middle education on average report 0.23 score points more satisfaction with life than people with lower education.) In the ordered probit estimation, a positive coefficient indicates that the probability of stating

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[10] Due to clustering and stratification in contrast to pure random sampling, weights are necessary to get approximately unbiased point estimates. Weights are proportional to the inverse of the probability of being sampled. In addition, the weights are adjusted to the demographic structure in 1992.

[11] Ignoring the clustering in the estimation model is likely to produce downward biased standard errors, due to the effects of aggregate variables on individual data (Moulton, 1990). To get unbiased standard errors for the aggregate variable 'direct democratic rights', the 26 cantons are used as sampling units. (Ignoring clustering, a t-value of 5.079 instead of 3.054 is estimated in Table 1.) Apart from clustering, stratification also has a downward effect on standard errors. The significance levels take into account the bias due to stratification, i.e. $p < 0.01$ for $|t| > 2.88$, $0.01 < p < 0.05$ for $2.17 < |t| < 2.88$ and $0.05 < p < 0.10$ for $1.81 < |t| < 2.17$.

[12] For a continuous variable, the coefficient indicates the increase in happiness scores when the independent variable increases by one unit.

happiness greater than or equal to any given level increases. The marginal effect indicates the change in the share of persons belonging to a stated happiness level when the independent variable increases by one unit.[13] In the case of dummy variables, the marginal effect is evaluated in regard to the reference group. For simplicity, only the marginal effects for the extreme value of very high happiness (score 10) are shown in Table 1. (For example, being unemployed rather than employed lowers the probability of a person stating that he or she is completely satisfied by 21.1 percentage points.)

4.2. *Demographic and Economic Factors of Life Satisfaction*

Compared to the reference group, people older than 60 are happier. Women are not happier than men if the different employment status is considered separately. Furthermore, foreigners are subject to a significantly lower probability of reaching high happiness scores compared to the Swiss. People with higher education report significantly higher subjective well-being. Couples without children are happier than singles, single parents and people living in collective households.

Among the economic variables, higher income correlates with higher happiness in a statistically significant way. However, the differences in subjective well-being are rather small. Consider, for example, the highest income group with a monthly equivalence income above Sfr. 5,000. Compared to persons with low income, only a 6.8 percentage points larger share reports being 'completely satisfied'. As already alluded to above, unemployment has a very large negative influence on individual well-being. The coefficient of this variable is largest in comparison to the other significant coefficients mentioned.

The demographic and economic variables in the happiness equation thus yield very similar results for Swiss data as were previously found by Blanchflower and Oswald (2000) and Di Tella *et al.* (1997) for other countries, in particular the highly significant and large negative effect of being unemployed, and the small positive effect of income.[14]

4.3. *The Effect of Direct Democracy on Subjective Well-being*

Table 1 also shows the results for one of the institutional variables. The index for direct democratic rights has a highly significant positive effect on happiness. An increase in the index of direct democracy by one point raises the share of persons indicating very high satisfaction with life by 2.8 percentage points. This result is consistent with our hypothesis that the institutions of direct democracy raise the reported subjective well-being. In addition, the

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[13] Alternatively, the marginal effect indicates the change of the probability belonging to a stated happiness level when the independent variable increases by one unit.

[14] Part of the correlation observed can, of course, be explained by reverse causation. For happy people, it is easier to find a partner. They probably less often lose their job and get jobs where they earn more money.

Table 1

Direct Democracy and Satisfaction with Life in Switzerland

Variable	Weighted least squares Std. err. adjusted to clustering in 26 cantons		Weighted ordered probit Std. err. adjusted to clustering in 26 cantons		
	Coefficient	t-value	Coefficient	t-value	Marginal effect (score 10)
(1) Demographic variables					
Age 30–39	−0.145	−1.064	−0.079	−0.865	−0.027
Age 40–49	−0.031	−0.270	−0.008	−0.106	−0.003
Age 50–59	−0.177	−1.898	−0.081	−1.275	−0.027
Age 60–69	0.258*	2.349	0.206**	2.903	0.073
Age 70–79	0.389*	2.866	0.295**	3.401	0.106
Age 80 and older	0.341*	2.519	0.273**	2.968	0.099
Female	0.039	0.765	0.043	1.211	0.015
Foreigner	−0.450**	−5.146	−0.284**	−5.048	−0.091
Middle education	0.232**	4.504	0.113**	3.143	0.039
High education	0.266**	3.387	0.119*	2.472	0.042
Single woman	−0.373**	−6.238	−0.258**	−6.294	−0.083
Single man	−0.295*	−2.557	−0.174*	−2.589	−0.057
Couple with children	−0.090	−1.440	−0.068	−1.777	−0.023
Single parent	−0.614**	−3.312	−0.372**	−3.602	−0.113
Other private household	−0.170	−1.499	−0.128	−1.664	−0.042
Collective household	−0.646**	−3.171	−0.413**	−3.432	−0.124
Self-employed	0.058	0.796	0.072	1.413	0.025
Housewife	0.155(*)	2.065	0.123*	2.463	0.043
Other employment status	−0.216(*)	−2.110	−0.129(*)	−1.911	−0.044
(2) Economic variables					
Unemployed	−1.574**	−5.768	−0.841**	−5.814	−0.211
Equiv. income Sfr. 2,000–3,000	0.156*	2.697	0.084*	2.199	0.029
Equiv. income Sfr. 3,000–4,000	0.243**	3.747	0.143**	3.169	0.050
Equiv. income Sfr. 4,000–5,000	0.399**	5.646	0.258**	5.382	0.092
Equiv. income Sfr. 5,000 and more	0.302**	4.938	0.192**	4.277	0.068
(3) Institutional variable					
Direct democratic rights	0.116**	2.907	0.082**	3.054	0.028
Observations	6,134		6,134		
R^2	0.091				
Prob > F	0.049		0.001		

Notes: Dependent variable: level of satisfaction on an eight point scale (scores of 1, 2 and 3 were aggregated). White estimator for variance. In the reference group are 'people younger than 30', 'men', 'Swiss', 'people with low education', 'couples', 'employed people' and 'people with a lower equivalence income than Sfr. 2,000'. Additional control variables (not shown) for size of community (5 variables) and type of community (7 variables). Significance levels: (*) $0.05 < p < 0.10$, * $0.01 < p < 0.05$, ** $p < 0.01$.

Data source: Leu *et al.* (1997).

effect itself is sizeable: (i) The marginal effect of direct democratic rights on happiness is as large as the effect of living in the second-bottom (Sfr. 2,000-3,000) instead of the bottom income category (< Sfr. 2,000). (ii) The effect is even larger when the full range of the institutional variable is considered, i.e. when individuals in canton Basel Land (with the highest democracy index of

5.69) are compared to citizens in canton Geneva (with the lowest direct participation rights of 1.75). The former state with an 11 percentage points higher probability that they are completely satisfied. (iii) The improvement affects everybody, i.e. the institutional factor is important in an aggregate sense. In comparison, getting a job 'only' raises the subjective well-being of the unemployed.

Do happy people choose direct democratic institutions? Or, in other words, does the causality between direct democracy and subjective well-being work in reverse? Direct democratic participation possibilities, in the form of referenda and initiatives in Switzerland, started to develop in the middle of the 19th century. The adoption of some of the instruments of direct popular participation reflects the spread of the spirit and ideas behind the American and the French revolutions. Equally important were political movements within the citizenry. Citizens fought for direct democratic instruments to gain political power against arbitrary decisions by parliaments and the influence of industrial pressure groups on these authorities in the cantons (see e.g. Kölz, 1998). This historic perspective suggests that the democratic institutions are not simply the result of happy and satisfied citizens. Especially during recent decades, institutional conditions in Swiss cantons have been quite stable,[15] which suggests that causality runs unambiguously from direct democratic rights to satisfaction with life.

4.4. *The Effect of Federalism on Happiness*

Table 2 focuses on federalism in the sense of 'devolution' as a second important political institution hypothesised to raise happiness. Therefore, the

Table 2

Local Autonomy and Satisfaction with Life in Switzerland

Variable	Weighted ordered probit Std. err. adjusted to clustering in 26 cantons			Weighted ordered probit Std. err. adjusted to clustering in 26 cantons		
	Coefficient	t-value	Marginal effect (score 10)	Coefficient	t-value	Marginal effect (score 10)
(1) Demographic variables	yes			yes		
(2) Economic variables	yes			yes		
(3) Institutional variables						
Local autonomy	0.098**	2.913	0.033	0.036	1.005	0.012
Direct democratic rights				0.071*	2.317	0.024
Observations	6,134			6,134		
Prob > F	0.003			0.001		

Notes: see Table 1.
Data sources: Ladner (1994) and Leu *et al.* (1997).

[15] The Spearman rank order correlation of the index for direct democratic rights between 1970 and 1996 is 0.803.

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variable 'local autonomy' is added to the demographic and economic factors in the happiness equation. (For simplicity, only the coefficients for variables of interest are shown. However, they indicate the partial effects controlling for the demographic and economic variables included in Table 1. Moreover, the coefficients of the latter variables are almost unaltered.[16]) The estimate reveals a statistically significant positive effect on subjective well-being. For local autonomy, the proportion of persons indicating very high happiness increases by 3.3 percentage points, compared to a situation in which the communes are one index point less autonomous vis-à-vis their canton.

Local autonomy and direct democracy are not independent of each other, of course. On the one hand, direct democracy fosters federal structures on the national and state level because citizens – in contrast to politicians – are most interested in strong federalism (Blankart, 1998). On the other hand, the persons bearing the costs and benefits of government action are better identifiable in a decentralised system. Direct legislation, therefore, leads to better political decisions, and federalism thus preserves direct democracy. As a result, the indices for direct democratic rights and local autonomy are correlated (r = 0.605). This makes it impossible to separate the effects of the two variables in one model clearly. The second equation in Table 2 jointly includes the two constitutional factors, local autonomy and direct democratic rights. The coefficient for the variable measuring federalism is roughly one third as large as when it is taken alone and it loses its significance. The index for direct democracy has only a slightly smaller marginal effect on life satisfaction than estimated in Table 1, namely 0.024 instead of 0.028.[17] Direct democracy and federalism in Switzerland thus seem to be complements rather than economic substitutes. Local autonomy is one of the several 'transmission mechanisms' of direct democracy's beneficial effects. In the following paragraphs, we therefore focus on direct democracy.

4.5. Sensitivity Analysis

To check the reliability of the results, several tests of robustness are performed: (i) the influence of outliers is analysed with a DFBETA-test; (ii) an ordinal measure instead of a cardinal one is applied for the extent of direct democratic rights; (iii) the effect of the four sub-indices on happiness is tested; and finally (iv) four different aggregate control variables are used.

To investigate whether the positive correlation between direct democracy and happiness is largely driven by a single canton, a DFBETA-test is performed. A two-step approach is chosen. In the first step, a further weighted ordered probit model with a dummy variable for each canton is estimated. In preparation for the second step, the estimated coefficients are correlated with the index for direct democratic rights. Due to the problem of heteroskedasticity, a

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[16] The full estimation results for all the equations are available from the authors on request.

[17] In an adjusted Wald test, the two institutional factors together are significant on the 5% level (Prob > F = 0.016).

weighted least square regression is estimated.[18] The result is as follows (t-values in parentheses):

$$\text{fixed effects for cantons} = \begin{array}{cc} -0.275^* + & 0.079^{**} \\ (-2.653) & (3.041) \end{array}$$

$$\times \text{ index for direct democratic rights,}$$

$$\text{number of observations} = 26 \text{ and adjusted } R^2 = 0.248.[19]$$

With the same estimation model, 26 equations are estimated, with a different canton omitted each time. For each equation, the estimated coefficient for the institutional variable is subtracted from the coefficient in the base equation (0.079) and divided by the estimated standard error. The resulting value is called DFBETA. If it is greater than 1.96 in absolute value, the omitted canton has a significant influence on the coefficient of the institutional variable. Table A3 in the Appendix shows that not one observation from a single canton has a significant influence. The maximum value of the DFBETA statistic is -0.829 for canton Ticino.[20] This shows that the positive effect of direct democracy on happiness is not the result of an influential outlier.

The measure applied for the extent of direct democratic participation possibilities is constructed as a cardinal index. However, the same results should be obtained if ordinal dummy variables for direct democratic rights are constructed. To test this claim, cantons were classified into three groups: cantons with an index score lower than four have low direct democratic rights, cantons with an index between four and five have medium direct democratic rights, and cantons with an index score above five are ranked highly with respect to direct democratic rights. The two dummy variables for cantons with a medium and a high ranking are included in the estimation equation presented in Table 3. As can be seen, satisfaction with life is higher for people living in cantons with medium and high direct democratic rights. The significant coefficient for the top category is 0.179. (In the reference group are people who live in cantons with low direct democratic rights).

The variable for direct democratic participation possibilities is a non-weighted composite index (see Appendix). This aggregation disregards various substitutive and complementary relationships between the single components of the index. Nevertheless, the components can be evaluated by themselves.

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[18] Heteroskedasticity arises because the coefficients for the canton's dummy variables are based on samples with largely different size. Therefore, the weighting variable contains the number of observations per canton.

[19] The results for ordinary least squares are as follows:

$$\text{fixed effects for cantons} = \begin{array}{cc} -0.402^* + & 0.125^{**} \\ (-2.277) & (3.104) \end{array} \times \text{ index for direct democratic rights,}$$

with adjusted $R^2 = 0.257$.

[20] If the fixed effect of this canton is omitted, the coefficient for direct democratic rights increases to 0.100.

However, the analysis faces the problem of multicorrelation.[21] Therefore, the influence of each component is evaluated separately (see Table 3).

All four sub-indices of direct democratic rights have a significantly positive effect on reported subjective well-being. The coefficients for the two sub-indices for the right to change the canton's law or the canton's constitution with a legislative or constitutional popular initiative are largest. Thus, the possibility of putting new questions on the political agenda is of special importance for the beneficial effects of direct democracy on citizens individual well-being.

In order to test for alternative explanations of the cross-regional differences in happiness, the effect of some aggregate control variables is estimated on its own as well as jointly with the institutional variable. Table 4 exhibits the results for the two macroeconomic variables 'national income per capita' and 'total tax burden', as well as for the two language variables 'French speaking canton' and 'Italian speaking canton'. Equations (1) and (2) indicate that national income per capita does not influence happiness significantly, whether it is controlled for institutional differences or not. The same holds for the variable total tax burden in (3) and (4). As can be seen, the introduction of these two macroeconomic variables does not (much) affect the size and significance of the direct democracy variable. In contrast, the variables for majority language are significantly correlated with reported satisfaction with life, i.e. living in a French speaking canton means significantly lower happiness, whereas living in the Italian speaking canton Ticino means significantly higher reported sub-

Table 3

Sensitivity Analysis: Ordinal Variable and Sub-Indices for Direct Democracy

Variable	Weighted ordered probit, std. err. adjusted to clustering in 26 cantons				
	(1)	(2)	(3)	(4)	(5)
(1) Demographic variables	yes	yes	yes	yes	yes
(2) Economic variables	yes	yes	yes	yes	yes
(3) Institutional variables					
Direct democratic rights index between 4 and 5	0.114 (1.733)				
Direct democratic rights index above 5	0.179* (2.308)				
Index for constitutional initiative		0.060* (2.311)			
Index for legislative initiative			0.072** (2.891)		
Index for legislative referendum				0.042$^{(*)}$ (1.945)	
Index for financial referendum					0.059** (3.075)
Observations	6,134	6,134	6,134	6,134	6,134
Prob > F	0.001	0.001	0.002	0.004	0.004

Notes: see Table 1. Coefficients with significance levels. t-values in parentheses. In the reference group in (1) are cantons with direct democratic rights lower than 4.
Data sources: Leu *et al.* (1997).

[21] The correlation between the four sub-indices is shown in Table A2 in the Appendix.

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Table 4

Sensitivity Analysis: Aggregate Control Variables

Variable	Weighted ordered probit, std. err. adjusted to clustering in 26 cantons					
	(1)	(2)	(3)	(4)	(5)	(6)
(1) Demographic variables	yes	yes	yes	yes	yes	yes
(2) Economic variables	yes	yes	yes	yes	yes	yes
(3) Institutional variable						
Direct democratic rights		0.087** (3.223)		0.084* (2.698)		0.080* (2.806)
(4) Macroeconomic conditions						
National income per capita in canton (in 1,000) in 1992	-1.8×10^{-4} (−0.054)	−0.004 (−1.256)				
Total tax burden (index) in canton in 1992			−0.002 (−1.340)	2.7×10^{-4} (0.171)		
(5) Majority language						
French speaking canton					−0.213** (−3.554)	−0.076 (−1.123)
Italian speaking canton					0.073$^{(*)}$ (1.963)	0.252** (3.337)
Observations	6,134	6,134	6,134	6,134	6,134	6,134
Prob > F	0.005	0.007	2.0×10^{-4}	0.002	0.010	0.001

Notes: see Table 1. Coefficients with significance levels. t-values in parentheses.
Data sources: Leu *et al.* (1997) and Swiss Federal Statistical Office (1997).

jective well-being (5). However, the lower well-being in the French speaking cantons can to a large extent be explained by weaker direct democratic rights (6). In (6) the coefficient of the institutional variable is almost unchanged and still significant ($p < 0.05$). It can be concluded that the extent of direct democracy has a robust influence on happiness.

4.6. *Who Benefits from Direct Democracy?*
Are the beneficial effects of direct democracy restricted to some privileged groups? To investigate this important question of equality, we analyse the influence of direct democracy for groups of persons sharing common characteristics in regard to sex, education, employment status and income. Technically, interaction variables are included in the estimation equation, in addition to the demographic and economic variables. The interaction variables are the product of dummy variables for the personal characteristics and the index for direct democratic rights.

The benefits of direct democracy reaped by women are smaller than for men. However, the difference is not statistically significant. There is also no significant difference between the three levels of education and the five categories of employment status distinguished, i.e. the positive effect of direct

democracy does not arise with the education classes and is not bound to a certain employment status. We have also analysed whether direct democracy raises the happiness of high income recipients, while not doing so for low income recipients. However, the interaction variables do not show any statistically significant differences. The positive effect of direct democracy on happiness applies to all income classes, and is not restricted to a particular one.

Overall, our analysis indicates that direct democracy is not used to discriminate against certain groups within society. The benefits are distributed rather evenly among social classes. However, as in other countries, a large proportion of residents is formally excluded from participation in the direct democratic process, namely foreigners. In the next paragraph, it is argued that they can reap only part of the utility derived from direct democracy.

4.7. *Direct Democracy and Procedural Utility*

Do citizens derive procedural utility from the possibility of participating in the directly democratic process? To answer this question, it is crucial to note that political participation in initiatives and referenda is restricted to Swiss nationals; only they can reap the respective procedural utility. Foreigners, in contrast, have in general no political participation rights. However, they cannot be discriminated from the favourable outcome of direct democracy (outcome utility). As foreigners cannot reap procedural utility from political participation, they are hypothesised to gain less from direct democracy than Swiss citizens. This can be tested either by considering an interaction effect between direct democracy and being a foreigner or by running separate equations for foreigners and Swiss.[22] The results for the latter test are shown in Table 5.[23]

In both equations, direct democratic rights have a positive effect on reported subjective well-being. However, a direct comparison of the two coefficients for direct democratic rights suggests that foreigners benefit less than Swiss citizens in cantons in which the institutions of direct democracy are well

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[22] Two separate regressions allow different coefficients for the control variables of the sample for foreigners and for Swiss citizens and thus foster the *ceteris paribus* interpretation of the results of the institutional variable.

[23] The results for the former test (a weighted ordered probit estimation with clustering in cantons) are as follows:

$$\text{satisfaction with life} = \ldots \quad \underset{(-0.283)}{-0.042} \quad \text{being a foreigner} \ldots + \quad \underset{(3.384)}{0.097^{**}}$$

$$\times \text{index for direct democratic rights} \quad \underset{(-1.699)}{-0.067}$$

$$\times \text{interaction term (index for direct democratic rights} \times \text{being a foreigner)},$$

with t-values in parentheses. The coefficient for the index of direct democracy is positive and statistically highly significant. This effect accounts for everybody, whether a Swiss citizen or a foreigner. The interaction variable shows that foreigners are *ceteris paribus* relatively less happy compared to Swiss citizens in cantons in which the institutions of direct democracy are well developed. However, the positive effect accounting for everybody is not compensated. This suggests, firstly, that foreigners are still better off in a more direct democratic canton and, secondly, that procedural utility, in addition to outcome utility, is an important source of satisfaction related to direct democracy.

Table 5

Satisfaction with Life of Foreigners and Swiss in Switzerland

Variable	Foreigners Weighted ordered probit Std. err. adjusted to clustering in 26 cantons			Swiss Weighted ordered probit Std. err. adjusted to clustering in 26 cantons		
	Coefficient	t-value	Marginal effect (score 10)	Coefficient	t-value	Marginal effect (score 10)
(1) Demographic variables	yes			yes		
(2) Economic variables	yes			yes		
(3) Institutional variable						
Direct democratic rights	0.035	0.951	0.010	0.098**	3.270	0.034
Observations	743			5,391		
Prob > F	0.002			0.006		

Notes: see Table 1.
Data source: Leu *et al.* (1997).

developed. Moreover, there is no evidence that the Swiss majority in more directly democratic cantons uses its institutional possibilities to exploit the minority of foreigners.

The size of the procedural utility gained from being able to participate in the direct democratic process can also be assessed. Comparing the positive marginal effect for direct democracy of 3.4 percentage points for Swiss citizens with the marginal effect of 1.0 percentage points for foreigners suggests that two thirds of the gain in well-being is due to the application of a favourable process in political decision-making.[24] Procedural utility, over and above outcome utility, is an important source of satisfaction due to direct democracy.

An alternative interpretation of these results can be advanced on the basis of the missing variables problem. Assuming that foreigners and Swiss citizens are equally affected by unobserved regional factors, the causal effect of direct democratic rights on happiness is identified by the difference in the coefficients for this variable between the two groups.[25] According to this interpretation, the marginal effect of direct democratic rights on subjective well-being is slightly smaller, namely 3.4 minus 1.0, i.e. 2.4 percentage points instead of 2.8 percentage points as estimated in Table 1.

5. Conclusions

With data from interviews of more than 6,000 Swiss residents, we have adduced strong evidence that institutional (or constitutional) factors exert a systematic and sizeable positive influence on reported happiness. The existence of

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[24] Quantitatively very similar results are obtained if interaction terms for direct democratic rights and being Swiss and being foreigner, respectively, are included in one equation instead of estimating two separate regressions.

[25] This interpretation is analogous to the differences-in-differences estimator for time series as e.g. applied in Card (1990).

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extended individual participation possibilities in the form of initiatives and referenda, and of decentralised (federal) government structures raises the subjective well-being of people.

The influence of these political institutions on happiness is consistent with the hypothesis that politicians in a strongly developed direct democracy are forced to follow the preferences of the voters more than when direct popular participation rights are less well developed. Moreover, the citizens gain procedural utility from the fuller possibilities of directly participating in the political process. Foreigners living in Switzerland are more likely to benefit from the outcome than from the process (from which they are excluded). We find indeed that foreigners tend to reap systematically positive but lower satisfaction from living in a canton with strongly developed direct participation rights than do the Swiss.

These results, with respect to the institutional determinants of happiness, are obtained even if the 'standard' determinants of happiness due to demographic and economic factors are controlled for, and a number of robustness checks are undertaken.

In consonance with other happiness studies, unemployment is associated with a considerably lower level of subjective well-being. A higher equivalence income has a statistically significant positive but small effect on happiness.

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References

Argyle, M. (1987). *The Psychology of Happiness*. London: Methuen.
Barro, R. J. (1997). *Determinants of Economic Growth: A Cross-Country Empirical Study*. Cambridge: MIT Press.
Blanchflower, D. G. and Oswald, A. J. (2000). 'Well-being over time in Britain and the USA.' NBER Working Paper No. 7487, Cambridge, M.A.: National Bureau of Economic Research.
Blankart, C. B. (1998). 'Politische Ökonomie der Zentralisierung der Staatstätigkeit.' Discussion Paper 108, Humboldt-Universität, Berlin.
Bohnet, I. and Frey, B. S. (1999). 'Social distance and other-regarding behavior in dictator games: comment.' *American Economic Review*, vol 89, no. 1, pp. 335–9.
Budge, I. (1996). *New Challenge of Direct Democracy*. Cambridge: Polity Press.
Card, D. E. (1990). 'The impact of the mariel boatlift on the Miami labor market.' *Industrial and Labor Relations Review*, vol. 43, no. 2, pp. 245–57.
Clark, A. E. and Oswald, A. J. (1994). 'Unhappiness and unemployment.' ECONOMIC JOURNAL, vol. 104, no. 424, pp. 648–59.
Costa, P. T. and McCrae, R. R. (1988). 'Personality in adulthood: a six-year longitudinal study of self-reports and spouse ratings on the NEO personality inventory.' *Journal of Personality and Social Psychology*, vol. 54, no. 5, pp. 853–63.
Cowell, F. A. (1990). *Cheating the Government. The Economics of Evasion*, Cambridge, M.A.: MIT Press.
Cronin, T. E. (1989). *Direct Democracy. The Politics of Initiative, Referendum and Recall*, Cambridge, M.A.: Harvard University Press.
Dasgupta, P. (1993). *An Inquiry into Well-being and Destitution*. Oxford, N.Y.: Oxford University Press.
Di Tella, R., MacCulloch, R. J. and Oswald, A. J. (1997). 'The macroeconomics of happiness.' Discussion Paper No. 19, Centre for Economic Performance, University of Oxford.
Diener, E. (1984). 'Subjective well-being.' *Psychological Bulletin*, vol. 95, no. 3, pp. 542–75.
Diener, E., Diener, M. and Diener, C. (1995). 'Factors predicting the subjective well-being of nations.' *Journal of Personality and Social Psychology*, vol. 69, no. 5, pp. 851–64.

Diener, E. and Oishi, S. (2000). 'Money and happiness: income and subjective well-being across nations.' Forthcoming in (E. Diener and E. M. Suh eds) *Subjective Well-Being Across Cultures.* Cambridge, M.A.: MIT Press.

Diener, E., Suh, E. M., Lucas, R. E. and Smith, H. L. (1999). 'Subjective well-being: three decades of progress.' *Psychological Bulletin*, vol. 125, no. 2, pp. 276–303.

Easterlin, R. A. (1974). 'Does economic growth improve the human lot? Some empirical evidence.' In (P. A. David and M. W. Reder eds) *Nations and Households in Economic Growth: Essays in Honour of Moses Abramowitz.* New York and London: Academic Press, pp. 89–125.

Easterlin, R. A. (1995). 'Will raising the incomes of all increase the happiness of all?' *Journal of Economic Behaviour and Organization*, vol. 27, no. 1, pp. 35–48.

Feld, L. and Kirchgässner, G. (1999). 'Public debt and budgetary procedures: top down or bottom up. Some evidence from Swiss municipalities.' In (J. M. Poterba and J. von Hagen eds) *Fiscal Institutions and Fiscal Performance.* Chicago: Chicago University Press, pp. 151–79.

Feld, L. P. and Savioz, M. R. (1997). 'Direct democracy matters for economic performance: an empirical investigation.' *Kyklos*, vol. 50, no. 4, pp 507–38.

Fernández-Dols, J.-M. and Ruiz-Belda, M.-A. (1995). 'Are smiles a sign of happiness? Gold medal winners at the Olympic games.' *Journal of Personality and Social Psychology*, vol. 69, no. 6, pp. 1113–9.

Frey, B. S. (1991). 'Forms of expressing economic discontent.' In (H. Norpoth, M. S. Lewis-Beck and J.-D. Lafay eds) *Economics and Politics. The Calculus of Support.* Ann Arbor: University of Michigan Press, pp. 267–80.

Frey, B. S. (1994). 'Direct democracy: politico-economic lessons from Swiss experience.' *American Economic Review*, vol. 84, no. 2, pp. 338–48.

Frey, B. S. (1997). 'A constitution for knaves crowds out civic virtues.' ECONOMIC JOURNAL, vol. 107, no. 443, pp. 1043–53.

Frey, B. S. and Eichenberger, R. (1999). *The New Democratic Federalism for Europe. Functional Overlapping and Competing Jurisdictions.* Cheltenham: Edward Elgar.

Gerber, E. (1999). *The Populist Paradox: Interest Group Influence and the Promise of Direct Legislation.* Princeton: Princeton University Press.

Headey, B. and Wearing, A. (1989). 'Personality, life events, and subjective well-being: toward a dynamic equilibrium model.' *Journal of Personality and Social Psychology*, vol. 57, pp. 731–9.

Hibbs, D. (1973). *Mass Political Violence: A Cross-National Causal Analysis.* New York: Wiley.

Hibbs, D. (1976). 'Industrial conflict in advanced industrial societies.' *American Political Science Review*, vol. 70, no. 12, pp. 1033–58.

Kenny, C. (1999). 'Does growth cause happiness, or does happiness cause growth?' *Kyklos*, vol. 52, no. 1, pp. 3–26.

Konow, J. and Earley, J. (1999). 'The hedonistic paradox: is homo economicus happier?' Mimeo, Department of Economics, Loyola Marymount University, Los Angeles.

Kölz, A. (1998). *Der Weg der Schweiz zum Modernen Bundesstaat. Historische Abhandlungen.* Chur and Zurich: Rüegger.

Ladner, A. (1994). 'Finanzkompetenzen der Gemeinden - ein Überblick über die Praxis.' In (F. Eng, A. Glatthard and B. H. Koenig eds) *Finanzföderalismus.* Bern: Emissionszentrale der Schweizer Gemeinden, pp. 64–85.

Leu, R. E., Burri, S. and Priester, T. (1997). *Lebensqualität und Armut in der Schweiz.* Bern: Haupt.

Lucas, R. E., Diener, E. and Eunkook, S. (1996). 'Discriminant validity of well-being measures.' *Journal of Personality and Social Psychology*, vol. 71, no. 3, pp. 616–28.

Makin, J. H. (1976). 'Constraints on formulation of models for measuring revealed preferences of policy makers.' *Kyklos*, vol. 29, no. 4, pp. 709–32.

Matsusaka, J. G. (1995). 'Fiscal effects of the voter initiative: evidence from the last 30 years.' *Journal of Political Economy*, vol. 103, no. 3, pp. 587–623.

Moulton, B. R. (1990). 'An illustration of a pitfall in estimating the effects of aggregate variables on micro units.' *Review of Economics and Statistics*, vol. 72, no. 2, pp. 334–8.

Myers, D. G. (1993). *The Pursuit of Happiness: Who Is Happy and Why?* New York: Avon.

Nannestad, P. and Paldam, M. (1994). 'The vp-function: a survey of the literature on vote and popularity functions after 25 years.' *Public Choice*, vol. 79, no. 3–4, pp. 213–45.

Opp, K.-D. (1989). *The Rationality of Political Protest, A Comparative Analysis of Rational Choice Theory.* Boulder: Westview Press.

Opp, K.-D., Voss, P. and Gern, C. (1995). *The Origins of a Spontaneous Revolution. East Germany 1989.* Ann Arbor: Michigan University Press.

Oswald, A. J. (1997). 'Happiness and economic performance.' ECONOMIC JOURNAL, vol. 107, no. 445, pp. 1815–31.

Pommerehne, W. W. (1978). 'Institutional approaches to public expenditure: empirical evidence from Swiss municipalities.' *Journal of Public Economics*, vol. 9, no. 2, pp. 225–80.

Pommerehne, W. W. (1990). 'The empirical relevance of comparative institutional analysis.' *European Economic Review*, vol. 34, no. 2–3, pp. 458–69.

Pommerehne, W. W. and Weck-Hannemann, H. (1996). 'Tax rates, tax administration and income tax evasion in Switzerland.' *Public Choice*, vol. 88, no. 1–2, pp. 161–70.

Rueben, K. (2000). 'Tax limitations and government growth: the effect of state tax and expenditure limits on state and local government.' Forthcoming in *Journal of Political Economy*.

Sandvik, E., Diener, E. and Seidlitz, L. (1993). 'Subjective well-being: the convergence and stability of self-report and non-self-report measures.' *Journal of Personality*, vol. 61, no. 3, pp. 317–42.

Santerre, R. E. (1989). 'Representative versus direct democracy: are there any expenditure differences?' *Public Choice*, vol. 60, no. 2, pp. 145–54.

Santerre, R. E. (1993). 'Representative versus direct democracy: the role of public bureaucrats.' *Public Choice*, vol. 76, no. 3, pp. 189–98.

Schneider, F. and Frey, B. S. (1988). 'Politico-economic models of macroeconomic policy: a review of the empirical evidence.' In (T. D. Willett ed.) *The Political Economy of Money, Inflation and Unemployment*. Durham and London: Duke University Press, pp. 240–75.

Schneider, F. and Pommerehne, W. W. (1983). 'Macroeconomia della crescita in disequilibrio e settore pubblico in espansione: il peso delle differenze istituzionali.' *Rivista Internazionale di Scienze Economiche e Commerciali*, vol. 33, no. 4–5, pp. 306–20.

Stutzer, A. (1999). 'Demokratieindizes für die Kantone der Schweiz.' Working Paper No. 23, Institute for Empirical Research in Economics, University of Zurich.

Swiss Federal Statistical Office (ed.) (1997). *Statistisches Jahrbuch der Schweiz*. Zürich: Neue Zürcher Zeitung.

Thomas, J. J. (1992). *Informal Economic Activity*. London: Wheatsheaf.

Trechsel, A. and Serdült, U. (1999). *Kaleidoskop Volksrechte: Die Institutionen der direkten Demokratie in den schweizerischen Kantonen 1970-1996*. Basel: Helbing and Lichtenhahn.

Tyler, T. R. (1990). *Why People Obey the Law*. New Haven: Yale.

Veenhoven, R. (1993). *Happiness in Nations: Subjective Appreciation of Life in 56 Nations 1946–1992*. Rotterdam: Erasmus University Press.

Wilson, W. (1967). 'Correlates of avowed happiness.' *Psychological Bulletin*, vol. 67, no. 4, pp. 294–306.

Winkelmann, L. and Winkelmann, R. (1998). 'Why are the unemployed so unhappy? Evidence from panel data.' *Economica*, vol. 65, no. 257, pp. 1–15.

Appendix

Index for Direct Democratic Rights and Local Autonomy in Swiss Cantons

Direct democracy is here defined in terms of individual political participation possibilities. In Switzerland, institutions for the direct political participation of citizens exist on the level of the federal state as well as on the level of cantons. However, the direct democratic rights on the level of cantons are very heterogeneous. Therefore, an index is constructed to measure the different barriers to citizens entering the political process, apart from elections in the year 1992. The index is based mainly on data collected in Trechsel and Serdült (1999) (for details see Stutzer, 1999).

The four main legal instruments directly influencing the political process in Swiss cantons are

- (a) the popular initiative to change the canton's constitution,
- (b) the popular initiative to change the canton's law,
- (c) the compulsory and optional referendum to prevent new law or changing law and
- (d) the compulsory and optional referendum to prevent new state expenditure.

Barriers are in terms of

- (a) the necessary signatures to launch an instrument (absolute and relative to the number of citizens with the right to vote),
- (b) the legally allowed time span to collect the signatures and
- (c) the level of new expenditure per head allowing a financial referendum.

(Compulsory referenda are treated like referenda with the lowest possible barrier.)

Each of these restrictions is evaluated on a six point scale: 'one' indicates a high barrier, 'six' a low one. From the resulting ratings, a non-weighted average is calculated for each instrument (i.e. four sub-indices) and for the composite index, which represents the measure of direct democratic rights in Swiss cantons. The results are presented in Table A1.

The index for local autonomy is based on survey results by Ladner (1994). Chief local administrators in 1856 Swiss municipalities reported how they perceive their local autonomy on a 10 point scale, with one indicating 'no autonomy at all', and 10 'very high' communal autonomy. Average scores for each canton are also shown in Table A1.

Table A1

Index for Direct Democratic Rights and Local Autonomy in Swiss Cantons

Canton	Direct democracy					Local autonomy
	Index for constitutional initiative	Index for legislative initiative	Index for legislative referendum	Index for financial referendum	Composite index for direct demo-cratic rights	
Aargau	5.67	5.67	6.00	4.50	5.46	4.9
Appenzell i. Rh.	6.00	6.00	6.00	3.00	5.25	5.0
Appenzell a. Rh.	6.00	6.00	6.00	4.00	5.50	5.8
Bern	2.67	2.67	3.67	5.00	3.50	4.6
Basel Land	6.00	6.00	6.00	4.75	5.69	4.3
Basel Stadt	4.67	4.67	4.00	4.25	4.40	5.5
Fribourg	2.67	2.67	2.33	2.00	2.42	4.2
Genève	2.00	2.00	2.00	1.00	1.75	3.2
Glarus	6.00	6.00	6.00	4.00	5.50	5.6
Graubünden	4.00	5.00	6.00	4.00	4.75	5.8
Jura	4.67	4.67	3.00	2.50	3.71	4.0
Luzern	4.67	5.33	3.67	4.25	4.48	4.1
Neuchâtel	2.67	2.67	1.67	1.50	2.13	3.7
Nidwalden	2.67	6.00	6.00	5.00	4.92	5.5
Obwalden	5.33	6.00	6.00	5.00	5.58	6.0
Sankt Gallen	3.33	4.00	3.00	3.25	3.40	4.9
Schaffhausen	5.33	5.33	5.17	4.50	5.08	6.1
Solothurn	5.33	5.33	6.00	5.00	5.42	4.9
Schwyz	5.33	5.33	4.67	4.38	4.93	4.6
Thurgau	3.67	3.67	4.33	4.50	4.04	5.9
Ticino	1.33	2.67	1.67	2.75	2.10	4.3
Uri	5.67	5.67	5.33	5.00	5.42	5.4
Vaud	2.33	2.33	2.00	3.00	2.42	4.7
Valais	3.00	3.67	6.00	1.00	3.42	5.5
Zug	5.00	5.00	3.67	4.00	4.42	6.0
Zürich	3.33	3.33	6.00	4.00	4.17	5.4

Sources: Ladner (1994) and own calculations on the basis of Trechsel and Serdült (1999).

Table A2

Correlation of Sub-indices and Composite Index for Direct Democratic Rights and Local Autonomy in Swiss Cantons

	CI	LI	LR	FR	DDR	LA
Index for constitutional initiative (CI)	1.000					
Index for legislative initiative (LI)	0.871	1.000				
Index for legislative referendum (LR)	0.669	0.772	1.000			
Index for financial referendum (FR)	0.539	0.632	0.562	1.000		
Composite index for direct democratic rights (DDR)	0.888	0.943	0.877	0.767	1.000	
Local autonomy (LA)	0.410	0.506	0.646	0.531	0.605	1.000

Table A3

Sensitivity Analysis: DFBETA-Test for 26 Swiss Cantons
Independent variable: direct democratic rights

Omitted observation	$\hat{\beta}_0$	DFBETA	Omitted observation	$\hat{\beta}_0$	DFBETA
Aargau	0.078*	0.030	Nidwalden	0.079**	0.007
Appenzell i. Rh.	0.079**	−0.007	Obwalden	0.073**	0.264
Appenzell a. Rh.	0.073**	0.241	Sankt Gallen	0.082**	−0.108
Bern	0.081**	−0.072	Schaffhausen	0.083**	−0.161
Basel Land	0.088**	−0.325	Solothurn	0.081**	−0.049
Basel Stadt	0.078**	0.065	Schwyz	0.078**	0.062
Fribourg	0.073*	0.217	Thurgau	0.079**	0.025
Genève	0.080**	−0.035	Ticino	0.100**	−0.829
Glarus	0.080**	−0.027	Uri	0.077**	0.073
Graubünden	0.080**	−0.025	Vaud	0.058*	0.775
Jura	0.079**	0.002	Valais	0.080**	−0.024
Luzern	0.084**	−0.186	Zug	0.078**	0.042
Neuchâtel	0.075*	0.139	Zürich	0.082**	−0.117

Notes: A value of DFBETA greater than 1.96 in absolute value shows an influential observation. Weight: inverse of the number of observations per canton. Significance levels: *$0.01 < p < 0.05$, **$p < 0.01$.
Data source: Leu *et al.* (1997).