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RESEARCH PAPER

Direct democracy and life satisfaction revisited: new evidence for Switzerland

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Abstract We re-evaluate the relation between cantonal direct democracy and perceived subjective well-being in Switzerland using new data from the Swiss Household Panel. In addition, this study goes beyond previous work by carefully controlling for cultural determinants of happiness such as languages and religion. We find that once language is controlled for, no robust significant relationship between the extent of direct democracy and life satisfaction can be observed. The results also show that direct democracy does not affect well-being within language groups in Switzerland.

Keywords Culture · Direct democracy · Happiness · Institutions · Utility

1 Introduction

Political outcomes that are closer to the preferences of the median voter are conjectured to be produced in a system with more direct popular rights than in a more representative political system (Feld and Kirchgässner 2001; Pommerehne 1978). Consequently, *ceteris paribus*, greater voters' influence on the political decision-making process can be expected to raise individuals' well-being. Not only does such citizen empowerment lead to political results that are more likely to be acceptable to a large part of a population, but citizens' well-being may also arise from their mere participation in the political decision-making

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process and from the perceived extent of the procedural fairness of this process. In fact, the utility gained from participation and procedural fairness was found to be larger than the utility gained from a (democratic) political outcome (Stutzer and Frey 2003).

Therefore, it seems plausible that citizen empowerment through more democratic institutions should lead to higher levels of self-reported happiness. Due to its federal structure,[1] Switzerland has often been perceived as an ideal laboratory to study the effects of differences in political institutions on political and social outcomes.[2] In particular, the decentralized government organization allows for considerable variation between the 26 cantons, with regard to direct popular rights. At the cantonal level, citizens vote on such topics as education, welfare, culture, and police.[3] An additional advantage of studying the effects of different political institutions within Switzerland rather than in an international setting is that many factors that are difficult to measure and make comparisons across countries problematic are irrelevant for an analysis within one country. In a series of influential studies, Frey and Stutzer used this unique Swiss setting to analyze the effect of (direct) democracy on happiness. They consistently found that direct democracy is a statistically significant positive determinant of happiness.[4]

One aspect that clearly contributes to the heterogeneity of the Swiss cantons, however, is Switzerland's multilingual structure. Switzerland is divided into three main language regions with rather different cultural and ethnical roots, namely the German-, the French-, and the Italian-speaking parts. In a recent international analysis, Dorn et al. (2006) show that levels of self-reported happiness vary considerably among countries with different languages. More specifically, subjective well-being is found to be higher in countries with Germanic languages as opposed to countries with Romance languages. Therefore, it might be important to control for language regions in the Swiss context as well. While it is beyond the scope of this paper to explicitly determine why cantonal language influences self-reported well-being, one possible explanation is that cantonal language is linked to personal and political 'culture,' which in turn influences self-reported happiness.[5] For example, in Switzerland, historically, development and extension of direct democratic rights took its origin in the German-speaking areas since the middle ages, while in the 19th and 20th century strong cross-cultural spill-overs in the shaping of political institutions became eminent. But even today, many apparent differences between the language regions persist, notably different voting patterns in national referenda, with mobility between

[1] See, e.g., Frey and Stutzer (2000, 2000a, 2000b), as well as Stutzer and Frey (2003).

[2] See, e.g., Feld and Savioz (1997) for the impact of direct democracy on economic welfare, Feld and Kirchgässner (2001) for its effect on public finances, or Feld et al. (2006) for its effect on income (re)distribution.

[3] Note however that at the federal level, citizens from all cantons have identical political rights with regard to important policy fields such as foreign policy, trade, or defense.

[4] International cross-section studies with macro-level data, however, present inconclusive results (see, e.g., Schyns 1998; Veenhoven 2000; Inglehart and Klingeman 2000). An exception is the study by Dorn et al. (2006).

[5] The share of those speaking the fourth language, Rhaeto-Romanic, is about 1% of the Swiss population and, therefore, in our context negligible. Moreover, practically all of these people speak fluent German, the main language of *Graubünden*, which is the only canton where Rhaeto-Romanic is spoken.

language regions being relatively low.[6] Moreover, the language spoken in a society might well proxy culture, as ''at the level of society, virtually every aspect of human culture is language dependent, social systems, morality, custom, science, group organization, and religion'' (Allott 1999, p. 71). As a consequence, it seems plausible that self-reported happiness scores might be influenced by the culture of the region in which a person resides. Thus, an empirical estimation of the determinants of life satisfaction in Switzerland should include a measure of *cantonal* culture. In the models where Stutzer and Frey (2000, 2003) use the dominant language in a canton as a proxy for regional culture, the resulting coefficients are typically highly significant.

The *individual* cultural background might also contribute to one's well-being: individual cultural background might play a role in forming values about certain aspects of life, and in perceiving own individual well-being under identical objective circumstances. This possibility is also noted by Easterlin (1974, p. 108). In particular, the culture in which one grows up appears as a persistent predictor of economic and social behavior, even if the cultural environment is different, as is the case for immigrants in alien host countries (Fernández and Fogli 2005; Fisman and Miguel 2006). Several more recent papers examine the correlation between individual culture and well-being.[7] For this reason, an analysis of the determinants of well-being should control for individual cultural background. One important dimension of individual cultural background is ethnicity. Guiso et al. (2006) argue that ethnicity correlates with relatively time-invariant and intergenerationally persisting values and beliefs, that are non-responding to changes in the economic conditions or political institutions, and, thus, in an econometric sense, quite exogenous.[8] In the Swiss context, language proxies well for ethnicity as most Swiss-German speakers are descendents of Germanic tribes (Alemannians) that settled in Switzerland from the decline of the Roman Empire until the Early Middle Ages. In contrast, the French-speaking population originated mainly from Romanized Celtic and some Germanic tribes (Burgundians) while the Italian-speaking population of Switzerland has its roots in Romanized Celtic settlements that are close in culture and dialect to their Lombard neighbors. For this reason, in this study, we employ individual language as a measure for individual ethnic and cultural background. However, even language by itself might constitute an important dimension of culture that is independent of ethnic background, as it serves as an important transmission channel of a specific view of the world, the social system, and customs (Allott 1999; Lazear 1999). More specifically, the language spoken also shapes human patterns of thought and perhaps how one values the contributions of political institutions to one's personal welfare. Nevertheless given the strong overlap between spoken language and

[6] See also Lijphart (1979) who, in a study of the structure of party affiliations in four multilingual countries (including Switzerland), concluded that ''because language is a crucial differentiator among nations, it is bound to be a major cleavage and a main source of partisan differences in 'nations' that are not linguistically homogeneous'' (p. 453). Investigations of mobility patterns of commuters of centrally located major Swiss regions reveal that people tend to commute along the language borders rather than across them. For both the German- and French-speaking language regions, for more than 97% of the labor force residence and location of work place coincide (see http;//www.pendlerstatistik.ch)

[7] For differences between Europeans and Americans with respect to the perception of (economic) inequality see Alesina et al. (2004). See also the various contributions in Diener and Suh (2000) and Ahuvia (2002).

[8] Other dimensions of individual culture, e.g., trust and social capital, include both a time-invariant component and one that is influenced by past individual behavior. In this anaylsis, we focus on the two dimensions of culture that are most stable over time, namely ethnicity and religion (Guiso et al. 2003).

ethnic origin in Switzerland, it is not possible to disentangle both determinants in this study, in contrast to countries with a history of immigration from different parts of the world.

In our analysis, cultural influences on well-being are taken into account by using indicators of cantonal and individual language. Another factor that is closely related to culture and that might have an impact on people's happiness is religion (Bjørnskov 2003; Ferriss 2002). Indeed, Guiso et al. (2006) show hat denominations shape an individual's behavior and beliefs even if the person views herself as detached from any religious organization. Not only do the slow changes in religious institutions contribute to their role as a cultural factor, but equally the persistence of beliefs transmitted through the intergenerational 'family channel' itself. Religious beliefs, as does 'culture' in general, passes value systems and rules of human interactions across generations; moreover, religion often defines what a 'fulfilled' life constitutes and which achievements are deemed desirable. We hence control for individual religions or confessions. While previous work often employed the frequency of participation in religious services to account for the social capital aspect of an active religious life (see Ferriss 2002, and the literature cited therein), in this study, however, we focus on the impact of a religion's embedded value system which does not depend on actual service attendance.

Another determinant of happiness whose impact on well-being has to be analyzed in a differentiated manner is income. While the extent of the effect of personal income on happiness is subject to debate, there is a general consensus that money, consumption, and wealth do matter for individual happiness (Heady and Wooden 2004; Headey et al. 2004). To capture the impact of income on well-being, it would be useful to focus on the relative economic position that an individual or family occupies in it rather than absolute levels of personal income. Positive distances in economic status relative to that of a reference group, such as average status within a country, have consistently beneficial effects on personal happiness (McBride 2001; D'Ambrosio and Frick 2004; Ferrer-i-Carbonell 2005). Moreover, the effect of relative income might be asymmetric for those below and those above the reference level, with potential non-linearities in the income effect (Fischer and Torgler 2006). In contrast to these considerations, the previous studies of Frey and Stutzer used a simpler framework that only included measures of absolute personal income.[9]

This paper takes a closer look at the relation between direct democracy and perceived subjective well-being in Switzerland, while also carefully controlling for the impacts of income and culture, the latter proxied by both language and religion. First, we briefly review the empirical results for Switzerland obtained by Frey and Stutzer in their various contributions (Sect. 2). Using a similar model as that of Frey and Stutzer (2000), we re-estimate this relationship allowing for the relative income position of the individuals and also using new, more recent data from the Swiss Household Panel (SHP) (Sect. 3). Using this dataset and panel techniques that control for individual heterogeneity, no robust relationship between direct democracy and happiness is observed. Section 4 concludes.

[9] Less recent cross-sectional contributions on happiness as well as suicide have employed a measure of the general level of economic development to capture income effects (e.g., Easterlin 1974; Jungeilges and Kirchgässner 2002; Oswald 1997). See also the graphical representation of countries' happiness ratings and GDP per capita in Frey and Stutzer (2002, p. 417).

2 Previous empirical research for Switzerland

All empirical studies by Stutzer and Frey are based on a cross-section of approximately 6,000 households from a 1992 dataset collected by Leu et al. (1997) that is a representative sample of the Swiss population.[10] The dependent variable in these studies measures general life satisfaction on a scale from 1 to 10.[11] The set of explanatory variables, which is very similar across their various contributions and follows the existing happiness literature, includes economic, sociodemographic, and institutional variables. In most of their studies, cultural determinants and/or macroeconomic variables are included for robustness checks. The cultural variables either refer to the main language of the commune of residence, as in Stutzer and Frey (2000), or the main language of the respective canton, as, e.g., in Frey and Stutzer (2000, 2000a). However, cultural determinants are sometimes missing (Frey and Stutzer 2000b; Frey et al. 2001).[12]

The main variable of interest among the explanatory variables is an institutional variable that measures a canton's level of direct democracy with an index ranging from 1 to 6. This composite index, developed by Stutzer (1999), is calculated as an unweighted average of four sub-indices, of which each assesses the degree of citizen empowerment through a specific institution of direct democracy. These institutions include the (i) constitutional and (ii) statutory initiatives, (iii) referenda on cantonal laws and statutes (statutory referenda) as well as (iv) referenda on single expenditure projects (fiscal referenda). Depending on the number of signatures required to use such institutions, the time given for their collection, and, in case of fiscal referenda, the expenditure thresholds that have to be met, value points are awarded which give rise to the single sub-indices. In our dataset, the lowest value of the composite index is achieved by Geneva (1.75 points), showing low values for all four subindices, and the highest by Glarus (5.75 points), which shows consistently very high values for all assessed institutions.[13] Frey and Stutzer (2000, p. 937), as well as Stutzer and Frey (2000, p. 32f.), present tables that show the distribution of this index over all Swiss cantons.

Certainly, such index measures the availability rather than the effective use of these institutions. However, with the help of a game theoretical model, Feld and Kirchgässner (2001) were able to show that even the mere existence of direct democracy, by exerting an impact as a so-called 'credible threat', induces an adaptation of the policy chosen by the politicians towards the electorate's preferences. In consequence, only taking into account occurrences of actual usage would understate the true institutional impact of direct democracy. Other studies have confirmed the policy-relevance of this composite index and employed it to measure the impact of direct democracy on policy outcomes.[14]

[10] Actually, there is oversampling of two groups, the elderly and the poor. However, a representative sample can be obtained by application of transversal weights, as Frey and Stutzer do in all their papers, or by eliminating the oversampled observations (which is possible due to the construction of the dataset). As will be shown below, these two methods can lead to quite different results.

[11] The first three categories are aggregated to increase the number of observations for the lowest category.

[12] The macroeconomic factors include the extent of local autonomy in a canton, national income per capita, the degree of urbanization, size of canton in terms of population, and the cantonal total tax burden (Frey and Stutzer 2000, 2000a).

[13] Geneva achieves a '2' for the constitutional and statutory initiative and the statutory referendum, but a '1' for the fiscal referendum. In contrast, the sub-indices for Glarus are as high as '6' for the first three institutions and '5' for the fiscal referendum.

[14] Using the composite index Feld et al. (2006) identify a significant impact on income inequality and redistribution, Fischer (2005) on student performance and crime, and Feld and Kirchgässner (2001) on local and state spending, just to name a few studies.

In accordance with the literature mentioned above, Frey and Stutzer assume that increased exposure to direct democracy leads to policy outcomes that are closer to citizens' preferences. This proximity should, in turn, make them happier. The primary estimation method used in their analyses is a weighted ordered probit model with robust standard errors obtained through clustering at the cantonal level (Moulton 1990).

In several contributions, the authors show that the index of direct democracy appears to be a positive determinant of happiness which is robust to different estimation methods and to the inclusion of additional control variables; the coefficient of direct democracy stays significant at least at the 5% significance level throughout all these estimations. In Frey and Stutzer (2000b), it is shown that the impact of direct democracy on happiness is also positive after controlling for those five cantons in which direct democratic rights are exerted through an open vote (*Landsgemeinden*). These are the cantons for which the index of direct democracy achieves its highest values. In a variation of the aforementioned approach, a regression excluding these cantons is carried out which results in the same positive finding for direct legislative rights (Stutzer and Frey 2000, footnote 18). As Stutzer and Frey (2000) show, the impact of the existence of direct democracy is also robust after controlling for measures of the actual use of the direct democratic institutions, proxied by the number of cantonal referenda. Moreover, the inclusion of interaction variables between dummies for personal characteristics and the index of direct democracy reveals that the gains in well-being are quite evenly distributed among different socioeconomic groups[15]. In Frey and Stutzer (2000, p. 927), the problem of causality concerning direct democracy is addressed through economic historical reasoning.

In their most recent contribution to the analysis of direct democracy and life satisfaction in Switzerland, Stutzer and Frey (2003) focus on procedural utility. They hypothesize that the direct democratic institutions create procedural utility for the Swiss citizens who have the right to vote, but not for foreigners who do not have these political rights. When estimating the determinants of happiness separately for both Swiss citizens and foreign residents, Stutzer and Frey find that the impact of direct democracy on happiness is indeed larger for Swiss citizens, a result that is interpreted as evidence for the existence of a considerable extent of procedural utility that can be derived from the direct democratic institutions.[16]

3 New estimates for Switzerland

We re-estimate the Frey and Stutzer (2000) model but go beyond their approach in several respects. First, we control for various aspects of 'culture', namely individual and cantonal language as well as individual religion. Furthermore, following the literature mentioned in the introduction, we do not look at the effect of (absolute) personal income but rather focus on the impact of the relative income position of the individual. Finally, while we replicate the results obtained by Frey and Stutzer with the Leu (1997) dataset, we also analyze new data from the Swiss Household Panel (SHP). The SHP is a longitudinal panel survey whose data are gathered annually using computer-assisted telephone interviewing (CATI). For the

[15] See Frey and Stutzer (2000), and Frey and Stutzer (2000b) regarding the poor. This statement, however, does not apply to foreigners (Stutzer and Frey 2003). See also footnotes 16, and 34.

[16] Analogous findings are obtained for the 'belief in having political influence', using the first wave of the SHP (1999) by including an interaction term between the index of direct democracy and being a foreigner.

first wave in autumn 1999, a representative sample of about 5,000 households from the Swiss population was drawn. For 2002, the sample size contained about 3,600 households[17] with a total of about 7,500 persons eligible for interview.[18] According to the Swiss Household Panel data providers, from 2000 to 2002 the individual net response rate varied between 84% and 89% (Budowski and Scherpenzeel 2004). As the information on life satisfaction is only available from the 2000 wave on, our analysis is restricted to the waves 2000–2002.

To make this analysis comparable with the Frey and Stutzer (2000) study, we restrict the sample to individuals older than 20. We also eliminate observations with missing values in the control variables like occupational status, age, or family type, as well as disability status. Once missing income variables in one wave are replaced by values in the previous or subsequent wave(s), and negative income values are set to zero, the number of remaining observations in the panel declines from the potential maximum of about 22,500 observations (all eligible persons observed over 3 years) to about 16,000 observations actually used.

The dependent variable depicting individual well-being is derived from a question on general life satisfaction whose exact wording is as follows:

> *In general, how satisfied are you with your life if 0 means 'not at all satisfied' and 10 means 'completely satisfied'?*

To be able to compare the results with those of Frey and Stutzer (2000), who use data of 1992, we make the following adjustments: we aggregate the four lowest categories (0, 1, 2, 3) into a single category, which also helps to avoid inference problems caused by too few observations. In addition, we deflate the income data of the SHP using the year 1992 as base year. To control for other factors besides income, we use an identical set of explanatory variables as Frey and Stutzer (2000) and also include year dummies. Extending their original model, however, we also employ dichotomous variables for various religious denominations and for poor health. Tables A7 and A8 of the Appendix provide descriptions and summary statistics of the variables whose construction is based on the SHP.[19] To estimate the model, we use an unweighted random-effects ordered probit model, thereby allowing for individual heterogeneity in the structure of the error term.[20] An approach using individual fixed effects was not deemed appropriate because of the time invariance of the institutional variable of interest; furthermore, with only three time periods, a fixed effects ordered probit estimation would have yielded severely biased coefficients (Greene 2004).

As is common in such studies, language proxies for ethnic background that constitutes an important time-invariant dimension of culture. Culture at the cantonal level is represented by the dominant ethnicity, measured by the language of the majority, which may be

[17] The number of participating households was 4,532 in 2000, and 4,314 in 2001 (Budowski and Scherpenzeel 2004).

[18] Only persons aged 15 or above were eligible for interview. In 2002, to about 550 persons the life satisfaction question was not applicable. About 1,300 individuals could not be reached or deliberately refused to answer. Finally, 5,600 persons' answers were recorded.

[19] For summary statistics for the variables of the LEU data set, see e.g., Frey and Stutzer (2000a). The distribution of the observations of the life satisfaction variable and descriptive statistics of the index of direct democracy are given in Tables A1 and A3 of the Appendix.

[20] The calculations have been performed by using the reoprob command in Stata, Version 9.1 (see for this Frechette 2001, 2001a). Points for the Gaussian–Hermite quadrature approximation are set at 30. Since the three waves are each representative for Switzerland, estimation without weights seemed appropriate. The reoprob command does not allow clustering at the aggregate level.

a decisive covariate because it can, to a rather large degree, 'explain' the level of direct democracy, as discussed before. This means that cantonal culture proxied by the dominant ethnic group might shape the very political institutions at the centre of this analysis.[21] Because there are three language regions in Switzerland, two corresponding dichotomous variables for 'French' and 'Italian' are used, while 'German' serves as base category. Similar arguments hold for local culture, proxied by the dominating language of the local community, but corresponding data are only available in the LEU dataset. As discussed in the introduction, it may equally be important to control for culture (i.e., ethnicity) at the individual level because the perception of the benefits of democratic institutions or what contributes to personal satisfaction may vary with individual cultural background. Because of the high percentage of foreigners in Switzerland (about 20%) and increasing mobility across language regions, the personal cultural background is frequently different from the dominant culture within a canton or local community. For the analysis of the SHP data, we thus use the language spoken in the family, indicated by the language of the household questionnaire, as the main variable representing the personal cultural background. As the corresponding information is not contained in the LEU data set, we use the dominant language of the local community as the second cultural variable for this analysis.

Another possible variable to constitute a time-invariant dimension of culture is religion. In Switzerland, both the German- and French-speaking parts are divided into regions with large majorities of either Catholic or Protestant populations. Thus, religion and language are not highly correlated. To account for religious denominations in the LEU data, we use a dichotomous variable indicating whether an individual pays church taxes or not. The SHP data allow us to control for several individual religious denominations. We include dummies for following a 'Protestant', 'Catholic', 'Christ-Catholic', 'other Christian' belief, and also 'no religion', with 'other/non-Christian denominations' forming the reference group.

Recent empirical analyses of happiness have shown that income comparisons are an important, but often neglected, determinant of subjective well-being (e.g., Ferrer-i-Carbonell 2005).[22] To take the importance of relative income position into account, we use the difference between actual individual income and cantonal subsistence income ($y-Y$), which is here defined as 40% of the average income in the respective canton[23]. To allow for the likely nonlinearity of the income effect, we include the squares of these differences

[21] An OLS regression of the index of direct democracy for the year 2000 on the three cantonal language variables yields the following result

$$\underset{}{\text{DEMO}} = \underset{(4.72)}{4.716\ \text{German}} + \underset{(2.75)}{2.753\ \text{French}} + \underset{(2.25)}{2.250\ \text{Italian}} + \hat{u},$$

with $R^2 = 0.612$ and 23 degrees of freedom. (The numbers in parentheses are the estimated t-statistics.)

[22] The high correlation between individual absolute and relative income impedes their simultaneous inclusion in one model. A comparison of two alternative models, one based on absolute income only, and one based on relative income only, led to no unequivocal preference of one over the other (based on their loglikelihood values). We present here the results for the model based on relative income.

[23] These values are comparable to the official cantonal subsistence level recommended biannually by the Swiss Conference for Social Assistance (SKOS). See also SKOS (2000). Testing alternative specifications, with, first, 60% of cantonal mean income, and, second, cantonal mean income as reference income, yields no substantial differences with respect to the impact of direct democracy and the cultural variables. Estimation results are available upon request.

calculated separately for positive and negative differences ((y−Y)^2 if y≥Y, 0 otherwise, and analogously for y<Y). Assuming a positive but decreasing marginal utility of income, we expect a positive sign for the relative income and a negative sign for the squared (positive) income difference.

Following the Hendry approach, we start with the comprehensive model, for both of whose datasets ordered probit estimates are given in Table A2 of the Appendix. For the SHP data, we show the results for the unbalanced and balanced panels.[24] For the LEU dataset, we present the results of weighted estimates that take into account the oversampling, as well as (unweighted) estimates for the smaller representative sample. In all models, the squared income variable for those below the cantonal reference income does not prove significant.[25] Therefore, this variable is deleted from the final model specification. In all estimations most of the variables controlling for religious denominations are not significant so that we have excluded them from presentation in the (reduced) result tables.[26] The subsequent discussion of the empirical outcome is restricted to the unbalanced panel analysis of the SHP and the full LEU dataset.

Table 1a shows the results of the models with the SHP data.[27] If no language variables are included, the index of direct popular rights has a significant positive impact as in the models of Frey and Stutzer. However, as soon as cantonal language is taken into account, the significance drops to the 10% level (model (2)), and the democracy index is no longer significant at any conventional significance level once household languages are controlled for (models (3) and (4)). The descriptive statistics of the direct democracy index, including its dispersion within cantonal and household culture, is provided in Table A3 of the Appendix. A corresponding analysis of variance shows that the variance of the democracy variable varies mainly between and not within the three language groups.[28] It is thus not surprising that the significant effect of the index of direct popular rights on happiness is not robust to the inclusion of language variables in the regression equation.

The language variables in model (2) indicate that people in French- and Italian-speaking cantons are c.p. significantly less satisfied with their lives than German-speaking persons. This result is in line with Dorn et al. (2006) who find that in countries with Romance languages self-reported happiness is significantly lower than in countries where German is the main language. Model (3) shows that the difference in subjective well-being between French- and Italian-speakers on the one hand and German-speakers on the other hand is more pronounced when family language is controlled for. The continuous decline in significance level of direct democracy between models (1) and (3) from the .1% level down to

[24] Similar results are obtained when the model is estimated for the three waves of the SHP separately (see Fischer 2005). Additionally, testing for various functional forms of the index of direct democracy does not reveal a considerably significant effect when culture is controlled for.

[25] This observation holds equally if reference income is defined as 60% of cantonal average earnings. In contrast, using mean cantonal income, the term for those below this benchmark becomes equally significant. No changes however, are observed for the cultural variables and the index of direct democracy. Results are available upon request.

[26] Only persons with 'other Christian denominations' report significantly higher levels of well-being (significance at the 5% level) compared to persons with 'other/non-Christian denominations', the reference group. This result contrasts the findings by Ferriss (2002). See Table A2 of the Appendix for details.

[27] We only present the results for the relevant variables. The complete results can be received from the authors upon request.

[28] 61.3% of the variance of the index of direct democracy is between and only 38.7% is within the three language groups. Even if the French- and Italian-speaking cantons are considered as one language group, we still get 60.6% between and only 39.4% of the variance within the groups.

Table 1a Personal subjective well-being in Switzerland, 2000–2002

SHP data, unbalanced panel, 16,367 observations, Ordered Probit

	Basic model (1)	Model including cantonal language (2)	Model including household language (3)	Model including cantonal and household language (4)
Direct democracy	0.094***	0.035(*)	0.027	0.029
	(6.60)	(1.75)	(1.46)	(1.40)
Relative income	0.049***	0.049***	0.048***	0.048***
	(6.63)	(6.56)	(6.49)	(6.48)
Income above subsistence level squared	−0.001***	−0.001***	−0.001***	−0.001***
	(4.68)	(4.64)	(4.59)	(4.58)
French-speaking canton		−0.209***		−0.057
		(4.17)		(0.70)
Italian-speaking canton		−0.172(*)		0.124
		(1.91)		(0.91)
French-speaking family			−0.248***	−0.196*
			(5.21)	(2.50)
Italian-speaking family			−0.273***	−0.362**
			(3.51)	(3.07)
Log of likelihood	−24,290.860	−24,282.157	−24,275.728	−24,274.948
Adjusted Mac Fadden's R^2	0.0201	0.0204	0.0207	0.0206
		Wald tests		
Joint significance of cantonal language variables		17.40***		1.56
Joint significance of family language variables			30.27***	14.42***
Joint significance of democracy and cantonal language variables		60.96***		3.68
Joint significance of democracy and family language variables			73.84***	17.49***
Joint significance of democracy and all language variables				75.39***

The numbers in parentheses are the absolute values of the z-statistics of the estimated parameters. '***', '**', '*' or '(*)' show that the corresponding null hypothesis can be rejected at the 0.1, 1, 5, or 10 percent level, respectively. The Wald tests are χ^2 with 1, 2, 3, or 5 degrees of freedom, respectively.

Table 1b Personal subjective well-being in Switzerland, 1992

LEU data, full cross section, 6,127 observations, Ordered Probit

	Basic model (5)	Model including cantonal culture (6)	Model including local culture (7)	Model including cantonal and local culture (8)
Direct democracy	0.074**	0.052(*)	0.041	0.044(*)
	(2.74)	(1.95)	(1.57)	(1.76)
Relative income	0.023**	0.023**	0.023**	0.023**
	(2.69)	(2.72)	(2.71)	(2.72)
Income above subsistence level squared	−0.001***	−0.001***	−0.001***	−0.001***
	(3.36)	(3.54)	(3.50)	(3.55)
French-speaking canton		−0.148*		(0.02)
		(2.14)		
Italian-speaking canton		0.248**		0.481***
		(3.07)		(3.30)
French-speaking local community			−0.189***	−0.179
			(3.82)	(1.29)
Italian-speaking local community			0.201**	−0.257**
			(2.57)	(2.85)
Log of likelihood	−10,033.054	−10,016.273	−10,014.360	−10,013.677
Adjusted Mac Fadden's R^2	0.0393	0.0407	0.0409	0.0408
		Wald tests		
Joint significance of cantonal language variables		74.15***		13.63**
Joint significance of local language variables			115.67***	8.67*
Joint significance of democracy and cantonal language variables		74.19***		14.05**
Joint significance of democracy and local language variables			115.67***	9.23*
Joint significance of democracy and all language variables				177.42***

The numbers in parentheses are the absolute values of the z-statistics of the estimated parameters. '***', '**', '*' or '(*)' show that the corresponding null hypothesis can be rejected at the 0.1, 1, 5, or 10 percent level, respectively. The Wald tests are χ^2 with 1, 2, 3, or 5 degrees of freedom, respectively. Full LEU sample has been estimated with individual weights. Robust standard errors obtained through clustering of cantons.

insignificance suggests that individual culture is a more relevant determinant of well-being than cantonal culture. The results of regression (4) support this view as the cantonal language variables lose their significance when family language is included in the model. This interpretation is in line with the Wald tests which confirm the dominance of the individual language variables over the cantonal language variables.

With regard to the income variables, relative income is always highly significant. This finding lends support to the view that relative income matters. On the other hand, the coefficient of the squared relative income term is—as expected—always negative and statistically significant. This result is clear evidence for decreasing marginal utility of income.[29]

It is useful to compare the new results obtained using SHP data with corresponding results based on the LEU dataset. These results are reported in Table 1b.[30] The effect of direct democracy on happiness is somewhat more robust in this dataset. However, the coefficient of the index of direct democracy again notably decreases once language variables are included in the estimation. In particular, the results of models (6) and (7) confirm the previous finding that the closer the unit to the individual level for which language can be controlled for, the more sizeable the decrease of coefficient value and significance level of the democracy variable is. Unfortunately, however, the LEU data does not allow us to define language variables at the family level, which proved to be the most appropriate way to control for individual culture in the analysis using the SHP data. This shortcoming affects particularly the estimation of model (8) which includes both sets of cultural variables. The cantonal and community language variables are highly correlated especially since almost all Italian-speaking communities pertain to the same canton. The results of models (7) and (8), which both employ communal language variables, should hence be interpreted with some caution.[31]

A difference between the two data sets is found with regard to the Italian language variables. While the coefficients for Italian-speaking canton and communities or families are negative in the estimations with the SHP data, positive coefficients result with the LEU data. Nonetheless, when comparing the two dominating language groups, German-speakers and French-speakers, persons of the latter always report lower well-being throughout all estimations and using both datasets.

With regard to the income variables, the estimates based on the LEU data do not differ from the previous results using SHP data. In these models, subjective well-being rises significantly with a growing distance of one's actual income to the cantonal subsistence level. As in the SHP dataset, we also find decreasing marginal utility of income.[32]

[29] Testing cantonal mean income as reference income, a breakdown of the significance for direct democracy is already observed in model (2), when cantonal culture measures are included.

[30] Model (5) roughly corresponds to the second equation in Frey and Stutzer (2000, Table 2, p. 927) since variables for health status and religious denomination have been added and income has been differently accounted for. Using the same specification, we were able to exactly replicate their results (see Table A4 of the Appendix). Thus, differences between their results and model (5) are due to these alterations.

[31] 'Being a foreigner' could be considered a cultural variable. Although it is included in the baseline model and its negative coefficient is reported in Appendix Table A2, it is too undifferentiated to measure a particular cultural background. Using information on the type of residence permit, we could show that having lived in Switzerland longer than 5 years (permit type C) exerts no differential impact on one's perception of direct democracy's benefits (see Table A6).

[32] Again, testing a similar model with alternative definitions of comparison income shows that direct democracy does not add to the joint significance of the cantonal or communal cultural variables.

In a next step, we split the datasets and conduct separate estimations for German- and French-speaking cantons, communities, and families (Table 2).[33] These differentiated results suggest that the beneficial impact of direct democracy on happiness is negligibly small in all German subsamples, but somewhat larger in the French subsamples. Using either data, the democracy variable is only significant for individuals in French-speaking cantons, but not for cantons whose majority language is German. However, splitting the SHP data according to individual languages shows no significant impact of the degree of direct democracy in any subpopulation.[34] Similarly, in the LEU dataset, direct democracy exerts no significant impact on personal well-being in either German- or French-speaking local communes. While these findings suggest that direct democracy is conducive to well-being in the six French cantons, the main result is that no robust significant impact of democracy can be observed when splitting the sample according to individual or local languages.[35]

In summary, the two datasets yield quite similar, but not fully identical findings with regard to the effect of democracy and culture (ethnicity) on well-being. When regressing a measure of subjective well-being on a rich set of covariates, the coefficient of the direct democracy variable is positive throughout all estimations presented in this paper. This result seems to lend support to our hypothesis. However, irrespective of the data source, the significance of the democracy effect is strongly reduced once language variables are included in the vector of covariates. In the model specifications where language is measured at the most disaggregate level possible, i.e., family language in case of the SHP data and community language in case of the LEU data, the null hypothesis that direct democracy has no impact on well-being can no longer be rejected even at the ten percent level. A further result common to both datasets is that individuals in French-speaking cantons, communities and families tend to be consistently less satisfied compared to their German-speaking counterparts. For the small Italian-speaking portion of the population, which is mainly concentrated in a single canton, results are ambiguous across the two data sets. In contrast, with regard to the income variables, there is no substantial difference between the two datasets or population groups. Overall, the respective findings show that relative income is significantly conducive to subjective well-being, with decreasing marginal effects.

[33] Estimating separate equations for Italian culture is not possible as there is only one canton, *Tessin (Ticino)*, in which the main language is Italian, rendering the institution invariant. Moreover, because most Italian-speaking Swiss people live in this canton, the equation for the subsample with Italian family culture is also dropped.

[34] Perception of life satisfaction and beneficial impacts of direct democracy might well be different for members of a minority in a alien cultural environment or depend on the extent to which one has adapted to the majority culture. Most of the estimation results in Table A5 of the Appendix, particularly those obtained with the full LEU sample, lend support to the view that the assessment of life satisfaction in the language-specific subsamples is not driven by the main culture of one's environment. Moreover, the results in Table A6 of the Appendix clearly show that only Swiss residents profit from direct democracy (not controlling for individual culture), while the life satisfaction of foreigners, independent of their duration of stay, is never positively affected.

[35] Testing the differential impact of direct democracy depending on the cultural background by interacting it with the cultural variables assumes that all remaining determinants of life satisfaction exert an identical influence across cultures. For this reason, splitting the dataset by cantonal or individual culture is the preferred method as it allows all remaining factors to equally exert differential impacts. Testing alternative models with different definitions of camparison income, for both datasets, we are able to corroborate the significant positive impact of direct democracy in French-speaking cantons.

Table 2 Results for different population groups

	German-speaking cantons	French-speaking cantons	German-speaking families	French-speaking families
	SHP data 2000–2002, unbalanced panel			
Direct democracy	0.017 (0.79)	0.205*** (3.41)	0.022 (1.05)	0.085 (1.63)
Relative income	0.038*** (4.15)	0.102*** (6.86)	0.038*** (4.19)	0.102*** (6.80)
Income above subsistence level squared	−0.001*** (3.63)	−0.001*** (4.08)	−0.001*** (3.67)	−0.001*** (4.07)
Log of likelihood	−15,955.975	−7,051.780	−15,694.591	−7,024.038
Number of observations	10,995	4,625	10,853	4,624
Adjusted Mac Fadden's R^2	0.0193	0.0229	0.0189	0.0234
	German-speaking cantons	French-speaking cantons	German-speaking community	French-speaking community
	LEU data, 1992			
Direct democracy	0.031 (1.15)	0.120* (2.13)	0.039 (1.31)	0.062 (1.23)
Relative income	0.023* (2.27)	0.057(*) (1.65)	0.024* (2.30)	0.058(*) (1.74)
Income above subsistence level squared	−0.001*** (3.53)	−0.003*** (3.19)	−0.001*** (3.50)	−0.003** (3.15)
Log of likelihood	−7,109.859	−2,399.429	−7,202.897	−2,295.106
Adjusted Mac Fadden's R^2	0.0371	0.0321	0.0372	0.0289
Number of observations	4,466	1,378	4,531	1,308

The numbers in parentheses are the absolute values of the z-statistics of the estimated parameters. '***', '**', '*' or '(*)' show that the estimated parameter is significantly different from zero at the 0.1, 1, 5, or 10 percent level, respectively. The Wald tests are χ^2 with 1 degree of freedom. See also Tables 1a and 1b.

The question remains as to why the reported differences for the direct democracy variable between the two datasets exist. There are at least two possible reasons. One is that the weighting procedure in the Leu data does not really produce a representative sample. This presumption is supported by the fact that estimations with a reduced, but representative sub-sample of the Leu data in place of the full Leu data with some oversampled population groups but corrective weights yield significance levels of the estimated coefficients of direct democracy which are clearly no longer above those obtained with SHP data (Table A2 of the Appendix). A second possible reason is that the perception of the Swiss population with respect to their valuation of the benefits of direct democracy could have slightly changed between 1992, when the Leu data were collected, and the years 2000 to 2002, as represented by the SHP data. In any case, as mentioned earlier, the failure to find a significant impact of direct popular rights on personal well-being in these Swiss microdata does not necessarily imply that, in Switzerland, the extent of direct democracy has no effect on life satisfaction at all. However, conditioned on culture, the intercantonal variation in democracy levels might simply not be sufficiently large in order to create a clearly measurable impact on overall life satisfaction.

4 Summary and concluding remarks

In this paper, we re-assess the impact of direct democracy on subjective well-being in Switzerland. Previous studies by Frey and Stutzer (2000, 2000b) based on cross-section data from 1992 find the striking result that a higher degree of cantonal direct democracy significantly increases happiness. Our study goes beyond their contributions by analyzing new panel data from the Swiss Household Panel. In addition, by including variables for languages and religions in our regression equations, we control for cultural determinants of life satisfaction, which might be particularly relevant in a culturally diverse country like Switzerland.

Results obtained with both the Swiss Household Panel data and the Leu cross-section data previously used by Frey and Stutzer show that culture as measured by languages has a sizable and significant impact on subjective well-being. With regard to cultural background, it appears that French-speaking individuals are clearly less satisfied with their lives than those speaking German, while results for the Italian-speaking population are ambiguous, depending on the data source. Religious denominations, however, do not significantly impact individual well-being, while relative income contributes positively to people's life satisfaction, in line with previous happiness literature. In addition, in this study we detect a decreasing marginal utility of personal income.

The main result of this study is that once we control for languages at the individual level, the measured impact of cantonal direct democracy on life satisfaction is no longer statistically significant at conventional levels.[36] Thus, contrasting previous analyses for Switzerland, we cannot robustly confirm the hypothesis that higher levels of direct democracy will, *ceteris paribus*, lead to policies that correspond more closely to voters'

[36] This lack of significance in the Swiss case, however, is possibly due to the low variability of democracy levels within Switzerland. Based on a cross-national analysis with international micro-data that allows for much larger differences in democracy levels, however, we found evidence for a significant positive effect of democracy on well-being (see Dorn et al. 2006).

preferences and thus increase people's well-being. These results highlight the importance of controlling for individual cultural background when comparing measures based on self-assessments across language borders.

There are two potential explanations, suggesting paths for future research. First, political institutions might serve as a transmission channel of a country's culture. In other words, cultural values prominent in one country may determine the type of institutions which are chosen by its population. If such culture and values are transmitted over generations, and newcomers become fully integrated, then preferences of the population remain stable over time. In consequence, existing political institutions might reflect preference structures in the population not only at the time of their emergence, but also centuries later. In such a case, our results would not completely refute the Frey-Stutzer findings, but highlight the fact that although direct democracy affects life satisfaction, it mediates cultural values present in the cantonal population. For a final judgment, a solid transmission channel analysis has to be carried out.

Alternatively, our result might just show that 'life satisfaction' has different meanings in different languages. It might well be that French-speaking persons systematically report lower life satisfaction levels, and German-speaking persons higher ones. Since direct democracy is systematically lower in French-speaking cantons than in German-speaking cantons, the degree of citizen empowerment might capture a mere language effect, and the correlation between institutions and well-being in Frey and Stutzer (2000) might be spurious. These conjectures call for an analysis of subsamples defined by different personal and cantonal cultural background, which is not possible with Swiss data as Swiss people are rather immobile across the language regions.[37] Possibly, an exploitation of the variation in individual cultural background (e.g., that of immigrants) in the US might help shed more light on this issue.

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5 Appendix

Table A1 Distribution of life satisfaction in the unbalanced panel, index of direct democracy in 2000

Canton	Categories								CS	DD
	3	4	5	6	7	8	9	10		
Aargau	0.7	0.7	3.4	2.9	15.9	37.4	19.7	19.3	8.34	5.46
Appenzell Innerrhoden	0.0	0.0	20.0	20.0	40.0	20.0	0.0	0.0	0.03	5.44

[37] See footnote 6.

Table A1 continued

Canton	Categories								CS	DD
	3	4	5	6	7	8	9	10		
Appenzell Ausserrhoden	0.0	0.8	3.8	3.8	19.1	35.1	19.1	18.3	0.8	5.50
Bern	0.4	0.5	3.7	2.8	14.8	40.3	17.9	19.7	11.46	3.02
Basel-Stadt	1.1	1.8	5.0	2.8	12.5	38.9	17.7	20.3	2.8	4.40
Basel-Landschaft	1.1	1.8	5.0	2.8	12.5	38.9	17.7	20.3	3.27	5.48
Freiburg	0.5	1.2	6.7	5.8	18.4	36.1	16.2	15.2	4.03	2.79
Genf	2.0	1.7	7.4	6.7	19.0	35.6	11.9	15.6	4.92	1.75
Glarus	1.2	1.2	7.1	2.4	15.3	29.4	12.9	30.6	0.52	5.75
Graubünden	0.3	0.0	1.7	3.0	9.6	32.6	22.6	30.2	1.84	4.83
Jura	0.0	0.0	0.0	0.0	12.5	62.5	25.0	0.0	0.05	3.71
Luzern	1.4	0.4	3.9	4.9	14.0	39.2	18.6	17.7	5.16	4.42
Neuenburg	1.9	1.0	6.7	6.1	15.2	36.8	13.7	18.7	6.43	2.19
Nidwalden	0.0	0.0	7.1	7.1	16.1	44.6	8.9	16.1	0.34	4.44
Obwalden	0.0	0.0	2.3	8.0	13.6	35.2	5.7	35.2	0.54	4.63
St. Gallen	0.7	0.4	3.3	4.0	15.1	33.7	18.9	23.9	5.52	3.46
Schaffhausen	0.6	0.6	5.1	3.9	16.0	39.7	19.2	14.7	0.95	5.21
Solothurn	0.5	1.2	3.2	3.3	16.2	38.8	19.7	17.2	3.67	5.25
Schwyz	0.8	0.0	5.0	2.5	14.5	37.6	19.4	20.3	1.48	4.93
Thurgau	0.5	0.7	5.2	3.7	16.7	38.2	19.1	15.9	2.49	4.33
Tessin	1.9	0.8	6.3	6.6	15.3	33.7	18.1	17.4	4.56	2.25
Uri	2.6	0.0	2.6	7.7	7.7	23.1	7.7	48.7	0.24	5.13
Waadt	1.6	1.2	5.2	5.0	14.0	40.9	17.0	15.2	9.46	2.42
Wallis	1.3	0.2	3.5	3.6	14.0	41.0	16.3	20.2	3.37	3.58
Zug	0.0	0.5	4.4	3.4	18.9	39.3	18.0	15.5	1.26	4.42
Zürich	0.9	0.6	3.6	4.2	15.8	37.2	18.7	19.0	16.47	3.50
Total Share	1.0	0.8	4.5	4.3	15.3	37.7	17.6	18.9		

CS is the cantonal share in observations in the unbalanced panel and DD the value of the index of direct democracy for the year 2000.

Table A2 Results for Switzerland, comprehensive model

	SHP data		LEU data	
	Balanced panel	Unbalanced panel	Full sample	Representative sample
Direct democracy	0.025	0.029	0.044(*)	0.028
	(1.04)	(1.41)	(1.78)	(1.18)
Good or average health	Reference category			
Bad health	−0.574***	−0.612***	−0.702***	−0.712***
	(15.62)	(18.92)	(16.99)	(18.99)
Age 20–29	Reference category			

Table A2 continued

	SHP data		LEU data	
	Balanced panel	Unbalanced panel	Full sample	Representative sample
Age 30–39	−0.216*** (3.38)	−0.152** (3.08)	−0.036 (0.42)	−0.097(*) (1.74)
Age 40–49	−0.172* (2.56)	−0.140** (2.71)	0.065 (0.85)	0.047 (0.75)
Age 50–59	−0.012 (0.17)	0.022 (0.41)	0.041 (0.69)	−0.026 (0.49)
Age 60–69	0.388*** (4.81)	0.417*** (6.52)	0.299*** (3.87)	0.254*** (5.59)
Age 70–79	0.441*** (4.41)	0.466*** (5.81)	0.412*** (4.66)	0.396*** (5.02)
Age 80 and older	1.188*** (7.58)	0.958*** (7.56)	0.424*** (4.67)	0.493*** (6.04)
Male	Reference category			
Female	0.192*** (4.18)	0.177*** (4.64)	0.061 (1.62)	0.070* (2.12)
Swiss	Reference category			
Foreigner	−0.190** (2.72)	−0.266*** (4.77)	−0.233*** (4.05)	−0.186*** (3.19)
Low education	Reference category			
Middle education	0.154** (2.78)	0.111* (2.45)	0.050 (1.20)	0.077** (2.99)
High education	0.199** (3.02)	0.171** (3.13)	0.041 (0.73)	0.100* (2.45)
Single woman	−0.384*** (5.71)	−0.389*** (6.72)	−0.271*** (5.50)	−0.176*** (3.79)
Single man	−0.465*** (5.98)	−0.468*** (7.11)	−0.212*** (3.54)	−0.270*** (6.39)
Couple without children	Reference category			
Couple with children	0.021 (0.45)	0.30 (0.73)	−0.140*** (3.42)	−0.076** (2.61)
Single parent	−0.512*** (5.82)	−0.455*** (6.26)	−0.372*** (3.59)	−0.346*** (3.47)
Other private household	−0.268(*) (1.93)	−0.244* (2.13)	−0.165* (2.29)	−0.167*** (3.42)
Collective household	−0.089 (0.56)	−0.217(*) (1.81)	−0.384*** (3.31)	−0.262** (2.99)
Employed	Reference category			
Self-employed	−0.049 (1.28)	−0.048 (1.39)	0.054 (1.21)	0.066(*) (1.71)
Housewife	0.152** (2.63)	0.133** (2.59)	0.134** (2.65)	0.058 (1.16)
Other employment status	0.068 (1.06)	0.089(*) (1.71)	−0.037 (0.54)	−0.054 (0.83)
Unemployed	−0.568*** (4.13)	−0.627*** (5.39)	−0.778*** (5.01)	−0.680*** (6.29)

Table A2 continued

	SHP data		LEU data	
	Balanced panel	Unbalanced panel	Full sample	Representative sample
Relative Income	0.052*** (5.75)	0.049*** (6.48)	0.029** (2.65)	0.027** (3.01)
Income above subsistence level squared	−0.001*** (4.07)	−0.001*** (4.61)	−0.001*** (3.26)	−0.001** (3.01)
Income below subsistence level squared	0.053 (0.48)	0.050 (0.49)	0.124 (1.28)	0.029 (0.35)
German-speaking canton	Reference category			
French-speaking canton	0.057 (0.60)	−0.056 (0.69)	−0.005 (0.03)	−0.067 (0.37)
Italian-speaking canton	0.396* (2.30)	0.125 (0.92)	0.480*** (3.25)	0.326** (3.15)
German-speaking household/ German-speaking local community	Reference category			
French-speaking household/ French-speaking local community	−0.254** (2.80)	−0.197* (2.51)	−0.183 (1.32)	−0.094 (0.54)
Italian-speaking household/ Italian-speaking local community	−0.539*** (3.39)	−0.362** (3.07)	−0.251** (2.77)	−0.095 (1.48)
Protestant (SHP)/ paying church taxes (LEU)	0.140 (1.44)	0.104 (1.26)	0.052 (0.95)	0.094* (2.19)
Catholic (SHP)	0.050 (0.51)	0.041 (0.50)		
Christ-catholic (SHP)	0.116 (0.88)	0.080 (0.71)		
Other Christian religion (SHP)	0.233* (2.08)	0.193* (1.97)		
Other denomination/ Jewish / Muslim (SHP) / not paying church taxes (LEU)	Reference category			
No religion (SHP)	−0.043 (0.42)	−0.068 (0.77)		
Dummy for the year 2000	0.253*** (10.40)	0.253*** (11.36)		
Dummy for the year 2001	0.124*** (5.16)	0.111*** (5.04)		
Dummy for the year 2002	Reference year			
Number of observations	12,537	16,367	6,127	5,107
Log of likelihood	−18,100.287	−24,274.830	−10,011.887	−8,535.529
Rho	0.526***	0.539***		
Adjusted Mac Fadden's R^2	0.0192	0.0206	0.0409	0.0363

The numbers in parentheses are the absolute values of the z-values of the estimated parameters. '***', '**', '*' or '(*)' show that the estimated parameter is significantly different from zero at the 0.1, 1, 5, or 10 percent level, respectively. Controls for the type (and size of) of commune are included but not reported. Full LEU sample has been estimated with individual weights, and both LEU samples also with robust standard errors obtained through clustering of cantons.

Table A3 Descriptive statistics of the index of direct democracy, unbalanced panel, averaged over 2000 until 2002

	Mean	Standard deviation	Median	Minimum	Maximum
All cantons	3.60	1.13	3.50	1.75	5.75
German-speaking cantons	4.16	0.90	4.33	3.02	5.75
French-speaking cantons	2.48	0.52	2.42	1.75	3.71
Italian-speaking canton	2.25	0.00	2.25	2.25	2.25
French- or Italian-speaking cantons	2.45	0.49	2.42	1.75	3.71
German-speaking families	4.13	0.92	3.58	1.75	5.75
French-speaking families	2.50	0.58	2.42	1.75	5.48
Italian-speaking families	2.74	0.99	2.25	1.75	5.75
French- or Italian-speaking families	2.54	0.67	2.42	1.75	5.75

Table A4 Replication of the EJ 2000 specification: the impact of direct democracy on well-being

	SHP data		LEU data	
	Balanced panel [12,537]	Unbalanced panel [16,367]	Full sample [6,134]	Representative sample [5,113]
Basic model (1)	0.067*** (3.88)	0.089*** (6.11)	0.083** (3.05)	0.072* (2.60)
Model including cantonal language (2)	0.026 (1.09)	0.026 (1.27)	0.057* (2.11)	0.039 (1.51)
Model including household/community language (3)	0.003 (0.12)	0.020 (1.04)	0.043 (1.51)	0.037 (1.16)
Model including cantonal and household/community language (4)	0.017 (0.70)	0.020 (0.98)	0.049(*) (1.88)	0.034 (1.28)

Number of observations is given in square parentheses, absolute values of the z-statistics below the coefficient. Only coefficients of direct democracy variable are reported. '***', '**', '*' or '(*)' show that the corresponding null hypothesis can be rejected at the 0.1, 1, 5, or 10 percent level, respectively.

Table A5 Results for different population groups II

	German-speaking cantons	French-speaking cantons	German-speaking families	French-speaking families
	SHP data 2000–2002, unbalanced panel			
Direct democracy	0.009 (0.38)	0.192** (3.12)	0.013 (0.60)	0.099(*) (1.74)
Different language spoken in family or canton	−0.270* (2.36)	0.106 (0.92)	−0.103 (0.88)	−0.080 (0.63)
Relative Income	0.036*** (3.95)	0.102*** (6.88)	0.038*** (4.15)	0.102*** (6.77)
Income above subsistence level squared	−0.001*** (3.48)	−0.001*** (4.09)	−0.001*** (3.64)	−0.001*** (4.05)
Log of likelihood	−15,569.174	−7,047.2432	−15,606.775	−7,007.9593
Number of observations	10,787	4,622	10,798	4,611
Adjusted Mac Fadden's R^2	0.0191	0.0228	0.0189	0.0234
	German-speaking cantons	French-speaking cantons	German-speaking community	French-speaking community
	LEU data, 1992, full sample			
Direct democracy	0.030 (1.10)	0.089(*) (1.79)	0.041 (1.51)	0.061 (1.13)
Different language spoken in family or canton	−0.054 (1.52)	0.282 (1.39)	−0.032 (0.16)	−0.006 (0.05)
Relative Income	0.023* (2.27)	0.059(*) (1.72)	0.024* (2.31)	0.058(*) (1.73)
Income above subsistence level squared	−0.001*** (3.53)	−0.003*** (3.27)	−0.001*** (3.50)	−0.003** (3.14)
Log of likelihood	−7,103.496	−2,396.516	−7,202.8545	−2,295.1049

Table A5 continued

	German-speaking cantons	French-speaking cantons	German-speaking families	French-speaking families
Number of observations	4,461	1,378	4,531	1,308
Adjusted Mac Fadden's R^2	0.0367	0.0329	0.0370	0.0285

The numbers in parentheses are the absolute values of the z-statistics of the estimated parameters. '***', '**', '*' or '(*)' show that the estimated parameter is significantly different from zero at the 0.1, 1, 5, or 10 percent level, respectively. The Wald tests are χ^2 with 1 degree of freedom. See also Tables 1a and b. Italian-speaking persons, persons residing in Italian-speaking communities or in Ticino (288 observations) have been excluded from the analysis. If the dominating language in the sample is French, the 'different language' variable refers to German, and vice versa.

Table A6 Results by residence status

	Swiss residents	Foreign residents	Foreign residents with non-C permit	Foreign residents with C permit
	SHP data 2000–2002, unbalanced panel			
Direct democracy	0.043*	−0.291	−0.094	0.027
	(2.02)	(0.43)	(0.92)	(0.37)
Relative Income	0.052***	0.103***	0.162***	0.072*
	(6.53)	(3.36)	(3.27)	(1.99)
Income above subsistence level squared	−0.001***	−0.001**	−0.002**	−0.000
	(5.03)	(2.57)	(2.85)	(0.21)
French-speaking canton	−0.212***	−0.252	−0.476(*)	−0.030
	(4.02)	(1.53)	(1.91)	(0.17)
Italian-speaking canton	−0.124	−0.551*	−0.388	−0.419
	(1.29)	(2.26)	(1.12)	(1.56)
Log of likelihood	−21,622.266	−2,615.740	−843.886	−1,748.259
Number of observations	14,757	1,610	541	1,069
Adjusted Mac Fadden's R^2	0.0195	0.0105	0.0108	0.0115
	Swiss residents	Foreign residents	Foreign residents living > 13 years	Foreign residents with C permit
	LEU data, 1992			
Direct democracy	0.058(*)	0.067	0.020	0.098
	(1.67)	(0.76)	(0.23)	(1.01)
Relative Income	0.019(*)	0.083	0.116	0.096
	(1.89)	(0.99)	(1.33)	(1.02)
Income above subsistence level squared	−0.000**	−0.003	−0.005	−0.005
	(3.03)	(0.26)	(0.32)	(0.44)
French-speaking canton	−0.195*	0.043	−0.127	0.066
	(2.52)	(0.15)	(0.48)	(0.22)
Italian-speaking canton	0.183*	0.400	0.167	0.476
	(2.09)	(1.33)	(0.52)	(1.50)

Table A6 continued

	Swiss residents	Foreign residents	Foreign residents with non-C permit	Foreign residents with C permit
Log of likelihood	−8,604.044	−1,299.590	−832.557	−1,120.870
Number of observations	5,384	743	471	643
Adjusted Mac Fadden's R^2	0.0342	0.0316	0.0199	0.0271

The numbers in parentheses are the absolute values of the z-statistics of the estimated parameters. '***', '**', '*' or '(*)' show that the estimated parameter is significantly different from zero at the 0.1, 1, 5, or 10 percent level, respectively. See also Tables 1a and 1b. A Swiss C permit allows permanent residence, while other types of permits (mostly B) restrict duration of residence to up to 5 years. In the LEU-data, the small number of foreigners with duration of residence < 13 years did not allow a separate analysis for this sample.

Table A7 Description of the variables from the Swiss Household Panel

Variable	Definition	Based on/Source
Life satisfaction	8 categories, with the original categories 0, 1,2, and 3 forming the lowest	p0Xc44
Bad health	1 if subjective state of health is not good, 0 otherwise	1 if P0Xc01 > =3
Age	Year of interview—birth year of interviewee	200X—birth year
Age 30–39	1 if age is between 30 and 39, 0 otherwise	
Age 40–49	1 if age is between 40 and 49, 0 otherwise	
Age 50–59	1 if age is between 50 and 59, 0 otherwise	
Age 60–69	1 if age is between 60 and 69, 0 otherwise	
Age 70–79	1 if age is between 70 and 79, 0 otherwise	
Age 80 and older	1 if age is older than 80, 0 otherwise	
Female	1 if person is female, 0 otherwise	sex = 2
Foreigner	1 if person is foreigner, 0 otherwise (single, double or triple citizenship)	nat_1_X, nat_2_X, and nat_3_X
Middle education	1 if person completed secondary II education, 0 otherwise	educat0X = 4, 5, 6, or 8
High education	1 if person completed a tertiary education (university, university of applied science, Higher Master Craftsman's Diploma)	educat0X = 7, 9, 10
Single woman	1 if a single is female, 0 otherwise	Single = 1 & Sex = 2
Single man	1 if a single is male, 0 otherwise	Single = 1 & Sex = 1
Single	1 if a person lives alone without children, 0 otherwise	hldtyp0X = 1, 2 or 3
Couple with children	1 if an unmarried couple with children lives in the same household, 0 otherwise	hldtyp0X = 8, 9, 10 or 11
Collective household	1 if household is a collective household, 0 otherwise	hldtyp0X = 13
Other private household		
Self-employed	1 if a person is self-employed or employed in own company, 0 otherwise	p0Xw29 = 3 or 4 & (unemployed = 1, housewife = 1, or occupa0X = 3, 7, 8, or 10)
Housewife	1 if person is a housewife or a houseman, 0 otherwise	occupa0X = 6
Other employment status	1 if person works in the family, is an apprentice or a student, does military service, is retired or other	1 if (self-employed = 0 & housewife = 0 & unemployed = 0 & employed = 0)
Single parent	1 if a single parent with child(ren) lives in this household, 0 otherwise	hldtyp0X = 4 or 5
Unemployed	1 if person is unemployed and either officially recorded or not, 0 otherwise	occupa0X = 9

Table A7 continued

Variable	Definition	Based on/Source
Income	Monthly net income of the household, deflated to the reference year 1993 with the GDP deflator, divided by the equivalence scale of the Swiss Conference for Public Assistance.	i0Xeqsn/12*inflation index
Direct democratic rights	Index of direct democracy of the year of interview	Own calculations, based on Stutzer (1999)
French, Italian or German household language	Interview language of household questionnaire	hlingu0X (1 = French, 2 = German, 3 = Italian)
Protestant	1 if person is a Protestant, 0 otherwise	p0Xr01 = 1
Catholic	1 if person is a Catholic, 0 otherwise	p0Xr01 = 2
Christian Catholic	1 if person is a Christian Catholic, 0 otherwise	p0Xr01 = 3
Other Christian denomination	1 if person has another Christian denomination, 0 otherwise	p0Xr01 = 4
No denomination	1 if person has no official denomination or religion, 0 otherwise	p0Xr01 = 8

X stands for the year in which the person or household was interviewed (X = 0, 1, or 2, i.e., 2000, 2001 or 2002), p for personal and h for household questionnaire. Detailed information on the nomenclature used in the SHP surveys can be found at www.swisspanel.ch/shpdata/var_nom.php?lang=en&pid=25 (18.02.2005).

Table A8 Descriptive statistics for the Swiss Household Panel (unbalanced)

Variable	Mean	Std.dev.	Min	Max
Life satisfaction	8.10	1.42	3	10
Direct democracy	3.60	1.13	1.75	5.75
Bad health	0.15	0.35	0	1
Age 30–39	0.24	0.43	0	1
Age 40–49	0.24	0.42	0	1
Age 50–59	0.18	0.39	0	1
Age 60–69	0.12	0.32	0	1
Age 70–79	0.07	0.25	0	1
Age 80 and older	0.02	0.13	0	1
Female	0.56	0.50	0	1
Foreigner	0.10	0.30	0	1
Middle education	0.59	0.49	0	1
High education	0.24	0.42	0	1
Single woman	0.11	0.31	0	1
Single man	0.07	0.25	0	1
Couple with children	0.46	0.50	0	1
Single parent	0.05	0.22	0	1
Other private household	0.02	0.12	0	1
Collective household	0.01	0.11	0	1
Self-employed	0.15	0.36	0	1

Table A8 continued

Variable	Mean	Std.dev.	Min	Max
Housewife	0.12	0.33	0	1
Other employment status	0.21	0.41	0	1
Unemployed	0.01	0.10	0	1
Relative Income	2.62	3.19	−1.85	90.66
Income above subsistence level squared	17.04	165.73	0	8218.72
Income below subsistence level squared	0.01	0.12	0	3.42
French-speaking cantons	0.28	0.45	0	1
Italian-speaking canton	0.05	0.21	0	1
Italian-speaking household	0.05	0.23	0	1
French-speaking household	0.28	0.45	0	1
Protestant	0.40	0.49	0	1
Catholic	0.42	0.49	0	1
Christ-catholic	0.02	0.13	0	1
Other Christian religion	0.03	0.16	0	1
No religion	0.12	0.32	0	1
Suburban communes	0.27	0.44	0	1
Wealthy or peripheral communes	0.17	0.38	0	1
Tourist communes	0.07	0.26	0	1
Industrial and tertiary sector communes	0.10	0.31	0	1
Rural commuter communes	0.08	0.27	0	1
Mixed agricultural communes	0.01	0.11	0	1
Peripheral agricultural communes	0.02	0.13	0	1
Dummy for the year 2000	0.36	0.48	0	1
Dummy for the year 2001	0.34	0.47	0	1

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