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The Impact of Social Capital on Subjective Well-Being: A Regional Perspective

Sibylle Puntscher · Christoph Hauser · Janette Walde · Gottfried Tappeiner

Abstract This study analyses the determinants of the most widely used indicators of subjective well-being (SWB), namely life satisfaction and happiness, within European regions. In particular, we assess to what extent these two measures are related to strictly economic factors or alternatively are driven by social and institutional settings. Our analyses extend the corresponding literature by (1) focusing on European regions instead of nations of the whole world and thus allowing for intra-national differences; (2) highlighting the impact of social capital considered in a broad manner covering general trust, institutional trust, associational activity and the close social ties; and (3) modelling possible spatial influences from the neighbouring regions by estimating a spatial error model. The results indicate that such spatial autocorrelations indeed exist and that the various social capital components are major impact factors alongside the conventional determinants health, religion and unemployment, but that income does not exhibit a statistically significant influence on the SWB of the European regions considered.

Keywords Subjective well-being · Life satisfaction · Happiness · Social capital · European regions · Spatial analyses

1 Introduction

The concept of subjective well-being (SWB) was for a long time reserved to the disciplines of psychology, philosophy and sociology, where it was designated in short as the "global

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experience of positive reactions to one's life" (Diener 1994, p. 108). In recent years the public relevance of such non-monetary aspects is increasingly realised as well-being and is now understood as a rather multidimensional concept covering various aspects of life (Conceição and Bandura 2008). Furthermore, the conventional indicators of well-being, like the gross domestic product (GDP) or the inflation, are criticised as being too one-sided and unable to account for non-monetary dimensions of quality of life like health, environment or social disintegration (Diefenbacher and Zieschank 2010; Stiglitz et al. 2009).

Consequently, researchers from related disciplines like economics and political science began to show interest in the concept of subjective well-being (Easterlin 1974; Frey and Stutzer 2000, 2002b; Kenny 1999; Morawetz et al. 1977; Oswald 1997). Alongside conventional analyses on an individual level, a growing number of cross-country analyses were conducted on the significant differences in the level of countries' SWB in global analyses. Typically, some structural impact factors like income and economic stability of a nation were analysed (Bjørnskov 2003). The influence of these measures is found to vary depending on the overall income of the nations in the sample (Frey and Stutzer 2002a). Hence, mere latent and non-economic determinants like spirituality, health or social capital were additionally included in further analyses (Bjørnskov 2008; Helliwell 2001, 2006).

The present paper extends the corresponding literature in a twofold way. Firstly, the estimations focus further on the influence of social capital, which is briefly defined as "features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit" (Putnam 1995, p. 67). For this purpose, the following analyses will consider it in a more extensive setting than done in the current literature on SWB, which includes mainly trust and networking activity. The effects had by general trust, institutional trust, associational activity and close social ties on two indicators for subjective well-being, namely life satisfaction and happiness, are examined.

Secondly, in order to control for regional differences, the observation units used within these analyses are the European regions instead of the generally considered nations of the world. The European Union represents a somewhat more homogeneous environment in terms of industrial structure and level of development in contrast to a global cross-country sample; this facilitates the identification of driving forces from non-economic factors such as social capital. In addition, contemporary research has highlighted a high degree of variation in associational activity (Beugelsdijk and Van Schaik 2005), social trust (Akçomak and Ter Weel 2009) and cultural norms (Tabellini 2010) throughout the European regions that emerges not only between, but also within, nation-states (in particular in countries like Italy or Belgium). Thus, for the purpose of analysing the effects of social capital on well-being in Europe a regional perspective appears to constitute the accurate unit of observation.

The further structure of the paper is as follows: Section 2 briefly summarizes the current literature on cross-country analyses of happiness, life satisfaction and subjective well-being. Section 3 describes the data used for the empirical analyses in Section 4. Lastly, Section 5 presents a discussion and Section 6 offers a summarizing conclusion.

2 Literature

A large branch of the research on happiness, life satisfaction or subjective well-being (terms that are frequently used interchangeably) is conducted on a micro level. Briefly stated, the main influencing socio-demographic characteristics studied are marital status, age, faith, gender, ethnicity, employment status, education, income and health (Diener

et al. 1999; Frey and Stutzer 2002a). The following short literature overview will, however, not deal further with this individual-level research. The interested reader is referred to the reviews by Dolan et al. (2008) and Diener and Ryan (2009).

Most cross-country evaluations of subjective well-being, used as summarizing term for happiness and life satisfaction, were published only recently. The first aggregated finding, however, was already derived in 1974 by the economist Richard Easterlin (1974). He first provided evidence that richer countries are happier, but that over time an increase in national income does not necessarily increase overall happiness. This finding was a first trigger for the subsequent discussion of happiness in economic research.

Considering this relationship now at one point in time, Frey and Stutzer (2002a) argue that a positive relation between income and happiness exists primarily in countries with a GNP per capita below USD 10,000, while the effect vanishes for richer countries (p. 9). Similarly, Inglehart and Klingemann (2000) identify USD 13,000 (in purchasing power parity (PPP), 1995) as the threshold above which the significant linkage between national wealth and national well-being vanishes. Furthermore, they conclude that the main impact factors for subjective well-being on a country level are economic development as well as cultural characteristics, i.e. mainly the experience of a communist regime and the importance of political institutions.

The effect of income and other potential influence factors across countries was tested further using various samples and additional control variables. Bjørnskov (2003) adopts the World Values Survey (WVS) from 1993 on overall 32 countries in Europe, America and Asia and shows that life satisfaction has a positive relation to income and economic stability. In this study, he also highlights social capital in terms of general trust, civic participation and perceived corruption as an important impact factor for national satisfaction with life. In this context he states that „few Northern European countries are probably the happiest in the world because of their high level of social capital more than their pecuniary affluence" (p. 15).

Bjørnskov (2008) further examines these findings on the basis of a US sample covering the period 1983–1998 and 48 US states. Variables on social capital, corruption, population structure and welfare expenditures are used to explain average life satisfaction in these states as dependent variables. Bjørnskov follows the idea of Putnam (2000) and measures social capital as social trust as well as formal and informal social activity. He finds that social trust exhibits a strong positive influence on mean state happiness, while the effect of the two factors on sociability is somewhat restrained.

Social capital as influencing factor for life satisfaction at the cross-national level is further analysed by Kroll (2008), who considers what he calls cognitive social capital (i.e. generalised trust), structural social capital (i.e. associational activity) and linking social capital (i.e. trust in institutions). In an overall sample comprising 125 nations he finds structural social capital to exhibit a strong impact, general trust to have a weak influence and institutional trust to not have any impact at all on national life satisfaction. He further forms subsamples on the basis of GDP p.c. in order to take into account the findings of Frey and Stutzer (2002a) and Inglehart and Klingemann (2000). In the subsample of rich countries the influence of social capital (except for institutional trust remaining statistically not significant) becomes stronger, while the significant effects of the structural control variables GDP and unemployment disappear. The findings in poor and middle-income countries, however, show a noticeable effect of the economic variables GDP, unemployment and the GINI coefficient combined with significantly positive, but rather moderate, coefficients for cognitive and structural social capital.

A sample of 80 countries from around the world is used by Borooah (2006) to analyse the happiness level on both the national and the individual level. On the one hand, he states

that the former Soviet countries are among the unhappiest and the Latin American countries are found primarily among the happiest countries worldwide. On the other hand, he identifies spirituality, family, social circle, a good life standard and health as the most important factors for a person's happiness level.

Kacapyr (2008) analyses the impact factors of national life satisfaction with the World Database of Happiness employing data from the 1990s for 63 countries. He investigates primarily the effect of objective health, measured in terms of life expectancy, war experience, inflation rate, unemployment rate, spirituality, gender equality and also includes dummies for Latin American and former Soviet countries. In contrast to Borooah (2006), he finds no significant coefficient for the former Soviet bloc countries, but indeed for the finding that Latin American countries are significantly happier than other nations worldwide. The further coefficients mostly confirm earlier results: income, religion and health increase national life satisfaction, while inflation rate, unemployment rate and war experience exert a negative influence.

Two further cross-country studies on happiness originate from Ram (2009, 2010). The main finding of the earlier study published in 2009 is that even if a country's government spends more, the national happiness level does not change significantly. Ram additionally finds a positive association between income and happiness and a rather unstable regression coefficient for the trust factor included. In his sample the average life satisfaction is again lower in the transition countries.

In his later 2010 publication, Ram tested the association between social capital (measured by the traditional trust question, namely "Generally speaking, would you say that most people can be trusted?") and happiness using the WVS database and the World Database of Happiness covering a total of 69 countries from all over the world. He primarily detects an unstable connection between these two concepts. His further findings corroborate the results stated in the earlier study (2009).

Ultimately, the relationship between subjective well-being and the economic indicators income and unemployment rate across nations is analysed further by Stanca (2010), implementing a spatial lag model. Income is shown to shape the level of subjective well-being in countries with a lower GDP, whereas the effect of unemployment is documented predominantly in rich nations. Hence, Stanca (2010) highlights the importance of including geographic pattern, culture and institutions in the model to fully understand the effects on subjective well-being.

3 Data and Model

The earlier findings on influential determinants of SWB obtained using national data are now considered on a regional level within Europe in order to model intra-national differences in the particular variables. With regard to technical implementation, the regional perspective of an analysis needs to consider the possibility of spatial autocorrelation effects, for which reason a spatial regression model is estimated.

3.1 Data

The main data source of the following analyses is the fifth and currently last wave of the European Value Study (EVS 2011) fielded in 2008. The EVS is a joint survey program conducted by several European countries on "ideas, beliefs, preferences, attitudes, values and opinions of citizens all over Europe." (http://www.europeanvaluesstudy.eu/evs/about-evs/).

The dataset used covers 160 NUTS1–NUTS2[1] regions in 27 European countries[2] (islands and regions with a sample size smaller than 30 are excluded from the analyses). Further data on the control variables is taken from the database maintained by Eurostat, the statistical office of the European Union (http://epp.eurostat.ec.europa.eu/).

3.1.1 Subjective Well-Being

We follow contemporary literature (Gundelach and Kreiner 2004; Stanca 2010; Veenhoven and Ehrhardt 1995) in analysing the two dominant indicators of SWB: happiness and life satisfaction. Even though there is obviously a great deal of analytical overlap in both concepts, they are generally assumed to emphasise different aspects of SWB (Diener 1994; Minkov 2009; Ryan and Deci 2001). Whereas happiness places the focus on affective components such as pleasant and emotional life experiences, life satisfaction provides information on cognitive considerations such as reflective judgement pertaining to life control and self-realization (Lucas and Diener 2009).

Some concerns were articulated on the measurement and comparison of subjective well-being. However, these points of criticism were examined at both the national and the individual level and largely disproved by Veenhoven (2007), who illustrates the meaningful comparison of SWB on a macro level. The approach taken by current macro studies is pursued by measuring the regional level of SWB by means of the arithmetic mean (Bjørnskov 2008; Kacapyr 2008).[3]

The survey question "How satisfied are you with your life" from the EVS is used to measure life satisfaction on a 10-point answer scale, where 1 is least satisfied and 10 is most satisfied. This variable mainly covers the cognitive facets of subjective well-being. The regional average responses to this question range from 5.36 to 8.44. Overall, this regional ranking shows the highest scores in all five Danish regions and the lowest in three North-central Bulgarian regions.

Additionally, the hedonic perspective of subjective well-being of a region is measured with the question "Taking all things together how happy are you" from the same dataset. In this case, the answer scale ranges from "1—not at all happy" to "4—very happy" and is measured again as regional average value. The indicator ranges from 2.45 in the Portuguese Algarve to 3.59 in the Dutch region Overijssel, followed closely by other regions from the Netherlands and Belgium.

These two indicators for subjective well-being exhibit a highly significant correlation coefficient of 0.836 on the regional level and could hence be understood as tantamount, interchangeable indicators, as is currently the case in cross-national studies (Hayo 2004; Ram 2010; Stanca 2010). However, Gundelach and Kreiner (2004) substantiate the above mentioned meanings of subjective well-being and argue that life satisfaction is a rather

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[1] Nomenclature of Territorial Units for Statistics (NUTS) is the regional classification used by Eurostat.

[2] Countries in the sample (number of regions in brackets): Austria (9), Belgium (11), Bulgaria (6), Switzerland (1), Czech Republic (8), Germany (13), Denmark (5), Estonia (1), Spain (6), Finland (4), France (8), Greece (3), Hungary (7), Ireland (2), Italy (4), Lithuania (1), Luxembourg (1), Latvia (1), Netherlands (12), Norway (1), Poland (16), Portugal (5), Romania (8), Sweden (8), Slovenia (2), Slovakia (4), United Kingdom (12).

[3] Both SWB indicators are ordinal-scaled and as such the arithmetic mean could be an inappropriate aggregation method. Therefore, the analyses were repeated using the regional percentages of people defining themselves as quite or very happy or as highly satisfied (scoring between 8 and 10 on the question of life satisfaction). The results of these additional analyses (not shown here) are similar in algebraic sign and significance of the estimated coefficients and hence do not provide further information.

concrete concept while happiness describes a merely fuzzy feeling (p. 381). They use the EVS dataset to demonstrate that both concepts are influenced in part by different determinants and hence cannot necessarily be seen as interchangeable. This understanding is followed within this study. Therefore, the following analyses are conducted separately for the two indicators.

The regional spread of scores for life satisfaction and happiness across the European regions is depicted in Fig. 1. This mapping indicates a noticeable distribution of subjective well-being with an agglomeration of more satisfied and happy regions in Northern Europe and lower levels of subjective well-being in the East and South of Europe. Additionally, it also highlights some considerable regional, intra-national differences for the two SWB indicators.

3.1.2 Social Capital

The explaining variable, on which this paper focuses, is social capital. To quote James Coleman (1988), social capital "is not a single entity but a variety of different entities, with two elements in common: they all consist of some aspect of social structures, and they facilitate certain actions of actors—whether persons or corporate actors—within the structure" (p. 16). Hence, social capital itself is not directly observable, but rather a latent concept and summarizing term for various dimensions. Putnam (1995, 2000) mainly identifies trust, networks and norms within a society as the important features of social capital. The influence of some of these facets on subjective well-being was corroborated among others by Helliwell and Putnam (2004), Winkelmann (2009) and Hudson (2006).

The dimensions of social capital included in the following analyses are identified with a principal component analysis (PCA) with orthogonal Varimax rotation of 11 variables again taken from the EVS 2008 and considered to cover the most important social capital characteristics.

The rotated component matrix of the PCA illustrated in Table 1 identifies four components with an eigenvalue larger than 1 explaining 64.8 % of the total variance and a KMO value of 0.716. The first factor reflects the vertical (institutional) trust within a region and is hence denominated "Institutional Trust". It can be interpreted as a subjective measure for the institutional quality depending on the sensation and experience of the concerned population within a region as it prevents people from feeling powerless and helpless within the society (Kroll 2008). Factor 2 comprises the three questions on "General Trust" towards other people and is probably the most investigated indicator of social capital. Factor 3 and Factor 4 summarize the variables of social networks representing both "Weak Ties" (in the form of associational activity with sporadic encounters as envisaged by Granovetter (1973)) and "Strong Ties" (considering the involvement in the close social environment of friends and family).

3.1.3 Additional Determinants of Subjective Well-Being

The literature on happiness shows that health has a statistically significant impact on subjective well-being (Borooah 2006). Hence, a health indicator is included in the following analyses. Again a variable from the EVS is used within the model, namely the regional average score for the question "Describe your state of health these days" measured on a 1–5 scale (1 very poor, 5 very good).

Religion was also reported to induce a higher level of national satisfaction with life a (Borooah 2006; Kacapyr 2008) and is hence accounted for by the regional score for the
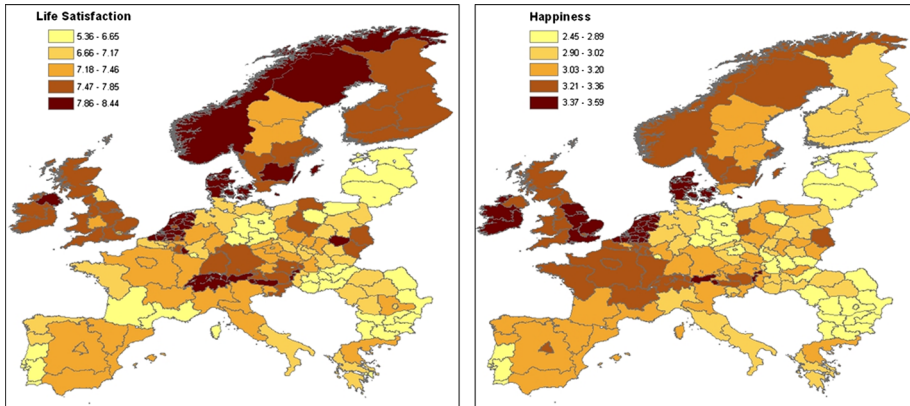
Fig. 1 Map of life satisfaction and happiness in European regions

Table 1 Rotated component matrix using 11 EVS variables

	Component			
	1	2	3	4
How much confidence in: parliament	*.827*	.081	.080	.021
How much confidence in: government	*.789*	.058	.075	−.033
How much confidence in: justice system	*.743*	.133	.032	.025
How much confidence in: the police	*.719*	.090	−.017	.098
Most people try to take advantage of you or try to be fair	.103	*.826*	.056	.080
Most of the time people try to be helpful or mostly looking out for themselves	.123	*.783*	.008	.056
People can be trusted/can't be too careful	.085	*.711*	.152	−.012
Number of active associational memberships	.032	.034	*.899*	.014
Number of passive associational memberships	.095	.170	*.870*	.052
How important in your life: family	.035	−.057	−.012	*.808*
How important in your life: friends and acquaintances	.040	.154	.069	*.725*

Italics based values indicate which variable corresponds to which factor

Extraction method: principal component analysis. Rotation: varimax with Kaiser normalisation

EVS question "How important in your life: religion" measured on a 1–4 scale (1 not at all important, 4 very important).

Moreover, two regional economic indicators are considered in the estimations. Mean household income per capita from 2006 to 2008 (expressed in PPP) is included as an indicator for income to control for the monetary effect on happiness in developed regions (Bjørnskov 2008; Stevenson and Wolfers 2008). Household income is chosen instead of the conventional indicator GDP p.c. as it is shown to better cover the material living standard of citizens (Stiglitz et al. 2009). The second structural indicator considered is the regional unemployment rate used as proxy for the stability of an economy. Again, it is included in the analyses as a three-year-average from 2006 to 2008.

Following the findings of earlier studies, some regional dummies are included in order to distinguish Scandinavian regions (shown to be happier and more satisfied by Bjørnskov

(2003) and Helliwell (2003)) and transition, post-communist regions [with significantly lower satisfaction scores on a national basis (Ram 2010)]. Lastly, two dummies are considered for urban regions, where 70 % of the population lives in an urban environment, and alternatively for rural regions, where at least 70 % of the population lives in a rural surrounding.

The variance inflation factors (VIF) are computed to control for possible multicollinearity between the included regressors, yielding a maximal VIF value of 6.5, with all others below 4. These VIFs are far below the critical threshold of 10 generally considered in the literature (O'Brien 2007) for all included predictors and thus do not point to a severe multicollinearity problem.

3.2 Model

In order to account for a possible spatial autocorrelation, a spatial error model (SEM) based on a row-standardised Queen Contiguity matrix is estimated via Maximum Likelihood with both subjective well-being indicators as dependent variables. The Queen matrix is a binary weighting matrix, which classifies regions as neighbours, who share either a border or a corner point.

The SEM considers spatial autocorrelations within the error terms by adopting the following specifications:

$$
\begin{aligned}
SWB &= X\beta + u \\
u &= \lambda Wu + \varepsilon \\
\varepsilon &\sim N(0, \sigma^2 I_n)
\end{aligned}
\tag{1}
$$

where SWB is the $n \times 1$ vector of regional Subjective Well-Being values, n is the sample size, X is a $n \times k$ matrix of the k independent variables used to explain SWB, β is the $k \times 1$ vector of estimated parameters, u is the spatially autocorrelated error term, λ is the parameter characterizing the spatial dependence in the error term, W is the $n \times n$ spatial weighting matrix and ε is the $n \times 1$ vector of remainder noise, which is assumed to be i.i.d. and normally distributed.

The spatial parameter lambda (λ) comprises the effect of missing variables, measurement errors with spatial pattern or spatial heterogeneity (Collins 2009). It is included in the analyses in order to appropriately model life satisfaction and happiness and thus obtain efficient estimates.

The pseudo R-squared is used as an indicator for the model's goodness of fit. It is calculated as the squared correlation between the observed values of the dependent variable and the corresponding fitted values predicted by the estimated model. Thus, this indicator of fit ranges from 0 to 1 with higher values indicating a better fit of the model.

The Likelihood Ratio Test for Spatial Dependence is applied as specification test in order to compare the basic regression model with the spatial specification and, thus, to confirm the necessity of modelling spatial autocorrelation. The appropriateness of the models is evaluated using the Schwarz Information criterion (SIC) as quality measure of fit (Schwarz 1978). The model with the lowest value is preferred. Additionally, the Likelihood Ratio Test for Model Selection is used to choose between the nested models and to compare their fit. The test statistic $D = -2 \cdot (LL_{null\,model} - LL_{alternative\,model})$ is asymptotically Chi square distributed with the degrees of freedom (df) equal to the difference in the number of estimated parameters of the compared (nested) models. If the null hypothesis

has to be rejected, then the alternative model provides a better fit compared to the nested null model.

All following estimations are calculated using the open source software GeoDa^{TM} (version 1.4.0) for spatial analysis (Anselin et al. 2006).

4 Results

The regional mapping of life satisfaction and happiness in Fig. 1 already suggests the existence of spatial patterns within the European regions. Thus, the possibility of spatial dependencies is tested and confirmed statistically by means of the highly significant Moran's I statistic and the LM-Error-Statistic for the two dependent variables.

4.1 Life Satisfaction

First, spatial error models are estimated using life satisfaction as dependent variable, which is the predominantly used indicator for subjective well-being. Table 2 presents three models including various explaining variables. For all three models the spatial parameter lambda (λ) is highly significant, indicating the appropriateness of the spatial model.

Model 1 focuses on the structural and economic variables, indicating that a high unemployment rate deteriorates life satisfaction at the regional level. By contrast, income already exhibits no statistically significant effect in this parsimonious model. Furthermore, life satisfaction seems to be higher in Scandinavian regions and lower within predominantly rural regions.

These findings change slightly after including the subjective variables for health and religion in Model 2. The dummy variable for rural regions becomes statistically insignificant and the coefficient of the dummy for Scandinavian regions is now significant only at the 10 % significance level. Highly significant coefficients are obtained, however, for both health and religion, which remarkably foster regional life satisfaction.

The four components of social capital are finally added in Model 3 in Table 2. Following the Likelihood Ratio Test for Model Selection, Model 3 is found to provide a better fit than the nested Models 1 and 2. Furthermore, the two indices of fit applied are also clearly in favour for this last model. The Pseudo-R^2 increases from 0.411 for the first, most parsimonious model to 0.717 for the last model 3 including the social capital indicators. Also the SIC suggests the third model to be preferred in comparison to the other models estimated as it exhibits the lowest value after including the social capital components. The empirical results for the effects of these social capital factors on the regional level of life satisfaction exhibit clearly positive coefficients significant at the 1 %-level for Institutional Trust and General Trust. Hence, the findings of Bjørnskov et al. (2010) and Kroll (2008) on the beneficial effect of General Trust are corroborated also within a cross-regional setting. In contrast to the national study by Kroll (2008), however, the Institutional Trust factor also strongly influences the life satisfaction of a region in a positive manner. Hence, these results follow and empirically confirm the argumentation of Frey and Stutzer (2002a), namely that subjective well-being depends not only on personal characteristics but clearly also on the institutional environment (p. 175). The indicator for associational activity, Weak Ties, is also positively significant, although only at the 10 % level. The fourth social capital indicator, Strong Ties, does not exhibit a statistically significant influence on regional life satisfaction.

Table 2 Spatial error model for "life satisfaction"

	Model 1		Model 2		Model 3	
	Coeff.	SE	Coeff.	SE	Coeff.	SE
Constant	7.539***	0.347	2.768***	0.630	3.716***	0.637
Household income ×1,000	0.009	0.014	0.002	0.012	0.004	0.012
Unemployment rate	−0.055***	0.014	−0.040***	0.012	−0.040***	0.012
Scandinavian regions	0.755***	0.267	0.461*	0.238	0.136	0.193
Transition regions	−0.271	0.186	−0.098	0.157	0.057	0.140
Urban region	−0.134	0.084	−0.084	0.070	−0.072	0.067
Rural region	−0.172**	0.083	−0.111	0.068	−0.034	0.066
Religion			0.428***	0.083	0.361***	0.078
Subjective health			0.973***	0.127	0.756***	0.130
F1—institutional trust					0.360***	0.085
F2—general trust					0.332***	0.101
F3—weak ties					0.173*	0.091
F4—strong ties					0.170	0.115
Lambda	0.728***	0.051	0.760***	0.047	0.653***	0.061
Pseudo R-squared	0.411		0.526		0.717	
SIC	182.37		132.55		121.38	
Likelihood ratio test for spatial dependence	70.92***		78.95***		36.80***	
Likelihood ratio test for model selection (df)			59.96 (2)***		31.47 (4)***	

Italics based values indicates the variable significant at the 5 %-level

Coeff. regression coefficient, *SE* standard-error, *df* degrees of freedom

* Significance at $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

Throughout the estimated models, income does not display a statistically significant coefficient, which might depend on the chosen, overall rather high-income sample. Hence, life satisfaction does not improve with income within the European regions. This supports the findings of Frey and Stutzer (2002a) as the effect of increasing income becomes negligible for life satisfaction in rich regions. The second economic indicator, the unemployment rate, shows a highly significant, negative coefficient. A lower unemployment rate and hence a rather stable economic environment thus improves regional life satisfaction. Furthermore, the importance of religion and the level of self-rated health exhibit positive and highly significant coefficients. The two dummies for the degree of urbanisation no longer have a statistically significant influence on the life satisfaction of a region.

Somewhat surprising is the fact that the two dummies included for the Scandinavian regions and the former Soviet bloc regions are statistically insignificant, although especially former Soviet bloc countries were shown to report a lower level of subjective well-being (Borooah 2006; Ram 2009, 2010). This result can possibly be explained by the variation in social capital across European regions found in the actual sample. The Scandinavian regions are found to have a rather high degree of social capital, while its endowment is found to be rather low in Eastern Europe, especially with regard to trust and networking (Pichler and Wallace 2007).

4.2 Happiness

The same models are estimated for the regional happiness factor as the second indicator for subjective well-being (cf. Table 3). Again, following the Likelihood Ratio Test for Spatial Dependence and with the spatial parameter lambda (λ) having a highly significant coefficient, the SEM is found to be an appropriate estimation specification for regional happiness.

Model 1 in Table 3 includes only the economic and dummy variables. Income again has no statistically significant influence on the happiness indicator, while the unemployment rate is negatively related to it. The stronger effects, however, are associated with the four dummy variables. The Scandinavian regions are reported to be happier, while transition regions show significantly lower levels of happiness. Additionally, both urban and rural regions are associated with lower levels of happiness than are intermediate regions.

However, by including a growing number of non-monetary variables in the models, all these effects vanish. The most complete Model 3 clearly demonstrates that only the non-monetary regressors are significantly related to the happiness indicator. As can be seen in Table 3, both goodness-of-fit statistics indicate Model 3 to be the most appropriate of the three estimations. The Pseudo-R^2 value is the highest for this last model (0.777) compared to the others with 0.343 and 0.557. Additionally, the SIC is lowest for model 3 exhibiting a value of -242.67 compared to -122.21 of model 1 and -207.15 of model 2. This finding is further substantiated by the observed Log-Likelihood Ratio statistic, which is larger than the tabular Chi squared value with 4 degrees of freedom at the 5 % level equal to 9.488.

The importance of religion and the level of self-rated health within a region positively influence the happiness level in a manner similar to the earlier findings for life satisfaction. Highly significant, positive coefficients are obtained for all four social capital indicators. The Strong Ties exhibit the strongest impact on regional happiness followed closely by Weak Ties and General Trust. Hence, the close social environment is central for happiness, while it was negligible within the earlier estimations of regional life satisfaction. Furthermore, the coefficient of the Institutional Trust dimension is numerically rather small

Table 3 Spatial error model for "happiness"

	Model 1		Model 2		Model 3	
	Coeff	SE	Coeff	SE	Coeff	SE
Constant	3.210***	0.134	1.110***	0.218	1.505***	0.204
Household income ×1,000	0.003	0.006	−0.004	0.004	−0.004	0.004
Unemployment rate	−0.014**	0.005	−0.009**	0.004	−0.004	0.004
Scandinavian regions	0.259**	0.105	0.097	0.086	−0.026	0.064
Transition regions	−0.151**	0.072	−0.068	0.055	−0.025	0.045
Urban region	−0.069**	0.032	−0.038	0.024	−0.020	0.021
Rural region	−0.066**	0.032	−0.037	0.023	−0.011	0.021
Religion			0.115***	0.029	0.088***	0.025
Subjective health			0.493***	0.044	0.393***	0.041
F1—institutional trust					0.080***	0.027
F2—general trust					0.157***	0.032
F3—weak ties					0.130***	0.029
F4—strong ties					0.177***	0.037
Lambda	0.740***	0.050	0.787***	0.043	0.685***	0.057
Pseudo R-squared	0.343		0.557		0.777	
SIC	−122.21		−207.15		−242.67	
Likelihood ratio test for spatial dependence	78.01***		98.90***		62.20***	
Likelihood ratio test for model selection (df)			95.10 (2)***		55.82 (4)***	

Italics based values indicates the variable significant at the 5 %-level

Coeff. regression coefficient, *SE* standard-error, *df* degrees of freedom

* Significance at $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

within the analyses of regional happiness, but is one of the most important indicators for life satisfaction.

5 Discussion

The current paper contributes to the literature on subjective well-being by analysing the determinants of life satisfaction and happiness on a regional level. This aggregation level allows potential intra-national differences in the included variables to be controlled for; such differences are already empirically shown to exist for social capital factors (Putnam et al. 1993; Tabellini 2010). Additionally, the set of explanatory variables used in the current literature is enlarged by including social capital in a more extensive fashion than in the conventionally applied settings.

From a methodological point of view, the results indicate the existence of spatially autocorrelated error terms and thus of neighbourhood effects within the European regions. Such a spatial autocorrelation does not necessarily have to exist within national analyses as well. However, it is still advisable to control for it in order to avoid inefficient estimates produced by inappropriate modelling. Yet, except for Stanca (2010) and Lin et al. (2014) most prior cross-national research has not addressed the possibility of such spatial effects.

The sample used in the estimations at hand comprises predominantly high-income regions, with 90 % of the considered regions having a GDP p.c. higher than EUR 10,000. Thus, the statistically insignificant coefficients of the income indicator for life satisfaction and happiness are consistent with earlier cross-country studies of Western samples indicating that a growing income is not necessarily correlated with higher subjective well-being across rich nations (Bjørnskov et al. 2010; Blanchflower 2009; Frey and Stutzer 2002a).

The central finding of the current study is that all four dimensions of social capital considered in these analyses are exceedingly important for happiness and, with exception of the factor Strong Ties, also for life satisfaction. Hence, based on regional aggregates it is possible to replicate the findings from micro-level analyses on the beneficial association of SWB with general trust in the form of expecting other people to return wallets (Helliwell and Wang 2011) and with weak ties in the sense of communal experiences such as singing in a choir (Clift and Hancox 2001). Furthermore, the influence of the other factors included in the regressions changes significantly with the consideration of social capital as impact factor. Thus, models that do not include social capital as influential factor might face a severe missing variable problem (that increases with the level of development of the observed area).

A first important effect of social capital concerns the two regional dummies for the Scandinavian and the Eastern European regions, which exhibit statistically non-significant coefficients. This result, however, again does not contradict earlier studies that conclude that Scandinavian regions are significantly happier and that transition regions score below-average SWB levels (Bjørnskov 2003; Kacapyr 2008). Instead, it substantiates that such regional disparities can be explained by the varying endowments of social capital. This conclusion is closer to theoretical considerations than is the rather unsatisfactory approach of using regional dummy variables, but the origin of the large regional differences in social capital still needs to be clarified. In order to examine these differences on the level of social capital of European regions, additional in-depth analyses are essential.

The estimation results (cf. Tables 2, 3) further lead to the conclusion that, if the basic material needs are acceptably provided, the main source of both life satisfaction and

happiness within a region is its prevailing security and (secular and spiritual) orientation. Secular orientation is reflected in the institutional trust and the spiritual orientation in the stated importance of religion. The feeling of security is gained by the awareness of living in a well-functioning society. Such an efficiently functioning society is characterized by economic productivity with a stable regional job market, democratic processes expected from official institutions, solidarity and the absence of discrimination (Desjardins 2008). Moreover, trust is explicitly indicated to be an important requirement for an efficient society (Hjerppe 1998). These properties (approximated in this study by the variables unemployment rate, institutional trust, general trust and weak ties) are confirmed to be highly important for the regional level of subjective well-being.

One further noticeable finding is that Strong Ties, i.e. the close social surrounding, exhibit a significant impact on happiness, but not on the cognitive aspects of life satisfaction. Thus, within the observed sample of the European regions the social surrounding has only a significant impact on the affective aspect and as such mainly influences the emotional facets of subjective well-being. It would be interesting to analyse whether this effect changes when additionally considering some developing countries. It seems conceivable that within the sample of rich regions the family covers a predominantly emotional dimension. According to the model of customer satisfaction proposed by Kano et al. (1984), the family can thus be seen as an excitement attribute or "delighter". In low-income countries, however, the family might also assume an indispensable supply function for basic needs and thereby substitute for their provision by public institutions (especially during illness and retirement). Hence, in a sample of rich regions a high regional level of life satisfaction is based on efficient public institutions, a stable economy and a cooperative environment, which are necessary to achieve self-realization and life control. In addition to these characteristics the close social, emotional surrounding of family and friends also plays a role in the creation of a positive emotional situation, i.e. of happiness. Thus, despite the high correlation between the two indicators of subjective well-being, the findings of this study indicate that highly satisfied regions are not necessarily happy when they lack the warm embrace of a tightly knit community. In contrast, a high regional level of happiness seems to invariably also promote life satisfaction.

6 Conclusion

The paper studies the distribution of happiness and life satisfaction in European regions and examines economic and in particular social characteristics as potential determinants. The two indicators of subjective well-being turn out to be highly correlated at a regional level and strongly clustered in space. Whereas regions in the transition countries exhibit low rates of happiness and life satisfaction, the territories in the Nordic countries are the top performers in both categories. The main driving force for these territorial characteristics is constituted by the region's endowment with social capital: Once it is controlled for levels of trust as well as social networks, the dummies for both Nordic and transition areas are not statistically significant.

Whereas average income does not exhibit any influence, the indicators on social and institutional trust and associational activity consistently display a significant positive impact on SWB. In addition, family and friendship ties also positively influence happiness (but not life satisfaction). Overall, the results highlight the importance of social interaction and integration for subjective well-being over monetary factors in a highly developed economy such as the European Union.

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