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Individual well-being, geographical heterogeneity and social capital

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Abstract

This paper argues the relevance of analysing the origins of contextual effects to explain subjective well-being (SWB). Using the 2012 European Social Survey, the study applies social capital indicators to distinguish between-context and between-individual heterogeneity in three multilevel models of happiness and life satisfaction. Five indicators of social capital at individual and regional level are used to measure the trust, networks and norms dimensions of social capital. Random intercept and random slope hierarchical models are used to control for unexplained regional variability. The possibility of aggregated subjective perceptions conditioning, or interacting with, the effects of individual perceptions is also examined. The results show that the regional means of the social capital indicators are useful in explaining not only average levels of SWB (between-context heterogeneity) but also differences in the importance individuals attribute to their social capital (between-individual heterogeneity). The paper also proposes a research agenda to expand the frontier on contextual effects in the new science of well-being.

Keywords: Happiness, life satisfaction, multilevel models, between-context, between-individual, European regions.

JEL codes: C51, C81, I31, Z13.

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Individual Well-Being, Geographical Heterogeneity and Social Capital

Abstract

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1 Introduction

The empirical literatures in psychology, sociology and economics have paid increasing attention to *subjective well-being* (hereafter SWB)[1] in recent years. Based on different methodologies, research results show variations in SWB across different geographical settings or *contexts*. Analysis of contextual factors, both economic (e.g., gross domestic product per capita or unemployment rates) and non-economic (e.g., *social capital*) is considered increasingly relevant (Manski, 1993; Westlund et al., 2010; Pittau et al., 2010; Ballas and Tranmer, 2012; Aslam and Corrado, 2012; Han, 2015)

As Duncan et al. (1998) indicate, the existence of contextual differences in SWB, considered as *regional* differences in this paper, does not necessarily imply the existence of effects directly associated with the general living environment. The differences may be attributable to the fact that specific types of people who are more likely to be happy or unhappy due to individual characteristics are more commonly found in particular places. *Compositional effects* (individual) must be distinguished from *contextual effects* (regional) of the socio-economic environment. This distinction suggests that the individuals' SWB can stem from processes operating at several *levels*, a lower microlevel compositional effect (characteristics of people *within* the region) and a higher macrolevel effect (differential characteristics of people *between* regions). "The key question is not whether variations between different settings exist but what is their origin" (Duncan et al., 1998). Multilevel (hierarchical or mixed) modelling is the proper technique for analysing the origins of these variations.

Contextual effects are associated with a word that has been used ambiguously in several literatures: heterogeneity. The term is most often used to describe a particular type of heterogeneity, *between-context heterogeneity*, which takes into account regional differences in the dependent variable. The traditional empirical approach controls these regional differences out, through dummy variables (fixed effects), instead of explaining them. This approach removes the regional variances, losing important information (Bell and Jones, 2015). Alternatively, this information can be incorporated in *random*[2] intercept multilevel models, as Rampichini and d'Andrea (1997), Pittau et al. (2010), Aslam and Corrrado (2012) and Han (2015) do for SWB, considering the effects of regional (level-two) variables. Moreover, regional heterogeneity may follow complex patterns in what Duncan et al. (1998) call *between-individual heterogeneity*, a term that refers to the effects of individuals' (level-one) explanatory variables of SWB. Between-individual heterogeneity can be modelled through random slopes or cross-level interactions. Studying higher-level economic variables, Pittau et al. (2010) estimate a random slopes model of SWB, and Schyns (2002) and Ballas and Tranmer (2012) analyse interactions of individually and geographically aggregate determinants of SWB. No previous paper has, however, focused on

[1] "Subjective well-being is the scientific name for how people evaluate their lives" (Diener, 2016). Gasper (2004) provides a framework to clarify the meaning of SWB. The term is related to other concepts, such as *quality of life*, analysed by Veenhoven (2000). Different disciplines and schools approach the concepts of SWB, *life satisfaction* and *happiness* in different ways. In the economics literature, these concepts are often considered as interchangeable synonyms (e.g., Frey and Stutzer, 2002; Layard, 2005). The empirical literature usually measures the general concept of SWB through survey questions about life satisfaction and happiness, which register the cognitive and affective dimensions of SWB, respectively. Throughout this paper, we use these two indicators to measure SWB.

[2] The word *random* refers to an estimation algorithm able to use the information provided by the estimation residuals for individuals and groups (contexts) of individuals. Considering the residual variances within (individual) and between (regional) enables better identification (estimation) of individual and contextual effects.

comparative analysis of between-context and between-individual heterogeneity in an SWB model with geographical hierarchy. Aslam and Corrrado (2012) consider some between-individual heterogeneity of social and economic variables when estimating their model for two different subsamples of regions, although they do not explicitly model this variable. Yuan (2016) studies random intercept and random slope models with interactions between social capital and income, but the study's higher-level variables refer to households, not geographical units.

This paper underscores the importance of studying the origins of both between-context and between-individual heterogeneity in the empirical analysis of SWB. The paper focuses on alternative ways of modelling the compositional and contextual (regional) effects of social variables on Europeans' SWB. Specifically, it focuses on three dimensions of social capital conditioning individuals' feelings and behaviour: trust, networks and norms. These three dimensions have not been considered together in previous multilevel research on social capital. We use information derived from the sixth wave of the European Social Survey (ESS), conducted in 2012, to study contextual effects through individual perceptions averaged geographically at the regional level.

Because our empirical approach is multilevel, exploiting data at individual and regional levels, individuals are considered as nested into a geographical social environment that conditions their feelings and behaviour. This spatial context creates a *vertical dependency* on individuals' SWB. Recently, the multilevel literature has been converging with the tradition of spatial econometrics[3], which studies *horizontal dependencies* between geographical spaces (Corrado and Fingleton, 2012; Pierewan and Tampubolon, 2014; Dong and Harris, 2015; Dong et al., 2016). These horizontal and vertical spatial relationships are still not well understood, and our study focuses on the vertical ones.

The contributions of this paper are the following. First, we provide evidence for the relevance of analysing the origins of heterogeneity in the empirical research on SWB, distinguishing between results for happiness and life satisfaction. Second, the paper develops a way to measure the three dimensions of social capital using principal components analysis of ESS questions, which has been proven useful in the estimation of three multilevel modelling specifications. Third, the methodological section of the paper summarizes several issues that have not been emphasized sufficiently in the empirical literature on SWB and proposes an agenda for further research.

The main results of our estimations show that the contextual effects of different dimensions of social capital affect SWB by different mechanisms. In the dimension of trust, the institutional component measured at the regional level seems to affect individuals' perceptions of the importance of individual institutional trust for happiness and life satisfaction, while the social component of trust at the regional level seems to exert only a direct influence on life satisfaction. The regional aggregation of emotionally linked networks appears to affect the positive evaluation of individual networks for happiness. Conversely, organizational linked networks are shown to reduce the indicators of SWB. These results illustrate additional possibilities for expanding the research frontier of the science of well-being.

The paper is structured as follows. Section 2 introduces the conceptual framework on SWB and social capital, and their contextual-regional relevance. Section 3 describes the data and methodological approach. Section 4 reports the results of the estimation of three multilevel models for life satisfaction and happiness. Section 5

[3] See Stanca (2010), Puntscher et al. (2014) and Fazio and Lavecchia (2013) for spatial econometrics analysis of variables related to the present paper.

discusses some implications of our main findings, and Section 6 summarizes the conclusions. The paper includes two appendices with additional empirical details.

2 Subjective Well-being, Social Capital and Geography

2.1 Defining SWB and Social Capital

Following the contemporary literature (e.g., Stanca, 2010; Portela et al., 2013; Puntscher et al., 2015), we focus on happiness and life satisfaction as indicators of SWB. Related to pleasant emotions (often short-term) or feeling good, happiness may represent an affective dimension of SWB. Life satisfaction is more closely related to cognitive judgments about feeling fulfilled in life or living a good life. Although the measurable effects of individual and regional determinants of individual well-being depend on the indicator used as a proxy of SWB, this paper uses individuals' responses to survey questions about happiness and life satisfaction as dependent variables in its estimations.

Analysis of well-being draws on a number of disciplines to determine life satisfaction and happiness at the individual level in relation to economic and social factors shaping individual behaviour and feelings. These factors include income or unemployment (Easterlin, 1974, 2001; Clark and Oswald, 1994), health status, marriage, friendship, beauty and others (Frey and Stutzer, 2002; Layard, 2005). Of these, this paper focuses on social capital (Portela et al., 2013; Puntscher et al., 2015; Han, 2015).

The concept of social[4] capital has been developed by Bourdieu, Coleman and Putnam. Bourdieu's definition of social capital emphasizes the existence of "network(s) of more or less institutionalized relationships… which provide each of its members with the backing of collectively-owned capital" (1986, pp. 248–249). Whereas Bourdieu focuses on the existence of social networks, Coleman defines social capital by its function. "It is not a single entity, but a variety of different entities having two characteristics in common: they all consist of some aspect of social structure, and they facilitate certain actions of individuals who are within the structure" (Coleman, 1990, p. 302). Encompassing the approaches of Bourdieu and Coleman, Putnam (1993, p. 167) sees social capital as "features of social organization, such as trust, norms and networks, that can improve the efficiency of society by facilitating coordinated actions", or the "connections among individuals' social networks and the norms of reciprocity and trustworthiness that arise from them" (Putnam 2000, p. 19). This meaning of social capital is closely related to the concept of sense of community in the field of community psychology, defined by McMillan and Chavis (1986) as "a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members' needs will be met through their commitment to be together". Although the concepts of social capital and sense of community have been used in different literatures, Pooley et al. (2005) suggest the possibility of combining the concepts to enhance our understanding of community.

The main limitation[5] of the concept of social capital is its multidimensional character, which makes it difficult to define and operationalise. The concept is, however, widely used in empirical research on different phenomena. Its constraints "should stimulate and enrich the debate from a theoretical and applied perspective. From a socio-economic point of view, there is a widespread perception that we are just at the beginning – and

[4] Among the several available surveys on social capital, Maleckia (2012) presents a summary of the regional perspective emphasized in this paper.

[5] Criticisms of the concept of social capital are reviewed by Fine (2010), Bjørnskov and Sønderskov (2013), Inaba (2013) and Andriani and Christoforou (2016).

probably inside a dark room – where theoretical and empirical frameworks are not clearly developed yet" (Andriani and Christoforou, 2016).

Our paper contributes to this debate by providing an empirical framework for analysing social capital that combines the three dimensions emphasized by the theories presented above—trust, networks and norms. In the dimension of trust, we follow Paxton (1999), distinguishing between trust in society as a whole and trust in institutions. Following Putnam's approach, we categorize networks as informal (exchanges with friends, relatives and colleagues) and formal (participation in work meetings and other professional organizations). With regard to norms, we consider collective actions aimed at mutual benefit, such as collection of signatures, participation in lawful public demonstrations, boycotting certain products or businesses, etc. While not identical, such social activism is related to the idea of *civic engagement* stressed by the OECD's (2016) *Better Life Initiative*.

The very concept of social capital implies that individuals' feelings and behaviour are conditioned by the social contexts in which the individuals are embedded. Among these possible social contexts, we focus on the geographical aspect.

2.2 The Effects of the Social Capital Dimensions on SWB: A Geographical Approach

The traditional empirical literature has used microdata to make inferences about the individual-level relationship between SWB and a wide range of socioeconomic and demographic characteristics. As mentioned above, individual characteristics create compositional effects. In addition to individual characteristics, Manski (1993) discusses how to model different individuals' propensity to behave depending on exogenous characteristics of their community. This paper approaches these contextual effects from a geographical perspective, viewing individuals as affected by the social conditions in their spatial context.

Contextual national economic determinants of SWB have been analysed by Veenhoven (2009) using aggregate indicators and by Schyns (2002) using multilevel techniques. Some studies (cited in the introduction), examine regional social and economic contextual factors of SWB in a multilevel setting, at times with contradictory results. For instance, Inglehart et al. (2008) find that, at the level of society, economic conditions seem to influence life satisfaction more strongly than happiness. In contrast, Puntcher et al. (2015) show that their indicator of *strong ties* (close relationships with family and friends) in European regions is statistically significant for happiness but not for life satisfaction. In focusing on the trust, networks and norms dimensions of social capital, however, the relevance of regional variables depends on the indicators used to proxy these dimensions (Scrivens and Smith, 2014).

The dimension of trust has received the most study. Higher trust seems to imply higher SWB, at both individual and aggregate level (e.g., Helliwell and Putnam, 2004; Rodríguez-Pose and von Berlepsch, 2014). The effects of social networks on SWB depend on type of network and aggregation level. Aslam and Corrado (2012) show positive effects of informal networks (personal relationships) at individual but not aggregate level. Conversely, Han (2015) finds no significant effect at individual level. Furthermore, Rodríguez-Pose and von Berlepsch (2014) find negative effects of formal (organizational) networks on SWB. For social norms, differences in critical measurement hinder comparison of results in the few existing studies of this dimension (Bjornskov, 2006; Leung et al., 2011; Rodríguez-Pose and von Berlepsch, 2014). The significance and sign of the effects of norms on SWB is still uncertain.

In order to treat the individual and regional factors that affect SWB, the empirical approach developed in the next section is multilevel. Perceptions of SWB are conditioned not only by the characteristics of the individual but also by how these characteristics define the individual's behaviour and emotions depending on the context in which he/she lives. As discussed above, multilevel modelling can address the origin of between-context and between-individual heterogeneity (Duncan et al., 1998), capturing the latter through random slopes and cross-level interaction terms, permitting the effects of the individual social capital variables to differ by region. This paper focuses on alternative specifications for modelling vertical dependencies among the data of nested observational units in terms of individuals and regions, as we show in the following section.

3 Empirical Approach

3.1 Data

To analyse the role of social capital at both individual and aggregate levels to explain Europeans' SWB, we use data from the ESS, developed to enable systematic study of social and demographic trends across Europe (ESS, 2012). Data were collected during 2012 for the sixth wave of the ESS, in 30 countries from some 55,000 individuals. Due to data availability issues, our analysis covers 24 European countries, disaggregated into 249 regions. The regional classification follows Eurostat's Nomenclature of Territorial Units for Statistics (NUTS), which determines four aggregation levels, from countries (NUTS-0) to the smallest harmonized territorial units (NUTS-3).[6] As the ESS does not provide homogeneous NUTS-level disaggregation across countries, one limitation of our study of contextual regional effects is the use of *regions* defined at different NUTS aggregation levels (see the enclosed figures), as in Aslam and Corrado (2012). To avoid terminological confusions, our multilevel level-one (micro) data correspond to individuals' ESS responses and our level-two (macro) data to regional averages of individuals' responses defined at three different NUTS aggregation *levels* (NUTS 1, 2 and 3).

As discussed above, we use happiness and life satisfaction as dependent variables to capture the affective and cognitive dimensions of SWB, respectively. The ESS provides information on happiness levels based on the question: "Taking all things together, how happy would you say you are?" For life satisfaction, the ESS asks: "All things considered, how satisfied are you with your life as a whole nowadays?" The responses range on a scale from zero (extremely unhappy/dissatisfied) to ten (extremely happy/satisfied). Given that the dependent variables are ordinal, the natural approach would be to study them through a multilevel ordered logit or probit model (Rampichini and d'Andrea, 1997; Yuan, 2016). We assume a linear relationship between the SWB indicators and their determinants, however, because using ordinality or cardinality makes little practical difference.[7] The dependent variables are not standardized here because standardization tends to reduce individual and regional variability (Heck and Thomas, 2008), which this paper attempts to model.

Figure 1 shows the spatial distribution of the regional averages of the dependent variables. The darker colour indicates higher happiness/life satisfaction. As stated in Section 2.1, some overlap occurs between happiness and life satisfaction indicators. Since the correlation between happiness and life satisfaction is 0.72, the estimation results presented below for both variables are generally similar, although we highlight some relevant differences.

[6] See http://ec.europa.eu/eurostat/web/nuts/overview.

[7] Our tests on the practical consequences of the linear hypothesis confirm the conclusions of Frey and Stutzer (2002), Ferrer-i-Carbonell and Frijters (2004), Pittau et al. (2010), Rodríguez-Pose and von Berlepsch (2014), Aslam and Corrado (2012) and Yuan (2016).

[FIGURE 1 ABOUT HERE]

[FIGURE 2 ABOUT HERE. Figures 1 and 2 positioned together]

Among the possible determinants of SWB, we focus on social capital. As discussed in Sections 2.1 and 2.2, the concept's multidimensionality makes it difficult to synthesize in a single variable. Among the possible ways to measure the trust, networks and norms dimensions of social capital, this paper chooses separate principal components analysis (PCA) of individual-level data for ESS questions related to each of the three dimensions (see Appendix A, Tables A1 to A3, for more details). The results of the PCA for the trust dimension of social capital show two underlying components, which we call *institutional* and *social* (interpersonal) *trust*. For the network dimension, we also obtained two components, labelled *informal* (support) and *formal* (organizational) *networks*. For the third dimension, norms, the PCA produces a single component, *civic engagement* (socio-political activism). Analysis of the interrelationships among these five components is left for further research using alternate measurement approaches.

The regional social capital variables are defined as the average values of the components obtained through PCA of the individual data.[8] In the models below, this means that average value is repeated for all individual observations in the same region. Figure 2 maps the spatial distribution of the regional means for the five PCA components of social capital described above.

Additionally, our multilevel analysis of the individual and regional social capital determinants of SWB is controlled by many socio-demographic individual factors, such as age, gender, education, political orientation, health and income (see Appendix B).

3.2 Methodology

This paper presents three different specifications for analysis of the contextual (regional) effects of social capital dimensions on SWB. They do not exhaust the possibilities offered by multilevel level modelling but illustrate alternative mechanisms to model the origin of regional differences in SWB. The first specification captures between-context heterogeneity, as in Aslam and Corrado's (2012) model, but focuses on our five social capital indicators. The other two specifications also capture between-individual heterogeneity, through random slopes and interaction terms. These last two models include hierarchical dependence on level-one variables, since belonging to one region or another may generate different perceptions of the importance of the individual social capital variables. Some readers may choose to skip the following technical details and go to the end of the section.

We follow Snijders and Bosker (2012) for general description of the models,[9] with slight changes in notation. An indicator of the SWB of individual i nested in region j (Y_{ij}) is supposed to depend on individual (level-one) control variables (C_{ij}) and social capital variables (X_{ij}). The index for individuals ($i = 1, \dots, n_j$) in these variables starts over for each regional group. As the values of a level-two variable do not depend on individual i, level-two variables have only the group j index ($\bar{X}_j$).

When the coefficients are modelled, a subscript of 00 indicates the overall intercept, a subscript of 10 parameters of level-one variables (individuals), and a subscript of 01 coefficients for level-two variables

[8] Sabatini (2006) and Portela et al. (2013), among others, follow a similar approach. Puntscher et al. (2016) compare alternative aggregation methods, whose relevance in a multilevel setting is also an issue for further research.
[9] These authors, among others, explain the assumptions relevant to the models, not reproduced here for the sake of brevity.

(regions). The models below introduce two random terms, U_{0j} for regional intercepts and U_{1j} for regional slopes of the individuals' social capital variables. These random effects are latent variables. They force the estimation algorithm to consider the regional residuals in order to model regional dependence in the level-one values of Y_{ij} (random intercepts) or the effects of the level-one values of X_{ij} on Y_{ij} (random slopes). We focus here on interpreting three alternate ways of capturing compositional and contextual effects and do not discuss the portion of regional variability in the SWB indicators that remains unexplained in each case.[10]

Model I: Within- and Between-Group Model

The individual level (micro) model for region *j* captures the compositional effects through the following equation with three β coefficients:

$$Y_{ij} = \beta_{0j} + \beta_{1j}X_{ij} + \beta_{2j}C_{ij} + \epsilon_{ij} \quad (1)$$

The regional intercepts β_{0j} allow for between-context heterogeneity, specified as a latent regression model in which a common intercept $\tilde{\gamma}_{00}$ is added to regional intercepts that cannot be observed without error U_{0j}. Additionally, observable contextual effects are captured by the regional means (Mundlak, 1978). Therefore, the macro (regional), or level-two, model is as follows:

$$\beta_{0j} = \tilde{\gamma}_{00} + \tilde{\gamma}_{01}\bar{X}_j + U_{0j} \quad (2)$$

The total error of this model is decomposed into two random effects at individual (ϵ_{ij}) and regional (U_{0j}) levels, with variances of σ_ϵ^2 and σ_{U0}^2, respectively. Substituting equation (2) into (1) and reordering, we obtain a random intercept model, which includes both observable and non-observable contextual effects. The within (intra)-group regression model for region *j* becomes:

$$Y_{ij} = \tilde{\gamma}_{00} + \beta_{1j}X_{ij} + \tilde{\gamma}_{01}\bar{X}_j + \beta_{2j}C_{ij} + U_{0j} + \epsilon_{ij} \quad (3)$$

where the systematic (non-random) part of the intercept is $\tilde{\gamma}_{00} + \tilde{\gamma}_{01}\bar{X}_j$. Taking the regional average on both sides of equation (3), we get the following between-group regression model:

$$\bar{Y}_j = \tilde{\gamma}_{00} + (\tilde{\gamma}_{01} + \beta_{1j})\bar{X}_j + \beta_{2j}\bar{C}_j + U_{0j} + \bar{\epsilon}_j \quad (4)$$

To confirm explicitly that β_{1j} captures the relative effects of individual X_{ij} with respect to regional averages $\bar{X}_j$, we rewrite equation (3) through within-group centring. The coefficient of $\bar{X}_j$ in equation (4) is conserved using the mean-centred level-one explanatory variable, as in this equation:

$$Y_{ij} = \tilde{\gamma}_{00} + \beta_{1j}(X_{ij} - \bar{X}_j) + (\tilde{\gamma}_{01} + \beta_{1j})\bar{X}_j + \beta_{2j}C_{ij} + U_{0j} + \epsilon_{ij} \quad (5)$$

We choose to estimate equation (5) in order to stress its statistical equivalence to equation (3), an issue insufficiently highlighted in the existing multilevel SWB literature. To establish notation for estimable coefficients in the final specifications, we rename them as $\gamma_{00} = \tilde{\gamma}_{00}$, $\gamma_{10} = \beta_{1j}$ and $\gamma_{01} = \tilde{\gamma}_{01} + \beta_{1j}$, while δ_{10} replaces the unmodelled β_{2j} of the individual control variables. Our *Model I* thus follows the within- and between-group specification utilized by Aslam and Corrado (2012):

$$Y_{ij} = \gamma_{00} + \gamma_{10}(X_{ij} - \bar{X}_j) + \gamma_{01}\bar{X}_j + \delta_{10}C_{ij} + U_{0j} + \epsilon_{ij} \quad (6)$$

In this type of mean-centred specification, when both $\tilde{\gamma}_{01}$ and β_{1j} are positive, the estimated effects of relative individual social capital (γ_{10}) will be lower than the estimates for the regional mean (γ_{01}). If the within-

[10] See Pittau et al. (2010) and Aslam and Corrado (2012) for discussion of this unexplained variability using different multilevel specifications for the regions of Europe. If we compare the indexes used to analyse this variability, the variance partition coefficient and the intra class-correlation coefficient become complex when one of the models includes random slopes (Goldstein et al., 2002). We focus on proposing different ways to capture geographical heterogeneity in SWB studies.

group coefficients $\gamma_{10} \neq 0$, the individuals' perceptions of their own social capital relative to the exogenous regional averages of those social capital variables impact individual SWB. If the between-group coefficients $\gamma_{01} \neq 0$, the underlying exogenous characteristics of social capital in the regions to which the individual belongs, as measured by the regional averages, exert direct contextual effects on individuals' well-being.

Model II: Random Slopes for Individual Social Capital Variables

The second specification studied in this paper starts from equations (3) and (2) but introduces between-individual heterogeneity through group-dependence of the slopes on the individual social capital variables. When a random term is introduced to model the slopes of equation (3), Snijders and Bosker (2012, chap. 5) show that equations (3) and (5) are no longer statistically equivalent. In a random slopes setting, these authors recommend using the X_{ij} variables instead of $X_{ij} - \bar{X}_j$, unless there is a clear theory suggesting that relative social capital is what matters for individual SWB. Model I permits estimation of the effects of individual social capital indicators relative to a geographical context, but we are not certain if the relevant mechanism operates in this way or through absolute levels of the individual variables. Even if the relative approach is the proper one, the level-two context here is defined according to data availability and may not be suitable to measure the most relevant relative social capital. Since we focus on the effects of individual social capital on SWB, our second model is defined for the X_{ij} variables. Using the notation of estimable coefficients in equation (6), the level-two equations for equation (1) are the following two latent models:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}\bar{X}_j + U_{0j} \quad (7)$$

$$\beta_{1j} = \gamma_{10} + U_{1j} \quad (8)$$

where the variances of the level-two random terms are σ^2_{U0} and σ^2_{U1} (their covariance is not discussed in this paper). Substituting these equations into equation (3), *Model II* becomes:

$$Y_{ij} = \gamma_{00} + \gamma_{10}X_{ij} + \gamma_{01}\bar{X}_j + \delta_{10}C_{ij} + U_{0j} + U_{1j}X_{ij} + \epsilon_{ij} \quad (9)$$

The γ_{10} coefficients of X_{ij} in equations (6) and (9) are directly comparable. Since X_{ij} is not mean-centred in equation (9), however, the γ_{01}coefficients are not comparable in Models I and II. The reason is that, unlike the latent coefficients in equations (5) and (4) for Model I, the coefficients of $\bar{X}_j$ are now different in equation (9) and in the following between-group regression model for Model II:[11]

$$\bar{Y}_j = \gamma_{00} + (\gamma_{10} + \gamma_{01})\bar{X}_j + \delta_{10}\bar{C}_j + \bar{U}_{0j} + \bar{U}_{1j}\bar{X}_{ij} + \bar{\epsilon}_j \quad (10)$$

In Models I and II, the regional variation of intercepts contains an explained portion ($\gamma_{01}\bar{X}_j$) and an unexplained portion, represented by U_{0j}. The term $U_{1j}X_{ij}$ in Model II, the product of a latent level-two variable and a level-one observable variable, permits estimation of as many slope coefficients (β_{1j}) as regions in the sample, 249 in our case. Therefore, γ_{10} is the regional mean of β_{1j}, whose estimation is shown in Tables 2 and 3 below, along with the estimated variances of each slope coefficient.[12]

Model III: Cross-Level Interactions without Random Slopes

Our third model provides potential explanations for geographical variability of the slopes of individual variables. Now the heterogeneous effects of individual social capital on SWB are considered as produced by the

[11] Additionally, if random slopes are introduced into equation (6) of Model I, the specification would contain the term $\bar{U}_{1j}\bar{X}_{ij}$, which is not present in equation (9).

[12] See Pittau et al. (2010) for a graphical representation of the estimated slopes in a model of life satisfaction without social capital.

observable aggregate social capital, measured through the regional means. Since our purpose is to distinguish alternate mechanisms determining contextual effects on individual well-being, we omit the random component from equation (8), although it could be included. The slope model thus becomes:

$$\beta_{1j} = \gamma_{10} + \gamma_{11}\bar{X}_j \quad (11)$$

Adding equation (11) to equations (1) and (7) defines *Model III* as:

$$Y_{ij} = \gamma_{00} + \gamma_{10}X_{ij} + \gamma_{01}\bar{X}_j + \gamma_{11}X_{ij}\bar{X}_j + \delta_{10}C_{ij} + U_{0j} + \epsilon_{ij} \quad (12)$$

In Model III, the slope of X_{ij} is $\gamma_{10} + \gamma_{11}\bar{X}_j$ and thus varies by region. Since random slopes are not considered here, however, the estimation results produce two unique estimates for γ_{10} and γ_{11}, as opposed to 249 estimates for the term γ_{10}+U_{1j} in Model II. Because Model II uses the residual regional variance to model the slopes of X_{ij}, it should predict SWB better than the more parsimonious Model III, whereas Model III enables identification of social mechanisms affecting individual behaviour.

To sum up, Model I decomposes the between-context effect and the effect of individual social capital with respect to regional context. Model II allows for between-individual heterogeneity by considering the variance of the regional residuals to model the perceived effects of the individual social capital variables. Model III models these perceived effects by making these effects depend on the social capital regional averages. All three models are estimated by the restricted maximum likelihood (REML) method using the *lme4* R package (Bates et al., 2015). Table 1 summarizes the specifications.

[TABLE 1 ABOUT HERE]

4 Results

4.1 Individual and Regional Social Capital Determinants of SWB

Tables 2 and 3 show our assessment of the relationships among the five indicators of social capital at individual and regional levels, and two indicators of SWB for the three models described in Section 3.2.

The results from Model I are in line with the estimation for life satisfaction in Aslam and Corrado (2012). As explained after equation (6), the estimated effects of the relative individual social capital variables tend to be lower than those of the regional means. With the exception of the civic engagement indicator, the regional means of social capital are significant, explaining between-context heterogeneity in SWB. The random intercepts capture the remaining unexplained part of that heterogeneity. Our results show that the estimates of the individual and regional social capital variables are generally higher for life satisfaction (Table 3) than for happiness (Table 2).

Model II introduces random slopes for the individual variables of social capital. The dispersion of the estimated 249 regional slopes for each of these variables is significant, indicating the presence of a form of regional heterogeneity not explained by the regional means of social capital. Indeed, the statistical significance of the latter decreases with respect to Model I. Model II captures between-individual heterogeneity: the effects of individual social capital on the individuals' perceptions of SWB are different for residents of different regions. In other words, "similar types of people are behaving differently in different types of places" (Duncan et al., 1998). The average slope estimates of the individual social capital indicators are similar to those in Model I, but the individual and regional residual variances are lower. Model II can improve the estimation but does not explain the origin of between-individual heterogeneity.

[TABLE 2 ABOUT HERE]

[TABLE 3 ABOUT HERE. Tables 2 and 3 positioned together]

Model III provides an initial exploration of causes of between-individual heterogeneity. The estimates of the cross-level interaction terms between individual and regional social capital variables are generally negative. This means that, the higher the aggregate levels of social capital, the lower the effects of the individual social capital variables on SWB. We illustrate this result with the case of institutional trust in column (3) of Table 2. As explained after equation (12), the estimated slope of individual institutional trust is $0.2325-0.1136\bar{X}_j$, where $\bar{X}_j$ is the regional average of institutional trust. If the minimum and maximum values of $\bar{X}_j$ are examined for our sample (not shown), the result implies that the effects of individual social capital on happiness range from 0.41 to 0.13, respectively. Unlike the 0.23 or 0.25 average effect of individual institutional trust found in Models I-III of Table 2, this result indicates that the individual levels of institutional trust are perceived as less important for individual happiness in a region with high institutional trust. One possible interpretation is that, when collective perception of institutional trust is high, the probability of having trustworthy institutions is also high, leading individuals to attribute less importance to their perceptions of institutions.

This type of social mechanism only appears clearly for institutional trust in our two indicators of SWB and for informal networks (intimate relationships, meeting with friends...) in the case of happiness. The foregoing difference in the results for happiness and life satisfaction is consistent with Puntcher et al.'s (2015) findings on strong ties, as summarized in Section 2.2. The regional averages of those variables become statistically nonsignificant in Models II and III when considered on their own (without interaction). In those models, in contrast, the regional mean of formal networks (involvement in social organizations) has a direct negative contextual effect on individuals' evaluations of SWB. The negative estimates of the individual and regional indicators of formal networks are consistent with the findings of Bruni and Stanca (2008) and Rodríguez-Pose and von Berlepsch (2014). This result may be associated with the insignificance of our measure of civic engagement, since our study only analyses the social activism aspect of this variable, the aspect related to involvement in social organizations. This result is also consistent with Han's (2015) findings for *volunteer work* in a random intercept model of happiness for the inhabitants of Seoul.

In comparing Models II and III in Tables 2 and 3, we would highlight that the regional average of social trust (general interpersonal relationships) exerts a more significant direct influence on individuals' life satisfaction than on their happiness. This finding may indicate that the collective values of social trust affect the individual's cognitive dimension of SWB but not the emotional dimension (happiness), which is controlled by the interaction term of informal networks in Model III of Table 2.

4.2 Socio-Economic Individual Determinants of SWB: Control Variables

Appendix B shows the estimation results of the individual control variables. They are in line with findings in the previous literature, such as those of Dolan et al. (2008) and Portela et al. (2013). Age displays a significant U-shaped relationship, meaning that the young and the old tend to be happier, and women seem to be happier than men (see, e.g., Blanchflower and Oswald, 2004). High levels of income and subjective health increase the likelihood of having high indicators of SWB. For individuals' political orientation, religion and marital status, we find that individuals with right-wing beliefs and religion in their lives, and who are married seem to have higher SWB than those with left-wing beliefs and no religious beliefs, and who are unmarried. A higher

education level (ISCED 3 & 4 and ISCED 5 & 6) does not seem to have a significant effect on happiness and life satisfaction when compared to the reference group of individuals with no education or only compulsory education (ISCED 1 & 2). Moreover, our results show that living in a small town or in the countryside implies higher SWB than living in a big city (Hudson, 2006). Our findings agree with those of Inglehart et al. (2008) summarized in Section 2.2: The magnitude of the estimates for our income indicators is higher for life satisfaction than for happiness.

5 Discussion

Although the trust, networks and norms dimensions of social capital are suitable for regional analysis of contextual effects on SWB, analysis of these dimensions presents challenges. Without seeking to be exhaustive, we mention a few caveats. Firstly, in the absence of aggregate independent measures for social capital, one must measure contextual effects using the regional means of individuals' social capital indicators. This approach can cause interpretation problems, as individual perceptions of the social capital dimensions of trust and norms may be affected by, and may proxy, collective perceptions. Regional average values could be caused by the effects of institutions, government actions or cultural characteristics, which would bias estimation of the effects of individuals' perceived trust and norms on SWB. Further, the regional means of individual perceptions of networks cannot be considered as proxies of networks operating at regional level. Westlund et al. (2010) recognize the need for a better conceptualization of the relationship between social capital and space when analysing SWB. Such warnings must be considered when interpreting the results presented in the empirical portion of the paper. They might be regarded as examples of the problem of *shift of meaning* (Snijders and Bosker, 2012): variables aggregated from a lower to a higher level may have theoretically different meanings because of the different social processes occurring at different levels. Our PCA of trust, networks and norms at individual level produced five indicators of social capital. We used their regional means to assess the social environmental effects of social capital in three multilevel models of the subjective perceptions of happiness and life satisfaction. Secondly, the above-mentioned considerations may imply *heterogeneous effects* of individual social capital variables by region. Additionally, the joint effects of the several dimensions of social capital on SWB, interacting at the individual and contextual levels for the cognitive and emotional dimensions of SWB, may produce complex causal relationships. Lack of a solid theoretical framework to analyse this causality suggests a modelling approach based on latent hierarchical relationships.

Traditional analyses of SWB using microdata usually omit or control out contextual or societal factors that can be measured on different geographical scales. Some recent studies, summarized in the introduction of this paper, use multilevel techniques to distinguish the effects of variables that refer to individuals, from those of variables that refer to geographical contexts. While not a panacea for this type of problem, multilevel modelling has many advantages as compared to more traditional techniques. A multilevel approach allows inclusion of social hierarchical effects related to the individual's residential location, which may ultimately influence SWB. Random effects models are particularly suited to analysis of data with complex patterns of variability (Bell and Jones, 2015), as they permit analysing including the information provided by the dispersion of the data at individual and regional levels. That the relationships between an SWB indicator and the explanatory variables of social capital may be assumed to differ by region helps in tackling issues of aggregation and heterogeneity.

Our analysis can be summarized as follows:

In line with previous work, our results highlight the need to consider regional factors when analysing individual SWB, as the latter helps to explain between-region heterogeneity. The remaining unexplained regional variability of SWB (regional intercepts) can be controlled through random intercepts.

When individual variables are evaluated relative to regional means (centred), as in Aslam and Corrado's (2012) specification, and both individual and regional effects are positive, the estimates of the regional variables will be higher than those of the individual variables. This result is produced by the modelling strategy and alone does not permit us to draw conclusions about the relative importance of individual and contextual factors.

The random slope model can capture unexplained effects of the social (regional) environment on the importance attributed by individuals to their own individual variables as determinants of their SWB, after controlling for between-context heterogeneity in SWB. This model provides a way of analysing between-individual heterogeneity, as in Pittau et al.'s (2010) random slope model without social capital variables, but it does not explain the origins of that heterogeneity.

Analysis of possible cross-level interactions among individual and social capital contextual variables, like that performed by Ballas and Tranmer (2012) for economic variables, allow us to distinguish three types of effects for the determinants of SWB:

a) Individual: The coefficients of the personal perceptions of individual social capital represent the average effect on SWB for all the individuals in the sample, after controlling for all other individual and contextual factors and for unexplained regional heterogeneity (random effects).
b) Regional: The coefficients of the regional means of social capital represent a direct impact of the social context on the individual's SWB and explain between-context heterogeneity.
c) Cross-level interactions: The coefficients of the interactions between individual and regional variables indicate possible explanations for different individuals' evaluations of their determinants of SWB. Our results suggest that some contextual social capital components help to explain between-individual heterogeneity: Different feelings or behaviour of the same type of individuals living in different places are explained by the contextual effects of the regional social capital variables.

6 Conclusions

This paper underscores the importance of studying the origins of both between-context and between-individual heterogeneity in empirical analysis of SWB. These forms of heterogeneity can be controlled in random intercept and random slope multilevel models. The origins of these types of heterogeneity can also be explained using aggregated variables to model different contextual intercepts (geographical differences of SWB) or different contextual slopes (cross-level interactions) for the variables that refer to individuals.

The paper focuses on the social capital determinants of happiness and life satisfaction, using data from the ESS, round 2012. Through a dimensionality reduction technique, it evaluates social capital in a novel way relative to previous multilevel studies of social capital and SWB. Survey questions about the trust, networks and norms dimensions of social capital are used to define five indicators for individuals, which are averaged at regional level. We then follow Aslam and Corrado's (2012) specification, with random intercepts and centred individual variables of social capital. We compare this specification to two new models analysing the regional effects of social capital, which consider random intercepts jointly with random slopes or cross-level interactions.

Our empirical analysis reveals that the regional differences in the social capital indicators are useful in explaining not only average levels of SWB (between-context heterogeneity) but also differences in the importance individuals attribute to their own social capital (between-individual heterogeneity). In particular, our models with interactions reveal that, the higher the collective perceptions of institutional trust, the lower the relevance of the individual perception of institutional trust in explaining individual happiness and life satisfaction. This social mechanism also appears in informal (support) networks to explain the emotional dimension of SWB, happiness, but not the cognitive dimension, life satisfaction. Instead, our indicator of regional social trust (general interpersonal relationships) shows a direct impact on life satisfaction. All of our estimations indicate a negative effect of individual and regional formal (organizational) networks on SWB, while the social activism form of civil engagement studied in this paper turns out to be statistically nonsignificant.

The results are consistent with existing empirical literature, but our findings identify specific contextual mechanisms that are influencing individuals' SWB. This finding enables us to propose the following agenda as possible cutting-edge research in the science of well-being. First, the methodological caveats underscored in this paper should be approached from different empirical perspectives to address the aggregation problems when assessing contextual effects. Second, the multidimensional character of social capital and possible ways of approaching it in a multilevel geographical setting require additional analysis. Third, contextual economic and cultural variables, omitted in this paper, should be considered in later works. Fourth, different levels of geographical analysis should be taken into account (neighbourhood, country, etc.). Fifth, joint analysis of geographical and non-geographical contextual effects (family, social class, profession, etc.) may reveal relevant social mechanisms acting simultaneously. Sixth, alternative specifications of multilevel models could yield new insights. These may include cross-level interaction terms in models with random slopes, as well as interactions among social capital indicators or among social and economic variables. Additional terms capturing horizontal (spatial) dependencies must also be explored. Finally, analysing the implications of contextual effects for cohesion policies at different administrative levels requires further investigation.

Studying the contextual determinants of the different behaviour and feelings of individuals with similar personal characteristics is a vast field of research. The possibilities of multilevel modelling for exploring causal relationships related to SWB have a long way to go.

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Appendix A: Data

[TABLES A1 TO A3 ABOUT HERE]

Appendix B: Control Variables in the Determinants of Europeans' SWB

[TABLES B1 TO B2 ABOUT HERE]

LIST OF FIGURES

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TABLES

Tables in Sections 3.2 and 4.1

Table 1. Three multilevel models with contextual effects and random intercepts

Model	Specification	Effects
I	$Y_{ij} = \gamma_{00} + \gamma_{10}(X_{ij} - \bar{X}_j) + \gamma_{01}\bar{X}_j + \delta_{10}C_{ij} + U_{0j} + \epsilon_{ij}$	Within- and between-group model
II	$Y_{ij} = \gamma_{00} + \gamma_{10}X_{ij} + \gamma_{01}\bar{X}_j + \delta_{10}C_{ij} + U_{0j} + U_{1j}X_{ij} + \epsilon_{ij}$	Random slopes for individuals
III	$Y_{ij} = \gamma_{00} + \gamma_{10}X_{ij} + \gamma_{01}\bar{X}_j + \gamma_{11}X_{ij}\bar{X}_j + \delta_{10}C_{ij} + U_{0j} + \epsilon_{ij}$	Cross-level interactions without random slopes

Table 2. Social capital in three multilevel models of Europeans' happiness

(27,532 individuals from 249 regions)

Variables	Model I	Model II	Model III
Individual social capital ($X_{ij} - \bar{X}_j$ in Model I and X_{ij} in Models II and III): γ_{10}			
Trust: Institutional	0.2314***	0.2454***	0.2325***
	(0.0111)	(0.0195)	(0.0111)
Trust: Social	0.3339***	0.3517***	0.3362***
	(0.0113)	(0.0157)	(0.0113)
Networks: Informal	0.3032***	0.3249***	0.3049***
	(0.0109)	(0.0173)	(0.0109)
Networks: Formal	-0.0306**	-0.0495***	-0.0453***
	(0.0101)	(0.0114)	(0.0120)
Norms: Civic engagement	0.0108	0.0183	0.0097
	(0.0105)	(0.0118)	(0.0120)
Regional means ($\bar{X}_j$): γ_{01}			
Trust: Institutional	0.4323***	0.1246	0.1857
	(0.1014)	(0.0754)	(0.0989)
Trust: Social	0.4890***	0.1597*	0.1503
	(0.0937)	(0.0719)	(0.0919)
Networks: Informal	0.4582***	0.0465	0.1410
	(0.1059)	(0.0818)	(0.1035)
Networks: Formal	-0.7953***	-0.4795***	-0.7805***
	(0.1807)	(0.1191)	(0.1753)
Norms: Civic engagement	-0.0211	0.0182	-0.0091
	(0.1340)	(0.0880)	(0.1302)
Interaction individual-region ($X_{ij} * \bar{X}_j$): γ_{11}			
Trust: Institutional			-0.1136***
			(0.0256)
Trust: Social			-0.0191
			(0.0234)
Networks: Informal			-0.1535***
			(0.0290)
Networks: Formal			-0.0669
			(0.0346)
Norms: Civic engagement			-0.0166
			(0.0276)
Variance of random effects			
Individuals (σ_ϵ^2)	2.3499***	2.2754***	2.3469***
Regions (σ_{U0}^2)	0.1880***	0.1479***	0.1738***
Slopes of X_{ij} (σ_{U1}^2)			
Trust: Institutional		0.0536***	
Trust: Social		0.0236***	
Networks: Informal		0.0357***	
Networks: Formal		0.0043***	
Civic engagement		0.0046***	
-2 Log Likelihood	104,172.1	103,724.5	104,143.1

Note: Standard errors are in parentheses. * Significant at 5% level; ** at 1% level; *** at 0.1% level. The estimated overall intercept (γ_{00}) is not presented. The γ_{01} coefficients in column (1) cannot be compared to those in columns (2) and (3), as explained in Section 3.2. Appendix B provides the results for the individual control variables.

Table 3. Social capital in three multilevel models of Europeans' life satisfaction

(27,532 individuals from 249 regions)

Variables	Model I	Model II	Model III
Individual social capital ($X_{ij} - \bar{X}_j$ in Model I and X_{ij} in Models II and III): γ_{10}			
Trust: Institutional	0.3851***	0.3990***	0.3833***
	(0.0125)	(0.0224)	(0.0126)
Trust: Social	0.4010***	0.4210***	0.4051***
	(0.0128)	(0.0177)	(0.0128)
Networks: Informal	0.2556***	0.2734***	0.2578***
	(0.0123)	(0.0176)	(0.0123)
Networks: Formal	-0.0415***	-0.0590***	-0.0580***
	(0.0114)	(0.0123)	(0.0136)
Norms: Civic engagement	0.0289*	0.0330*	0.0277*
	(0.0119)	(0.0133)	(0.0136)
Regional means ($\bar{X}_j$): γ_{01}			
Trust: Institutional	0.6403***	0.1770*	0.2169
	(0.1205)	(0.0892)	(0.1196)
Trust: Social	0.7004***	0.3377***	0.3081**
	(0.1114)	(0.0853)	(0.1111)
Networks: Informal	0.5209***	0.1429	0.2814*
	(0.1258)	(0.0975)	(0.1250)
Networks: Formal	-1.0651***	-0.5990***	-1.0527***
	(0.2153)	(0.1400)	(0.2127)
Norms: Civic engagement	0.1784	0.1293	0.1785
	(0.1596)	(0.1037)	(0.1579)
Interaction individual-region ($X_{ij} * \bar{X}_j$): γ_{11}			
Trust: Institutional			-0.1719***
			(0.0290)
Trust: Social			0.0227
			(0.0266)
Networks: Informal			-0.0455
			(0.0328)
Networks: Formal			-0.0774*
			(0.0391)
Norms: Civic engagement			-0.0191
			(0.0313)
Variance of random effects			
Individuals (σ_ϵ^2)	3.0048***	2.9138***	3.0011***
Regions (σ_{U0}^2)	0.2719***	0.2211***	0.2630***
Slopes of X_{ij} (σ_{U1}^2)			
Trust: Institutional		0.0713***	
Trust: Social		0.0287***	
Networks: Informal		0.0293***	
Networks: Formal		0.0036***	
Civic engagement		0.0054***	
-2 Log Likelihood	111,134.8	110,693.6	111,114.7

Note: See note to Table 2.

Tables in Appendix A

[Tables A1 to A3 positioned together in Appendix A]

Table A1. Rotated component matrix of the trust dimension of social capital: loadings

Items	Components	
	Institutional trust	Social trust
Most people can be trusted, or you can't be too careful		0.827
Most people try to take advantage of you, or try to be fair		0.816
Most of the time people are helpful, or mostly looking out for themselves		0.782
Trust in country's parliament	0.830	
Trust in legal system	0.770	
Trust in the police	0.642	
Trust in politicians	0.840	
Trust in political parties	0.835	
Trust in the European Parliament	0.800	
Trust in the United Nations	0.751	
% of total variance	44.09	23.54

Note: KMO statistic = 0.877.

Table A2. Rotated component matrix of networks dimension of social capital: loadings

Items	Components	
	Informal networks	Formal networks
Work in a political party or action group during last 12 months		0.645
Work in another organization or association during last 12 months		0.793
Involved in work for voluntary or charitable organizations		0.687
How often you meet with friends, relatives or colleagues socially	0.786	
Take part in social activities compared to others of the same age	0.727	
People with whom you can discuss intimate and personal matters	0.658	
% of total variance	27.67	25.85

Note: KMO statistic = 0.667.

Table A3. Rotated component matrix of norm dimension of social capital: loadings

Items	Component
	Civic engagement
Contact politicians or government officials during last 12 months	0.522
Wear or display a campaign badge/sticker during last 12 months	0.625
Sign a petition during last 12 months	0.727
Take part in lawful public demonstration during last 12 months	0.596
Boycott certain products during last 12 months	0.600
% of total variance	38.19

Note: KMO statistic = 0.712.

Tables in Appendix B

Table B1. Determinants of Europeans' happiness: Individual control variables

Variables	Model I	Model II	Model III
Age	-0.0415***	-0.0428***	-0.0413***
	(0.0034)	(0.0034)	(0.0034)
Age squared	0.0004***	0.0005***	0.0004***
	(0.0000)	(0.0000)	(0.0000)
Gender: Female	0.1144***	0.1105***	0.1172***
	(0.0193)	(0.0191)	(0.0193)
Political position (ref. category: *left*)			
Centre	-0.0030	-0.0020	-0.0078
	(0.0302)	(0.0300)	(0.0302)
Right	0.2838***	0.2572***	0.2742***
	(0.0373)	(0.0371)	(0.0373)
Religion scale (ref. category: *low*)			
Medium	0.0031	0.0088	0.0045
	(0.0228)	(0.0226)	(0.0228)
High	0.2792***	0.2860***	0.2818***
	(0.0301)	(0.0298)	(0.0301)
Marital status (ref. category: *married*)			
Separated/Divorced	-0.4916***	-0.4922***	-0.4917***
	(0.0338)	(0.0335)	(0.0338)
Widowed	-0.7254***	-0.7129***	-0.7181***
	(0.0431)	(0.0427)	(0.0431)
Never married	-0.4706***	-0.4748***	-0.4724***
	(0.0287)	(0.0284)	(0.0287)
Level of education (ref. category: *ISCED 1&2*)			
ISCED 3	0.0268	0.0298	0.0307
	(0.0264)	(0.0262)	(0.0264)
ISCED 4	-0.0335	-0.0198	-0.0312
	(0.0339)	(0.0335)	(0.0338)
ISCED 5, 6	-0.0458	-0.0292	-0.0430
	(0.0308)	(0.0305)	(0.0308)
Place of residence (ref. category: *a big city*)			
Suburbs or outskirts of big city	0.0263	0.0123	0.0200
	(0.0357)	(0.0355)	(0.0357)
Town or small city	0.0391	0.0291	0.0363
	(0.0302)	(0.0298)	(0.0302)
Country village	0.0737*	0.0600*	0.0703*
	(0.0305)	(0.0301)	(0.0305)
Farm or home in country side	0.1837***	0.1656***	0.1737***
	(0.0458)	(0.0450)	(0.0457)
Health (ref. category: *very bad*)			
Very good	0.7174***	0.7242***	0.7161***
	(0.1013)	(0.1007)	(0.1012)
Good	1.2885***	1.2799***	1.2782***
	(0.0956)	(0.0953)	(0.0956)
Fair	1.6928***	1.6867***	1.6804***
	(0.0956)	(0.0952)	(0.0956)
Bad	2.0419***	2.0329***	2.0351***
	(0.0974)	(0.0970)	(0.0974)
Level of household income (ref. category: *low*)			
Medium	0.2395***	0.2442***	0.2400***
	(0.0238)	(0.0236)	(0.0238)
High	0.3883***	0.3918***	0.3896***
	(0.0271)	(0.0268)	(0.0271)

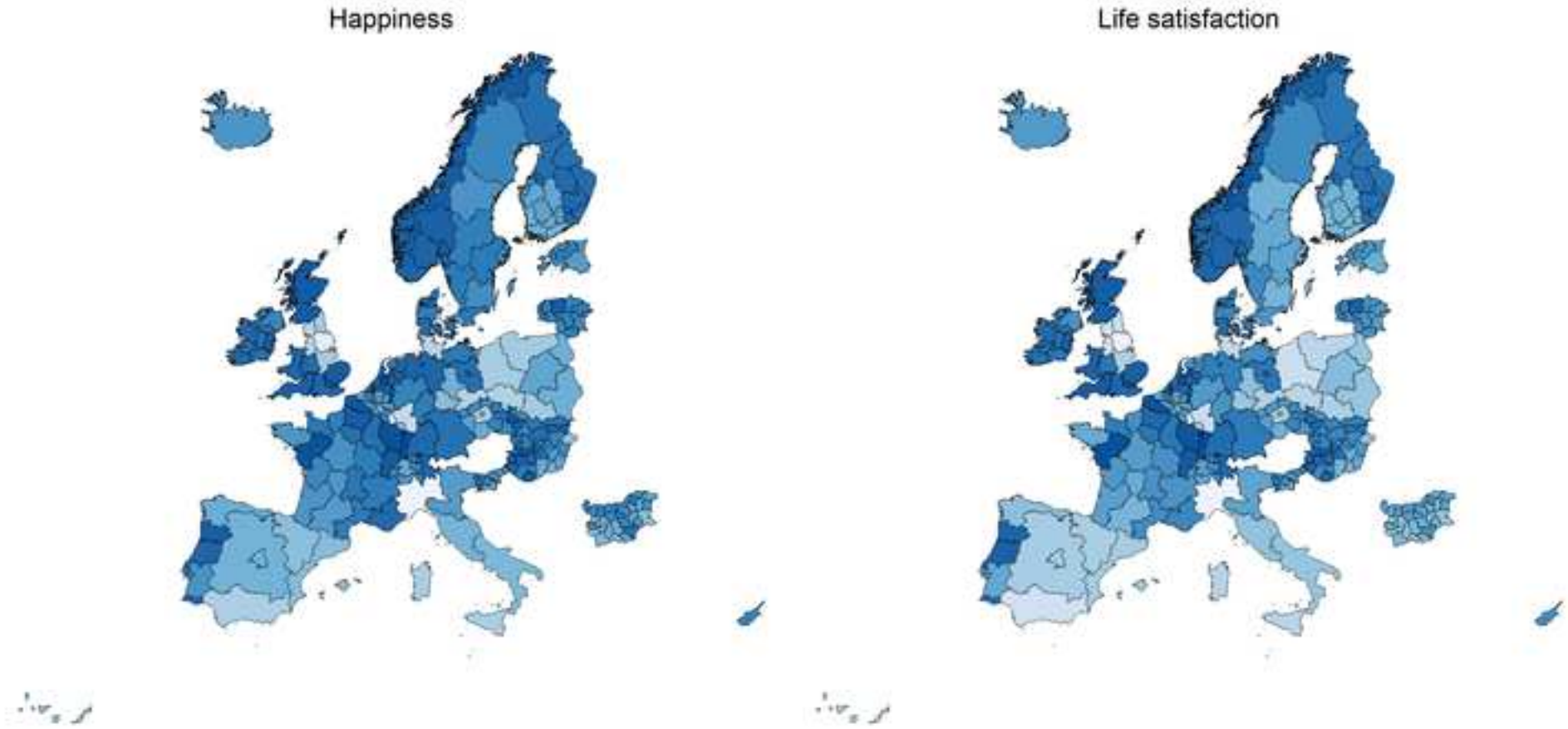
Note: Standard errors are in parentheses. * Significant at 5% level; ** at 1% level; *** at 0.1% level.

Table B2. Determinants of Europeans' life satisfaction: Individual control variables

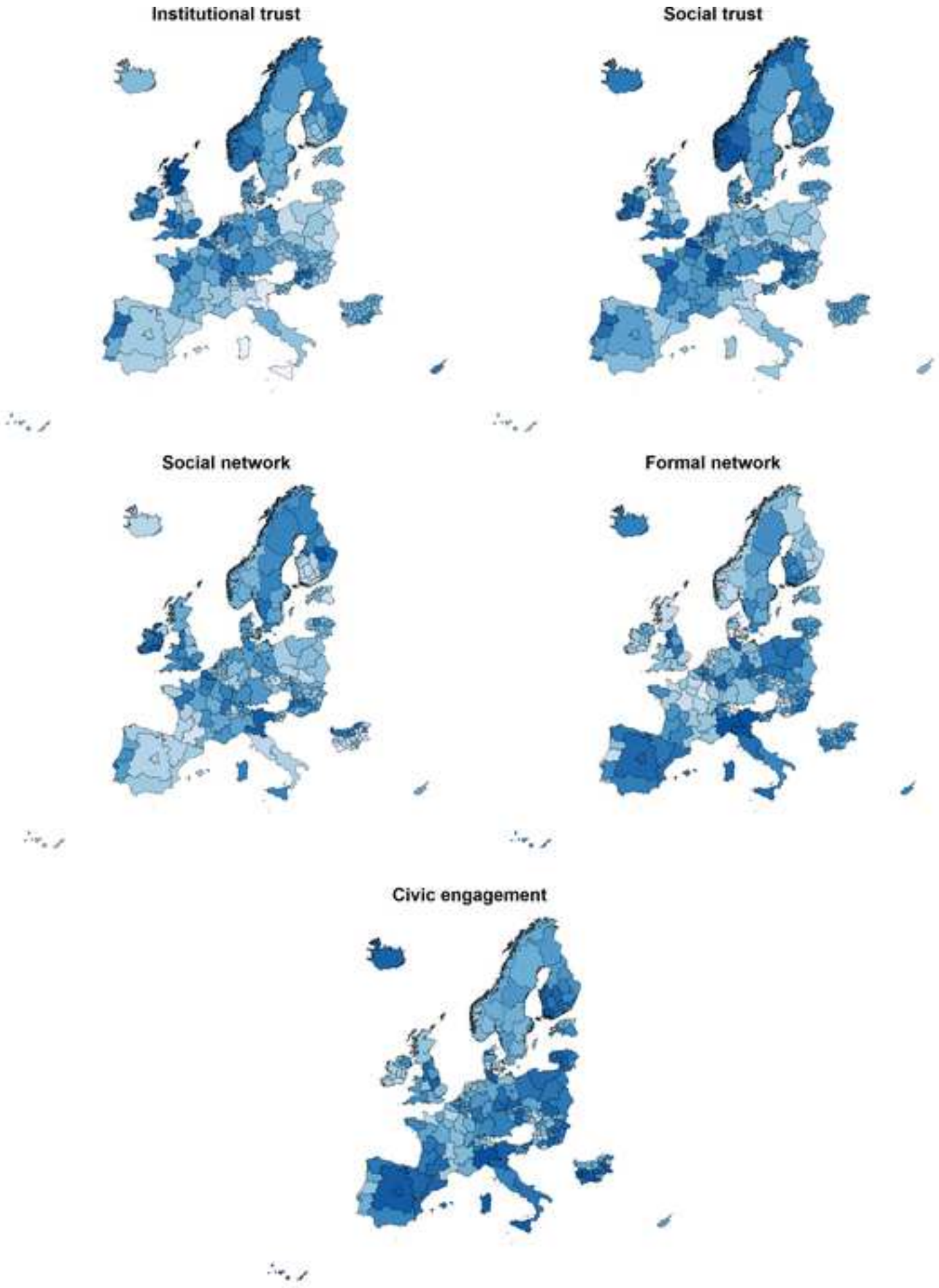
Variables	Model I	Model II	Model III
Age	-0.0594***	-0.0600***	-0.0595***
	(0.0039)	(0.0038)	(0.0039)
Age squared	0.0007***	0.0007***	0.0007***
	(0.0000)	(0.0000)	(0.0000)
Gender: Female	0.0506*	0.0437*	0.0511*
	(0.0218)	(0.0216)	(0.0218)
Political position (ref. category: *left*)			
Centre	0.0654	0.0638	0.0627
	(0.0342)	(0.0340)	(0.0342)
Right	0.4982***	0.4649***	0.4919***
	(0.0422)	(0.0420)	(0.0422)
Religion scale (ref. category: *low*)			
Medium	-0.0241	-0.0134	-0.0213
	(0.0258)	(0.0256)	(0.0258)
High	0.2150***	0.2201***	0.2165***
	(0.0340)	(0.0338)	(0.0340)
Marital status (ref. category: *married*)			
Separated/Divorced	-0.4396***	-0.4404***	-0.4405***
	(0.0382)	(0.0379)	(0.0382)
Widowed	-0.4349***	-0.4349***	-0.4320***
	(0.0487)	(0.0483)	(0.0487)
Never married	-0.3545***	-0.3551***	-0.3538***
	(0.0324)	(0.0322)	(0.0324)
Level of education (ref. category: *ISCED 1&2*)			
ISCED 3	0.0416	0.0401	0.0420
	(0.0298)	(0.0297)	(0.0298)
ISCED 4	0.0023	0.0046	0.0011
	(0.0383)	(0.0380)	(0.0383)
ISCED 5, 6	-0.0059	0.0073	-0.0045
	(0.0348)	(0.0346)	(0.0348)
Place of residence (ref. category: *a big city*)			
Suburbs or outskirts of big city	0.0307	0.0357	0.0309
	(0.0404)	(0.0402)	(0.0404)
Town or small city	0.0099	0.0137	0.0087
	(0.0342)	(0.0337)	(0.0341)
Country village	0.0833*	0.0822*	0.0812*
	(0.0345)	(0.0341)	(0.0345)
Farm or home in country side	0.1754***	0.1638**	0.1675**
	(0.0518)	(0.0511)	(0.0518)
Health (ref. category: *very bad*)			
Very good	1.1126***	1.1087***	1.1167***
	(0.1145)	(0.1139)	(0.1144)
Good	1.7515***	1.7284***	1.7487***
	(0.1081)	(0.1077)	(0.1081)
Fair	2.2597***	2.2389***	2.2569***
	(0.1081)	(0.1077)	(0.1081)
Bad	2.5847***	2.5579***	2.5860***
	(0.1101)	(0.1097)	(0.1101)
Level of household income (ref. category: *low*)			
Medium	0.3185***	0.3245***	0.3186***
	(0.0269)	(0.0267)	(0.0269)
High	0.5620***	0.5694***	0.5645***
	(0.0306)	(0.0303)	(0.0306)

Note: Standard errors are in parentheses. * Significant at 5% level; ** at 1% level; *** at 0.1% level.

Figure



Figure


Institutional trust
Social trust
Social network
Formal network
Civic engagement