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Spatial dependence multilevel model of well-being across regions in Europe

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A B S T R A C T

Understanding geographical perspective in explaining well-being is among the important issue in the subject. This study examines how nested and spatial structures explain variations in individual well-being across regions in Europe. We use the 2008 European Values Study, comprising 23,483 respondents residing in 200 regions (NUTS2) in Europe. Using spatial dependence multilevel model, the results show well-being to be spatially dependent through unobserved factors, meaning that well-being clusters because of clustering of unobserved factors. These findings suggest that addressing unobserved factors in neighbouring regions is an important issue for understanding individual well-being.

Introduction

Well-being here refers to subjective evaluations on human optimal experience and functioning (Ryan & Deci, 2001). Current literature shows two aspects in understanding well-being: affective and cognitive aspects. The affective aspect or mood is represented by happiness, while the cognitive aspect is represented by life satisfaction (Lane, 2000). Although this paper focuses on well-being, we use the term well-being, life satisfaction and happiness interchangeably.

The relationships between well-being and its geographical dimensions have been examined by a number of studies (Aslam & Corrado, 2012; Ballas & Tranmer, 2012; Brereton, Clinch, & Ferreira, 2008; Okulicz-Kozaryn, 2011; Oswald & Wu, 2011; Stanca, 2010). These studies investigate cross-area distributions of well-being which conclude that there are different distributions of well-being across areas. Stanca (2010) suggests that geographical factors must be included in any explanation of well-being. More specifically, Oswald and Wu (2011) conclude that the state in which one lives makes a contribution to individual well-being.

It is important to study well-being from geographical perspective for two reasons. First, there is a spatial distribution of well-being among the geographic areas (Oswald & Wu, 2011). One area has specific level of well-being compared to other areas. Previous research suggests that different areas may create different levels of well-being (Pittau, Zelli, & Gelman, 2010). For example, people who live in rich regions tend to have higher level of well-being. In addition, Di Tella, MacCulloch, and Oswald (2003) suggest that well-being among Europeans is affected by macroeconomic factors (e.g. per capita GDP, unemployment rate). Second, most areas in the world have boundary with other areas or share borders with each other. These areas thus have their own spatial structure. For example, Stanca (2010) finds that there are spatial patterns among countries in explaining the effect economic indicators on well-being. In addition, Ertur, Galo, and Baumont (2006) and Niebuhr (2002) conclude that macroeconomic indicators among regions in Europe have spatial dependence structure.

Besides these important considerations, a major issue in conducting spatial research is to identify spatial scale. Aslam and Corrado (2012) argue that one of the most suitable groupings in Europe and to deal with data available in Europe is NUTS (Nomenclature of Territorial Units for Statistics) system of regional classification or regions. There are two main reasons for this. First, regions seem to have similar cultural and geographical characteristics that results in individual clustering across countries. In addition, Veenhoven (2009) argues that institutional variations across regions within nations tend to be similar. Therefore, identifying these smaller areas within nations may have better understanding of well-being. Second, Rampichini and D'Andrea (1997) suggest that regions should be considered as the macro-level since individuals living in a region have relatively similar socio-economic, political and cultural environment which contributes to well-being. Moreover, in Europe it is possible to observe stronger similarities (economic and socio-cultural) between certain areas of different countries than within the same country. Based on these

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argument, we focus on NUTS level 2 as spatial scale and thereafter we use term region.

In attempting to examine how geographic factors affect well-being, the literature uses two methods of analysis: spatial dependence model and multilevel model. Spatial dependence model is used to estimate how the spatial structure of regions explains well-being. This model assumes that the characteristics of geographic areas may be dependent on each other as they share borders. For example, if regions A, B and C are neighbours, then this suggests that regions A, B and C may have similar levels of well-being, whereas the same cannot be said about non-neighbours regions X, Y and Z. Therefore, taking into account this spatial structure is likely to result in a better understanding of well-being. Studies that have already done so include Okulicz-Kozaryn (2011) and Stanca (2010), who suggest that well-being is indeed spatially structured.

Although these studies raise the understanding of how geographical factors explain well-being, they do so by using an area-aggregate of well-being data, ignoring multilevel structure of the data in which heterogenous individuals are nested within regions. It is essential to consider how this nested structure drives our understanding of individual well-being, for example how regional economic conditions impinge on individual residents' well-being. To deal with this issue, multilevel model seems the most suitable. Only few studies have so far used this. Pittau et al. (2010), for example, use multilevel model to examine economic disparity and individual life satisfaction across regions in Europe. More recently, Ballas and Tranmer (2012) use the same model to examine whether individual variations in happiness and well-being are attributable to individual, household, district or region characteristics.

Despite the usefulness of both spatial dependence and multilevel models in examining the geographical dimensions of well-being, these models are not without limitations. Spatial dependence model ignores multilevel structure of the data, while multilevel model ignores spatial dependence of neighbouring areas. To improve on this, we go further and follow Savitz and Raudenbush (2009) who propose an extension of these models by applying spatial dependence multilevel model. This model combines spatial contiguity at region level and nested structure of the data.

This paper aims to examine how the nested and spatial structures explain variations in individual well-being across regions in Europe. Using data from the 2008 European Values Study combined with regional statistics from Eurostat and digital boundaries from EuroBoundaryMaps, it is expected to advance our understanding how geographical dimensions explain well-being.

The results of this study suggest that well-being to be spatially dependent because of spatial dependence of unobserved factors. When using standard multilevel model, regional unemployment rate and per capita GDP have significant association with well-being. However, when spatial dependence multilevel is introduced, these contextual covariates become insignificant.

This paper is organised as follows: first, we identify the determinants of well-being in previous studies. We then describe the data and method used, including our construction of the covariates and the analytic strategy we used. In the penultimate section we present and discuss our results and their implications. Lastly, we conclude.

Determinants of well-being

Literature on the determinants of well-being is vast and still growing. Our review is thus by necessity selective (see Dolan, Peasgood, & White, 2008). Previous research however reveals a consistency among certain factors; these include health, companionship, unemployment and income.

Health is known to be an important determinant of happiness, the most often used measure of well-being. Reviewing some studies exploring various health-related indicators, including obesity, self-rated health and hypertension, Graham (2009) concludes that health has significant effect on happiness. More specifically, Gerdtham and Johannesson (2001) examine a national Swedish survey and conclude that certain socio-economic factors affect happiness through their impact on health.

Other than health, social interaction and companionship are also significant determinants in explaining well-being. Empirical studies within and across countries repeat the same result, indicating that family solidarity and friendship are strong predictors of well-being (Argyle, 2001). Moreover, Lane (2000) finds that in wealthy countries, companionship is even more important than income. The literature also shows that social capital, measured by participation in associations, has a positive correlation with well-being (Helliwell & Putnam, 2004).

On companionship, a number of studies discuss the impact of marital status on well-being: individuals derive social and emotional benefits from a supportive partner. Being married thus has a very high positive correlation with well-being, whereas being divorced and being widowed are detrimental to well-being (Argyle, 2001). There is also evidence that stable and secure intimate relationships are beneficial to happiness, and conversely that the dissolution of such relationships is damaging (Clark & Oswald, 2002; Graham, 2009).

Turning to one of the most important predictors of well-being, unemployment status has been recognised as a significant covariate of happiness. Previous studies (Clark & Oswald, 1994; Oswald, 1997) point out that unemployment is strongly and negatively associated with happiness, with severe and long-lasting negative impacts on well-being. These results cannot be interpreted only in terms of loss of income; there are significant non-pecuniary effects as well.

Another economic factor affecting well-being is income, the effect of which has become a major subject for debate in the literature. As far back as Easterlin (1974), research shows that personal income has a positive effect on happiness, but also that as GDP grows over time, happiness fails to follow. However, more recent studies examining this 'Easterlin paradox' have presented evidence to the contrary. Deaton (2008) demonstrates a positive relationship between per capita income and average happiness. Similarly, Inglehart, Foa, Peterson, and Welzel (2008) refer to the World Values Survey for 1981–2007 and find that as GDP per capita grows, well-being increases by as much as 77% in 52 countries across the world.

In terms of demographic factors, gender and age are the two standard covariates of well-being. Previous research concludes that women tend to be happier than men (Graham, 2009); one somewhat contentious explanation for this is that women tend to have a lower level of aspiration and thus a higher level of well-being (Frey & Stutzer, 2002). Age is also a significant covariate in the prediction of well-being; the association between the two is slightly positive (Argyle, 2001), with older people likely to be happier than younger ones. Previous studies have also found a U-shaped relationship between age and well-being (Blanchflower & Oswald, 2008; Clark, 2003): people tend to be happier when they are younger or older than when they are middle-aged.

Education may be one of the most intriguing determinants of well-being. A number of studies have investigated the relationship between the two (Diener, 2000; Diener, Sandvik, Seidlitz, & Diener, 1993; Stutzer & Frey, 2008), and suggest a positive correlation, due to the fact that education may lead to higher earning opportunities. In contrast, Clark and Oswald (1994) find a negative relation, which they conclude is due to education increasing aspirations and the