Essays on well-being during crisis in Europe

A thesis submitted to the University of Manchester for the degree of
Doctor of Philosophy in the Faculty of Humanities

2014

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\(^1\)This chapter is based on the following article: Pierewan, A.C., and Tampubolon, G. (forthcoming). Internet use and well-being before and during crisis in Europe. Social Indicators Research. doi: 10.1007/s11205-013-0535-0.
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The University of Manchester
Adi Cilik Pierewan
Essays on well-being during crisis in Europe
3 March 2014

Abstract

The claim that economic crisis matters for well-being seems intuitive; supporting evidence, however, remains elusive. The present study aims to examine the individual and contextual determinants of well-being across regions in Europe during the 2007-2008 economic crisis. This study contributes to the existing research on the determinants of well-being in three ways. First, while most studies explain the determinants of well-being in the context of non-crisis, this study examines the determinants during a period of crisis. Second, while most research on well-being focuses on cross-national comparisons of well-being, this study investigates variations at both the regional and national levels. Third, while most studies use either individual or aggregate analyses to examine the determinants of well-being, this study uses multilevel models.

This study uses datasets that combine individual, regional and country level data. Individual data is taken from the 2008 European Values Study (EVS) and the 2004-2010 European Social Survey (ESS). Regional level data comes from Eurostat and Euroboundarymaps, while country level data comes from the Inglehart Index, UNU-WIDER and Esping-Andersen categorisation on welfare states. To analyse the data, this study uses various multilevel models including multivariate multilevel model, multilevel simultaneous equations model and spatial dependence multilevel model.

The main findings show that during the crisis under consideration, well-being is associated not only with individual determinants, but also with regional and national determinants. Results suggest that happiness and health are positively correlated at individual, regional and national levels. In terms of social capital, this study shows the reciprocal relationship between association membership and trust. Frequent Internet use at the time of crisis is positively associated with well-being. Finally, the findings suggest that, by means of unobserved factors, well-being is spatially correlated with the well-being of those neighbouring regions.
Declaration

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Acknowledgements

All praise is due to Allah, the God of the universe. This study would not have existed without the will of God, Allah, the Giver of all good and perfect bounties. With his blessing and mercy, Allah granted me in order to see my dream through to completion. All praise for his guidance and grace. Peace and blessing be upon our prophet Muhammad.

Writing thesis is a sort of journey within the self, a journey to find myself. I must express my gratitude to my supervisors, Gindo Tampubolon and Ronnie Ramlogan for their excellent supervision and persistent support throughout my study of the doctoral programme. Gindo has given me supervision in many respects. He has taught me how to know myself. He has shown me how good quantitative research is done and has given me enormous assistance in dealing with survey data. He has motivated me to write a paper. Overall, I am thankful for all his contributions of time, ideas and techniques. Thank to his advice and suggestions, and for reading my papers, drafts, and chapters over and over again. His supervision has certainly made me a better researcher.

Many thanks to my examiners: Dimitris Ballas, Alan Marshall and the independent chair: Tarani Chandola for encouraging questions and invaluable inputs.

Manchester means invaluable place for me, a place to grow my academic development as well as human and spiritual development. The members of Institute for Social Change at the University of Manchester have contributed to the completion of this work. I am especially grateful to Rachel Gibson, Yaojun Li, Magdalen to name just a few, for their assistance. Paul Widdop for comments and discussions on the work at various stages. To my colleagues Sujarwoto, Devi Femina, Citra Jaya, Asri Maharani and Wulung Hanandita, what moments of great joy, enormous stress, and huge ambition have we shared the last couple of years. Thanks to my ISC roommate: Adrian, Lindsay and Annie. Frances Hunt and Amari Barash for their patience in correcting my language. Dan and his friends at Graphic Support Workshop, for giving excellent support in documenting my thesis. It is hard to imagine how I would have managed to complete my thesis without your suggestions and companionship. Having good colleagues is very helpful in writing a PhD thesis, as is having nice friends.

Thanks to all friends in Manchester: Pak Opik family, Pak Wisnu family, Mas Ari family, Mas Hen family, Mbak Tri family, Om Hayat family, Om Munas family, Mas Zaen family and all friends in Manchester. Thanks to all colleagues in Indonesia: Pak Djamal and Bude Neila, Pak Rochmat Wahab, Pak Ajam, Bu Puji, Mbak Nur, Mas Grendi, Mbak Pur and Mas Miko.

I must also express my gratitude to Indonesian government, for the funding of my doctoral programme. It would have been impossible to have come to a smooth completion of the research project without its grant assistance.

I would like to thank my family members for all their love: for my parents: Ibu, Bapak, Mama and Papa, who choose me with care and love. Thank Yuk Ari, Mbak Nusi, Mas Budi, Cak Erik, Ibuk Siwi, Pak Budi, Mas Jem and Anggita for your supports and prays.
A special thank for my daughter, Fathiy Pilar Pierewan, for your understanding, patience, support and encouragement. A special acknowledgment goes to my mothers, Sri Suktiati and Siti Subingah.
Chapter 1
Introduction

The recent economic crisis was instigated by one in the United States, which in turn was triggered by the collapse of Lehman Brothers, the fourth-biggest investment bank in the world. The crisis spread to Europe, signalled by the fall of the UK bank Northern Rock in September 2007 and widened to European countries such as Spain, Portugal, Greece and Italy. The situation in Europe, similar to that indicative of past economic crises, was marked by a rise in inflation rate and in the unemployment rate as well as a decline in economic growth.\footnote{In comparison with previous economic crisis, Gorton and Metrick (2012) conclude that the 2007-2008 global crisis was the worst since the Great Depression of the 1930s. In motivating the study of economic crisis and well-being, Deaton (2012, p.2) asserts that ‘the crisis brought harm to many, but it is a boon to researchers on subjective well-being, for whom it provided an unparalleled opportunity to examine how these events affected the standards of living, the emotional experiences, and life evaluations of those who lived through it’.}

The claim that an economic crisis matters for well-being seems intuitive;
yet supporting evidence remains elusive. Veenhoven and Hageenars (1989) discussed the negative, positive and neutral effects an economic crisis may have on well-being. The negative effects of an economic crisis stem from loss of employment and income. This was supported by Shapiro (2010) who used the CogEcon 2009 survey to examine the effects of financial crisis on household consumption. Shapiro concluded that financial crisis affects older Americans by causing a decrease in their household consumption. This decrease may have a negative effect on individuals’ well-being. On the other hand, Veenhoven and Hageenars (1989) argued that financial crisis might also have a positive effect on individuals’ well-being: many people tend to reduce their consumption of unhealthy products such as cigarettes and alcohol. As a result, the economic situation may increase their health status and in turn will increase their well-being. The neutral effect of the financial crisis has been posited by Deaton (2012) who fails to detect significant effects of the economic crisis on well-being.

This study aims to examine the individual and contextual determinants of well-being in Europe during the economic crisis. As suggested by Frey (2008), research needs to examine the effect of various economic conditions on well-being in order to increase our understanding of the factors contributing to well-being and in order to inform policy-makers in addressing well-being.

1.1 Why well-being and its study during the economic crisis?

Well-being is considered by many as an important goal in life. ‘Happiness is that ultimate goal because unlike all other goals, it is self-evidently good. If we are asked why happiness matters, we can give no further, external reason. It just obviously does matter’ (Layard, 2005, p.113). Diener (2000) shows evidence of such based on a survey of college students in seventeen countries. His
findings suggest that two measures of well-being, happiness and life satisfaction, were rated above average and more important than money in every country. Well-being is associated with a wide range of individual psychological and behavioural benefits (see Lyubomirsky et al., 2005). For example, well-being is an important cause of individual success which contributes to productivity, a happy marriage and good social relationships (Diener and Seligman, 2004).

In light of the importance of well-being, it is perhaps unsurprising that researchers pay close attention to the concept. Having foundations in philosophy, in particular in the writings of Aristotle and Bentham which continue to contribute to the discussion on the concept of happiness (Nussbaum, 2007), studies of well-being have extended into the disciplines of psychology (Diener and Biswar-Diener, 2008; Argyle, 2001; Kahneman et al., 1999), politics and public policy (Lane, 2000), economics (Frey and Stutzer, 2002; Bruni and Porta, 2005; Layard, 2005; Graham, 2009) and geography (Okulicz-Kozaryn, 2011; Ballas and Tranmer, 2012).

Within psychology, one of the first disciplines to examine the antecedents and consequences of subjective well-being, research has predominantly focused on the psychological determinants and the measurement of well-being (e.g. Kahneman et al., 1999; Argyle, 2001; Kahneman et al., 2004). Within the field of political science, well-being research has focused upon the ways in which political institutions can affect individuals’ happiness (Rode, 2012). For example, research in this area has suggested that democracy has a significant impact on individual well-being (Frey and Stutzer, 2002).

Within the discipline of geography, studies have addressed the issue of the importance and role of geographical factors in predicting and explaining individual well-being (e.g. Aslam and Corrado, 2012; Oswald and Wu, 2011). Findings suggest that place of residence may have a significant impact upon people’s well-being. For example, Brereton et al. (2008) showed that proximity
to major roads and airports may decrease individual well-being.

The economic determinants of well-being and happiness have attracted attention from economics researchers since the 1970s. Research in this area has typically focused upon the role of economic factors such as unemployment levels in affecting individuals’ well-being. In addition, several studies on happiness economics have revealed that economic factors affect individuals’ well-being (Easterlin 1974, Clark and Oswald 1994, Frey and Stutzer 2002, Graham 2009). In his seminal paper, Easterlin (1974) reports that income plays a crucial role in determining well-being. However, when an economy grows over time, aggregate levels of happiness remain stable. This latter evidence suggests that economic factors only impact individual well-being up to a certain point; that is, no additional benefits accrue once income and other economic factors reach a particular threshold.

The radical change in economic distribution during the recent economic crisis has features that may create different patterns of individual well-being. But few studies have asked how economic crisis affects well-being, and those that have done so have been inconclusive (Graham and Sukhtankar 2004, Veenhoven 2007, Veenhoven and Hageenars 1989, Deaton 2012). Graham and Sukhtankar (2004) explored the ways in which crisis in certain Latin American countries affects various attitudes related to individual well-being. Using the Latino Barometer Survey, they found that countries facing crisis have higher levels of well-being compared to non-crisis countries. However, when they introduce the Prospect of Upward Mobility which refers to individuals’ expectations about future mobility, the findings showed that the countries facing crisis have lower levels of well-being than non-crisis countries.

One of the most recent studies on the ways in which financial crisis affects well-being was conducted by Deaton (2012). Using Gallup polls from 2008-2010, the study shows that financial crisis generally does not affect individual
well-being. Moreover, Deaton illustrates that happiness can be influenced by one-off events such as Christmas and St Valentine’s Day, but not by overarching, ongoing events such as rising unemployment. He concludes that the mass media plays an influential role in determining levels of individual well-being. This evidence suggests that the effect of a major event (i.e. economic crisis) on individuals’ well-being may be mediated by information communicated via the mass media.

Besides academics, policy-makers consider well-being as well. For example, in 1971, Bhutan changed GDP with Gross National Happiness as an indicator of development in the country. More recently, in 2008, the Sarkozy Commission recommended policy-makers, academics, and civil society organisations to consider quality of life indicators (e.g. happiness, subjective well-being) as important measures of a country’s development (Stiglitz et al., 2008). This recommendation has been followed by UK Prime Minister Cameron, who has acknowledged that well-being is an important indicator of the UK’s successful development. The Organisation for Economic Co-operation and Development (OECD) also sets out to measure social progress among member states using a number of well-being indicators.

The interests of academics and policy-makers in measuring well-being should take into account the change brought about by economic crisis. The recent

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2 In February 2008, the President of the French Republic, Nicholas Sarkozy, unsatisfied with the present state of statistical information about the economy and the society, asked Joseph Stiglitz, Amartya Sen and Jean Paul Fitoussi to create a Commission, subsequently called ‘The Commission on the Measurement of Economic Performance and Social Progress’ (CMEPSP). The Commission’s aim has been to identify the limits of GDP as an indicator of economic performance and social progress, including the problems with its measurement; to consider what additional information might be required for the production of more relevant indicators of social progress; to assess the feasibility of alternative measurement tools, and to discuss how to present the statistical information in an appropriate way.

3 In the UK, the ONS proposal for measuring national well-being include ‘individual well-being’ a distinct domain capturing overall life evaluations.

4 In 2013, OECD publishes a guideline for measuring well-being. These guidelines have been produced under the OECD’s Better Life Initiative – a pioneering project launched in 2011, which aims to measure society’s progress across eleven domains of well-being, ranging from income, jobs, health, skills and housing, through to civic engagement and the environment (OECD, 2013).
crisis in Europe has several characteristics: a rise in inflation, a rise in the unemployment rate, and a drop in GDP growth. Since these characteristics are found to be significant predictors of well-being (Di Tella et al. 2001), the changes on these may result in different patterns of individuals’ well-being.

Figure 1.1: Well-being and economic conditions during crisis in Europe

Figure 1.1 shows changes in unemployment rate, inflation rate and GDP growth and well-being before and during the crisis. There is a marked decrease in GDP growth (from 3.3% in 2006 to -4.4% in 2008) and a marked increase in inflation rates (from 2.4% in 2006 to 3.7% in 2008) and unemployment rates (from 7.1% in 2008 to 9.3% in 2009). Although there is only a slight decrease in well-being indicated during the crisis (from 7.2 to 6.9), studying well-being in a time of crisis may still result in new insights for both academics and policy-makers.
1.2 Well-being: the concept and determinants

1.2.1 The concept of well-being

Well-being is a multidimensional phenomenon comprising several different aspects of an individual’s life (Stiglitz et al., 2010). Kahneman et al. (1999) argue that well-being can be conceptualised and measured at five distinct and hierarchically ordered levels (from molar to molecular); the levels are: external conditions such as income, neighbourhood, housing; subjective well-being, which is reflected by self-reports of satisfaction with life or happiness; persistent mood level, for example optimism or pessimism; immediate pleasures/pains, including transient emotional states such as joy and anger; and biochemical as the neural bases of behaviour.

In order to provide a more comprehensive review of subjective well-being, the following discussion describes two contrasting conceptualisations of subjective well-being: the hedonic approach and the eudaimonic approach (Ryan and Deci, 2001). According to the hedonistic approach of well-being, happiness is the avoidance of pain and the achievement of pleasure. This perspective emphasises the acquisition of material goods. According to Kahneman et al. (1999), hedonism reflects the view that well-being is the experience of pleasure or happiness. ‘Hedonism, as a view of well-being, has thus been expressed in many forms and has varied from a relatively narrow focus on bodily pleasures to a broad focus on appetites and self-interests’ (Ryan and Deci, 2001, p.144).

In contrast, the eudaimonic approach holds that happiness arises as people function and interact within society; it is an approach emphasising the role of non-material pursuits such as relationality and intrinsic motivation (Ryan and Deci, 2001). This approach insists that well-being consists of more than merely hedonic or subjective happiness: ‘Despite the currency of the hedonic view, many philosophers, religious masters, and visionaries, from both the
East and West, have denigrated happiness per se as a principal criterion of well-being (Ryan and Deci, 2001, p.145). According to the eudaimonic perspective, subjective well-being is the actualisation of human potential that is, the fulfillment or realisation of one’s daimon or true nature.

The two traditions of hedonism and eudaimonism are founded on distinct views of human nature and of what constitutes a good society. Accordingly, they ask different questions concerning the relationship of developmental and social processes with well-being. Moreover, they guide individuals towards different approaches to living life (Ryan and Deci, 2001).

This study, following well-being dimensions characterised by Huppert et al. (2009), uses two concepts of well-being: subjective well-being and social well-being. Subjective well-being includes happiness and life satisfaction, while social well-being refers to association membership and generalised trust. Hallerod and Selden (2013) identify five well-being arenas and related well-being problems: (1) health: subjective evaluation of health and indicators of somatic health problems; (2) functions: what people can or cannot do, for example if they need help with daily chores or have difficulty moving around; (3) psychosocial: being down-hearted and sad, anxious, and worried; (4) social relations: no close friends, lack of contact with neighbours; (5) economy: experiences of economic hardship, vulnerable economic situation. Using confirmatory factor analysis, Hallerod and Selden find that these five discrete arenas of well-being – health, functionality, psychosocial well-being, social relations, and economy – appear to have relationships among them. In addition, it provides a set of latent variables measuring the five specific well-being arenas and the multidimensional aspect of well-being.
1.2.2 Well-being during the economic crisis: a conceptual framework

Bernanke (2010) gives an overview to provide an understanding of the causes of the recent economic crisis. There are two causes: triggers and vulnerabilities. Triggers refer to the certain events or conditions that touched off the crisis, while vulnerabilities refer to the structural weaknesses in the financial system and in its regulation and supervision that propagated and amplified the initial shocks. One of the triggers of crisis in this case was the loss on subprime mortgages after house prices started to decline. However, this cannot completely explain the mechanism of crisis. Moving to the vulnerabilities, Bernanke (2010) argues that shadow banking was the source of key vulnerabilities. Shadow banks are financial institutions other than regulated financial ones; they serve as intermediaries to channel savings into investments.

Reinhart and Rogoff (2008) study the ‘big five’ crises: Spain (1977), Norway (1987), Finland (1991), Sweden (1991), and Japan (1992). The authors conclude that the economic crisis has different characteristics in different countries. Although there are different characteristics in different countries, there are similarities in the run-up of asset prices, in debt accumulation, in growth patterns, and in current account deficits. Moreover, Reinhart and Rogoff (2011) discuss a set of economic activities associated with the economic crisis: (1) inflation, hyperinflation, and currency crises; (2) debt categories and debt crises; (3) banking crises; (4) the ‘This-Time-Is-Different’ syndrome and serial default.

The recent economic crisis has had different effects on each country in Europe. For example, Italy, Greece and Spain suffer more from the crisis compared to other countries. However, Blanchard (2009) argues that globalisation undoubtedly resulted in increasing connectedness between financial institutions, both within and across countries. Thus, it is crucial to look at the crisis across Europe.
Many scholars have investigated the determinants of well-being (Graham, 2009; Frey and Stutzer, 2002). Some have suggested that the effect of economic conditions on subjective well-being is apparent (Di Tella et al., 2003; Graham, 2009; Frey and Stutzer, 2002). Economic crisis, as an economic circumstance, may affect well-being as well. However, few studies have examined determinants of well-being in times of crisis (Deaton, 2012; Veenhoven, 2007). Such an investigation is a necessity, as it may have beneficial implications for the study of well-being and for policy-making.

Most studies on the effects of economic crises on well-being focus on mental health problems. Viinamaki et al. (2000) explore mental health among the Finnish population during the economic recession of 1993-1995. The findings show that mental health problems are associated with unemployment for both men and women. Poor self-rated health, suicidal thoughts and poor economic conditions are significantly associated with mental health problems. Avcin et al. (2011) conduct a study on the mental health of employees in Slovenia. Using regression technique, they concluded that there is a significant increase in depression and anxiety in periods of financial crisis.

Additional evidence that economic crisis affects mental health has been provided by Sargent-Cox et al. (2011), who investigate the effects of financial crisis on self-reported health and psychological functioning among older adults as measured by depression and anxiety levels. Their study analysed 1,973 older adults using the latent difference score model. The results suggest that there is a significant increase in depression and anxiety during financial crises. Moreover, timing does matter: respondents who were interviewed in the beginning of crisis tended to have lower levels of depression compared to those who were interviewed six months later. Using the 2006 and 2010 Eurobarometer surveys, Evans-Lacko et al. (2013) investigate the change in unemployment rates among individuals with and without mental health problems. The find-
ings suggest that economic crisis worsens mental health conditions in people who already suffer from mental health problems, particularly males and people with lower levels of education.

Introducing geographical factors can help explain the relationship between the recent economic crisis and mental health. Gili et al. (2012) examine the associations between the two among patients in primary care in Spain. They studied 7,490 patients in 2006-2007 and 5,876 patients in 2010-2011. The results demonstrated an increase in the proportion of patients with mental health problems such as mood, anxiety and alcohol-related disorders during the crisis compared to the results measured before the crisis. Bernal et al. (2013), using Spanish national data between 2005 and 2010, investigated the association between financial crisis and suicide rates in Spain. The researchers applied segmented regression with a seasonally adjusted quasi-Poisson model and stratified analysis to test the association. The results show an 8.0% increase in suicide rates during the economic crisis. Results suggest that Mediterranean and northern areas of the country saw a greater increase in suicide rates than did central Spain.

In addition to studies on the effect of crisis on mental health, a few studies have focused on the economic crisis and happiness. Gudmundsdottir (2013), using a longitudinal, nationally representative sample from Iceland (N=4,992), aims to examine how economic crisis in Iceland affects happiness. She demonstrates that happiness decreased during the crisis with social relationships and health predicting 30.9% of the happiness variance, while unemployment, income and financial difficulty contributed 4.2%. However, when all variables were included, income and unemployment did not reveal an association with happiness. Another study conducted by Helliwell et al. (2013) investigate how the quality of social capital could help individuals to deal with the recent economic crisis situation. Using the Gallup-Healthways Well-Being In-
dex, European Social Studies and a Korean study, the researchers found that higher levels of social capital and trust at the community and national levels contribute to individuals’ ability to deal with the crisis.

Figure 1.2: Framework of the study

Figure 1.2 shows how economic crisis affects well-being. An economic crisis can have individual and contextual consequences. At the contextual level, increased unemployment rates, increased inflation rates, decreases in growth rates and increased inequality are among the consequences of economic crisis. Such economic conditions may affect well-being. For example, a large increase in the unemployment rate is closely related to increased suicide rates. Moreover, countries with lower levels of spending on active labour-market programmes suffer more than those spending more on such programmes (Stuckler et al., 2009). With regard to the individual level, changes in employment status, a decrease in household consumption and change in social capital are among the consequences of economic crisis. Since the labour market suffers
from a crisis, there is a probability of being unemployed which in turn affecting individual employment prospects (Bernal et al., 2013). In addition, household income decreased during the period in question because many households suffered from the macroeconomic conditions associated with the crisis (Shapiro, 2010). Evidence shows that economic situation in Europe is associated with a decrease in the incidence of traffic accidents, which indicates a decrease in private vehicle use (Stuckler et al., 2009), showing the decrease in household consumption. In terms of social fabric, financial crisis has a detrimental effect on social capital indicators including membership in voluntary associations and trust (Zizumbo-Colunga et al., 2010; Growiec et al., 2012). All of the consequences of economic crisis may have effect on individuals’ well-being. Next section describes previous research on the individual and contextual determinants of well-being at the context of both non-economic crisis and economic crisis.

1.2.3 Previous studies of well-being and its determinants in Europe

Findings from previous research on well-being suggest that factors contributing to well-being fall into two broad categories: individual and contextual. Individual factors pertain to the socio-demographic characteristics of individuals and their unique economic circumstances; these include gender, age, health, education, marital status, social capital, employment status and household income. Contextual factors pertain to variables at the broader, regional level and include per capita GDP, economic growth, unemployment rate, income inequality, societal values, political circumstances and geographical dimensions. Table 1.1 describes these two categories in greater detail.
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<tr>
<td>Britain</td>
<td>Individual</td>
<td>Ordered probit</td>
<td>Unemployment is negatively associated with mental health. More specifically, unemployment rate affects less distress among the young and among workers in high-unemployment areas. Being unemployed in long time tend to be less distress than those who recently have lost their jobs (Clark and Oswald 1994).</td>
</tr>
<tr>
<td>Britain</td>
<td>Individual</td>
<td>Tobit model</td>
<td>Heads of households who have outstanding credit tend to have lower levels of psychological well-being (Brown and Taylor 2005).</td>
</tr>
<tr>
<td>Britain</td>
<td>Individual</td>
<td>Linear regression</td>
<td>For men, mother involvement at age 7 was related to life satisfaction at age 42, while for women, closeness to mother at age 16 was related to positive psychological functioning at age 42 (Flouri 2004).</td>
</tr>
<tr>
<td>Britain</td>
<td>Individual</td>
<td>Ordered probit</td>
<td>Female with acute and chronic physical illness who are unemployed, living in poor households are associated with poor psychological well-being (Shields and Price 2005).</td>
</tr>
<tr>
<td>France</td>
<td>Individual</td>
<td>Linear regression</td>
<td>Negative effect of terrorism on life satisfaction (Frey et al. 2009).</td>
</tr>
<tr>
<td>Location</td>
<td>Unit of analysis</td>
<td>Method</td>
<td>Important findings</td>
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</tr>
<tr>
<td>Germany</td>
<td>Individual</td>
<td>Linear regression and probit</td>
<td>Well-being of employed and unemployed men with good job prospects are strongly and negatively affected by regional unemployment (Clark et al. 2010).</td>
</tr>
<tr>
<td>Germany</td>
<td>Individual</td>
<td>Linear regression</td>
<td>Living in a higher social economic status neighborhood tends to have higher level of life satisfaction (Dittmann and Goebel 2010).</td>
</tr>
<tr>
<td>Germany</td>
<td>Individual</td>
<td>Ordered logit</td>
<td>Income and unemployment status are significant determinants of life satisfaction. More specifically, 35-40% of the increase in life satisfaction in East Germany was attributable to the large increase in real household incomes (Frijters et al. 2004).</td>
</tr>
<tr>
<td>Germany</td>
<td>Individual</td>
<td>Linear regression</td>
<td>In West Germany neighborhood income effect on life satisfaction is positive, while in East Germany that effect on life satisfaction not significant (Knies 2012).</td>
</tr>
<tr>
<td>Germany</td>
<td>Individual</td>
<td>Two-stage least squares</td>
<td>Negative effect of pollution on well-being both using standard regression and instrumental variable estimation (Luechinger 2009).</td>
</tr>
<tr>
<td>Germany</td>
<td>Individual</td>
<td>Linear regression and conditional logistic estimator</td>
<td>Happier singles tend to marry, rather than marriage results in happy couples (Stutzer and Frey 2004).</td>
</tr>
<tr>
<td>Germany</td>
<td>Individual</td>
<td>Linear regression</td>
<td>Longer commuting time results in lower life satisfaction (Stutzer and Frey 2008).</td>
</tr>
<tr>
<td>Location</td>
<td>Unit of analysis</td>
<td>Method</td>
<td>Important findings</td>
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<tr>
<td>Germany</td>
<td>Individual</td>
<td>Limited dependent variable panel models</td>
<td>Unemployment has a large detrimental effect on life satisfaction. The non-pecuniary costs of unemployment by exceed the pecuniary costs associated with loss of income while unemployed (<a href="#">Winkelmann and Winkelmann</a>) (1998).</td>
</tr>
<tr>
<td>Germany</td>
<td>Individual</td>
<td>Longitudinal analysis using multilevel model</td>
<td>Satisfaction drops as one approaches divorce and then gradually rebounds over time (<a href="#">Lucas</a>) (2005).</td>
</tr>
<tr>
<td>Russia</td>
<td>Individual</td>
<td>Ordered logit</td>
<td>People who were happier 5 years prior to the study made more money and were in better health (<a href="#">Graham et al.</a>) (2004).</td>
</tr>
<tr>
<td>Russia</td>
<td>Individual</td>
<td>Structural equations model</td>
<td>Russians with higher income tend to have higher life satisfaction (<a href="#">Schyns</a>) (2001).</td>
</tr>
<tr>
<td>Sweden</td>
<td>Individual</td>
<td>Ordered probit</td>
<td>Income, health and education have positive association with happiness, while unemployment and urbanisation have negative association with happiness (<a href="#">Gerdtham and Johannesson</a>) (2001).</td>
</tr>
<tr>
<td>Switzerland</td>
<td>Individual and Cantons</td>
<td>Ordered probit</td>
<td>The possibility of individual participation on initiatives of referenda and decentralisation increases individual happiness (<a href="#">Frey and Stutzer</a>) (2000).</td>
</tr>
<tr>
<td>Switzerland</td>
<td>Individual</td>
<td>Weighted least square</td>
<td>Higher income aspiration reduces individual happiness (<a href="#">Stutzer</a>) (2004).</td>
</tr>
<tr>
<td>Location</td>
<td>Unit of analysis</td>
<td>Method</td>
<td>Important findings</td>
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</tr>
<tr>
<td>Europe</td>
<td>Individual</td>
<td>Linear regression</td>
<td>Working fathers are happier, whereas working mothers are not (Aassve and Sironi, 2012).</td>
</tr>
<tr>
<td>Europe and US</td>
<td>Individual</td>
<td>Ordered logit</td>
<td>The poor in Europe is more worried about inequality than those in US and being left-wingers in Europe is more suffered from inequality than those in US (Alesina et al., 2004).</td>
</tr>
<tr>
<td>Europe</td>
<td>Individual</td>
<td>Ordered probit</td>
<td>Positive association between income and happiness (Caporale et al., 2009).</td>
</tr>
<tr>
<td>Europe</td>
<td>Individual and aggregate</td>
<td>Linear regression</td>
<td>Northern Europe shows higher level of well-being, compared to Central and Southern Europe (Christoph and Noll, 2003).</td>
</tr>
<tr>
<td>Europe</td>
<td>Individual</td>
<td>Linear regression</td>
<td>People are likely to be happier when inflation and unemployment rate are low (Di Tella et al., 2001).</td>
</tr>
<tr>
<td>Europe</td>
<td>Individual</td>
<td>Linear regression and Ordered probit</td>
<td>Heavy TV viewers tends to have lower life satisfaction (Frey and Benesch, 2007).</td>
</tr>
<tr>
<td>Europe</td>
<td>Individual</td>
<td>Graphical modelling</td>
<td>Happiness is positively related to stable relationship and to country characteristics (Gundelach and Kreiner, 2004).</td>
</tr>
<tr>
<td>Eastern Europe</td>
<td>Countries</td>
<td>Ordered logit</td>
<td>Positive effect of education and income, while negative effect of unemployment on subjective well-being (Hayo and Seifert, 2003).</td>
</tr>
<tr>
<td>European Union</td>
<td>Individual</td>
<td>Ordered probit</td>
<td>Trust in some institution has positive and significant effect on people’s well-being (Hudson, 2006).</td>
</tr>
<tr>
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<td>Important findings</td>
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<tr>
<td>Europe</td>
<td>Individual</td>
<td>Structural equations model</td>
<td>Since Nordic countries have well-developed social welfare and health care systems, low unemployment, high social trust, and ethnic homogeneity, they have higher level of well-being compared to other European countries (Huppert and So, 2013).</td>
</tr>
<tr>
<td>Europe</td>
<td>Individual</td>
<td>Linear regression</td>
<td>Technology affluence are positively associated with well-being (Kavetsos and Koutrompis, 2011).</td>
</tr>
<tr>
<td>Europe</td>
<td>Individual</td>
<td>Linear regression and ordered probit</td>
<td>Negative impact of floods on life satisfaction (Luechinger and Raschky, 2009).</td>
</tr>
<tr>
<td>Europe</td>
<td>Individual</td>
<td>Linear regression</td>
<td>Subjective quality of life is very high among young Europeans aged 29 or below (Pichler, 2006).</td>
</tr>
</tbody>
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**Contextual determinants**

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<th>Location</th>
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<tbody>
<tr>
<td>Europe</td>
<td>Aggregated</td>
<td>Bivariate correlations</td>
<td>Countries wider well-being is associated with the dimension of material well-being, both negatively (consumption expenditure on items like food, clothing, restaurants and hotels) and positively (recreation and culture consumptions, and ICT levels) (Madonia et al., 2013).</td>
</tr>
<tr>
<td>Europe</td>
<td>Countries</td>
<td>Linear regression</td>
<td>Positive association between desentralisation and individual happiness (Diaz-Serrano and Pose, 2012).</td>
</tr>
<tr>
<td>Europe</td>
<td>Aggregate</td>
<td>Linear regression</td>
<td>Air pollution has negative and significant effect on subjective well-being (Welsch, 2006).</td>
</tr>
<tr>
<td>Location</td>
<td>Unit of analysis</td>
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<td>Important findings</td>
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<tr>
<td>Europe</td>
<td>Individual and regions</td>
<td>Multilevel regression</td>
<td>Greater regional effects relative to national effects, but individual well-being continues to be affected most by micro-level phenomena (Aslam and Corrado, 2007).</td>
</tr>
<tr>
<td>Europe</td>
<td>Individual and regions</td>
<td>Multilevel linear mixed model and random-effects ordered probit model</td>
<td>Individual and regional factors are significant in explaining well-being; Regional economic and non-economic factors contribute to explaining well-being (Aslam and Corrado, 2012).</td>
</tr>
<tr>
<td>Britain</td>
<td>Individual household, district and regions</td>
<td>Multilevel linear regression</td>
<td>Contextual covariations has small effect on well-being (Ballas and Tranmer, 2012).</td>
</tr>
<tr>
<td>Wales</td>
<td>Regions</td>
<td>Linear regression</td>
<td>Location-specific factors have direct impact on life satisfaction (Brereton et al., 2008).</td>
</tr>
<tr>
<td>Britain</td>
<td>Individual and regions</td>
<td>Ordered probit</td>
<td>Unemployment always hurts, but it hurts less when there are more unemployed people around (Clark, 2003).</td>
</tr>
<tr>
<td>Europe</td>
<td>Individual and country</td>
<td>Linear regression and multilevel linear regression</td>
<td>Rich European countries have high and relatively equal life satisfaction, while those in the poorer have low and unequal life satisfaction (Fahey and Smith, 2004).</td>
</tr>
<tr>
<td>Europe</td>
<td>Aggregated</td>
<td>Linear regression</td>
<td>Equality of income in country is positive and significant effect on life satisfaction (O’Connel, 2004).</td>
</tr>
<tr>
<td>Europe</td>
<td>Individual and regions</td>
<td>Multilevel linear and ordered logit model</td>
<td>Regional dimension is relevant for understanding life satisfaction (Pittau et al., 2010).</td>
</tr>
<tr>
<td>Germany</td>
<td>Aggregated</td>
<td>Linear regression</td>
<td>Higher local air pollution and noise levels are negative and significant effect on well-being (Rehdanz and Maddison, 2008).</td>
</tr>
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<tbody>
<tr>
<td>Europe</td>
<td>Regions</td>
<td>Spatial analysis using Moran’s I</td>
<td>Life satisfaction is spatially correlated across regions in Europe</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(<a href="#">Okulicz-Kozaryn</a>), 2011)</td>
</tr>
<tr>
<td>Italy</td>
<td>Individual and regions</td>
<td>Multilevel ordinal probit model</td>
<td>In terms of life satisfaction, Italy is not homogenous; regional characteristics contributes to life satisfaction (<a href="#">Rampichini and D’Andrea</a>, 1997).</td>
</tr>
<tr>
<td>Europe</td>
<td>Individual and aggregated</td>
<td>Ordered probit</td>
<td>Various macroeconomic indicators such per capita GDP and inflation rates have strong association with well-being (<a href="#">Di Tella et al.</a>, 2003).</td>
</tr>
<tr>
<td>Switzerland</td>
<td>Municipality, region and canton</td>
<td>Linear regression</td>
<td>Inequality is harmful for middle class (<a href="#">Winkelmann and Winkelmann</a>, 2010).</td>
</tr>
<tr>
<td>Europe</td>
<td>Country</td>
<td>Multilevel linear model</td>
<td>During the crisis, social capital can buffer individuals’ well-being (<a href="#">Helliwell et al.</a>, 2013).</td>
</tr>
<tr>
<td>Europe</td>
<td>Country</td>
<td>Ordered probit model</td>
<td>Floods have negative, significant and robust impact on life satisfaction (<a href="#">Luechinger and Raschky</a>, 2009).</td>
</tr>
</tbody>
</table>

Studies on well-being and crisis

<table>
<thead>
<tr>
<th>Location</th>
<th>Unit of analysis</th>
<th>Method</th>
<th>Important findings</th>
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<tbody>
<tr>
<td>Iceland</td>
<td>Individual</td>
<td>Linear regression</td>
<td>Income and unemployment did not predict happiness but financial difficulties did. A decrease in happiness was detected after the collapse (<a href="#">Gudmundsdottir</a>, 2013).</td>
</tr>
<tr>
<td>United States and South Korea</td>
<td>Individual and country</td>
<td>Multilevel linear model</td>
<td>High level of social capital and trust in communities and nations contribute to individual resilience during the crisis (<a href="#">Helliwell et al.</a>, 2013).</td>
</tr>
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<thead>
<tr>
<th>Location</th>
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<th>Method</th>
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</thead>
<tbody>
<tr>
<td>United States</td>
<td>Individual</td>
<td>Linear regression</td>
<td>In the beginning of crisis, Americans reported sharp declines in their life evaluation, sharp increases in worry and stress, and declines in positive affect (Deaton, 2012).</td>
</tr>
<tr>
<td>Latin America</td>
<td>Individual</td>
<td>Ordered logit</td>
<td>Countries facing crisis have a positive association with well-being. But when the Prospect of Upward Mobility is included, finding suggests that countries facing crisis have negative association with happiness (Graham and Sukhtankar, 2004).</td>
</tr>
<tr>
<td>Slovenia</td>
<td>Individual</td>
<td>Linear and logistic regression</td>
<td>Depressive and anxiety scores were significantly increased among 590 (46.6%) employees being affected by the economic crisis (Avcin et al., 2011).</td>
</tr>
<tr>
<td>Finland</td>
<td>Individual</td>
<td>Logistic regression</td>
<td>Subjective poor health, suicidal thoughts and poor economic situation were constantly associated with mental disorder in both sexes every year (Viinamaki et al., 2000).</td>
</tr>
<tr>
<td>Europe</td>
<td>Individual and aggregate</td>
<td>Logistic regression</td>
<td>Economic crisis may intensify social exclusion of people with mental health problems, particularly males and individuals with lower education (Evans-Lacko et al., 2013).</td>
</tr>
<tr>
<td>Spain</td>
<td>Individual</td>
<td>Logistic regression</td>
<td>Recession has significantly increased the frequency of mental health disorders and alcohol abuse among primary care attendees in Spain (Gili et al., 2012).</td>
</tr>
</tbody>
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<thead>
<tr>
<th>Location</th>
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<th>Method</th>
<th>Important findings</th>
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<tbody>
<tr>
<td>Spain</td>
<td>Individual</td>
<td>Segmented regression</td>
<td>The financial crisis has been associated with a relative increase in suicides. Vulnerable groups suffered from suicide rate are males and those of working age may be associated with the crisis and may benefit from targeted interventions (Bernal et al., 2013).</td>
</tr>
<tr>
<td>Australia</td>
<td>Individual</td>
<td>Latent difference score</td>
<td>A significant increase in depression and anxiety symptoms during the financial crisis period, but not explained by demographic or socio-economic factors such as an increase in financial hardship over time (Sargent-Cox et al., 2011).</td>
</tr>
<tr>
<td>Slovenia</td>
<td>Individual</td>
<td>Linear regression</td>
<td>Financial crisis in Slovenia has negative effect on psychological well-being (Avcin et al., 2011).</td>
</tr>
</tbody>
</table>
1.2.4 Individual determinants

A number of studies have investigated individual determinants of well-being. Comprehensive reviews of the literature suggest that, in Europe, subjective well-being is a function of age, gender, health, education, income, marital status, employment status and lifestyle (Blanchflower and Oswald [2008] Oswald and Wu [2011] Frey [2008] Graham [2009]). Of these determinants, the two most consistent predictors of well-being are companionship and employment status. Research has consistently found that companionship is positively associated with well-being, while unemployment is negatively correlated with well-being.

Research on the effect of age on well-being suggests that the association between the two is slightly positive, with older people likely to be happier than younger people (Argyle [2001]). Blanchflower and Oswald (2008) demonstrated a U-shaped relationship between age and well-being such that both younger and older people tend to be happier than middle-aged people. In terms of gender, the extant research suggests that women tend to be happier than men (Graham [2009]); one somewhat contentious explanation for this is that women tend to have lower levels of aspiration and, thus, a higher level of well-being (Frey and Stutzer [2002]).

Recent research findings suggest that health (both physical and psychological) plays an important role in individuals’ well-being (Graham [2009] Frey [2008]). Psychological health appears to be more strongly correlated with well-being than physical health (Dolan et al. [2008]). This may be because the concept of well-being itself is closely related to psychological health constructs (for example, excitement and joy in the case of enhanced well-being; anxiety and depression in the case of reduced well-being). In a study using data from a Swedish national survey, Gerdtham and Johannesson [2001] examined how health explains happiness and found that demographic factors were related to
happiness through health.

Previous studies on the relationship between education and well-being have obtained inconsistent findings. Diener et al. (1993); Stutzer and Frey (2008); Diener (2000) report a positive correlation between these two variables and speculated that this relationship might be mediated by earning opportunities such that a higher level of educational attainment leads to higher earning opportunities and thus, in turn, enhances well-being. Blanchflower and Oswald (2004) demonstrated that education is positively associated with happiness. In contrast, Clark and Oswald (1994) found that there was a negative relationship between educational attainment and well-being, and suggested that high levels of educational attainment might increase aspirations, thus leading to greater expectations of a higher income among the highly educated. Helliwell and Putnam (2004) have argued that education is indirectly associated with well-being through health, an argument that is supported by their finding that the predictive utility of educational attainment is attenuated when health status is incorporated as an additional predictor of well-being.

The relationship between income and well-being is generally positive. In a comprehensive review of the literature on the relationship between income and well-being, Clark et al. (2008) suggested that the positive association is due to reverse causation. A longitudinal study among Russians conducted by Graham et al. (2004) suggest that happy people have both a higher income and better health compared to unhappy people.

Another issue relating to the relationship between income and happiness is relative income - that is, how a person’s income compares with others’ income. In assessing the relative income hypothesis, the majority of previous studies measured neighbourhood income. However, more recent research suggests that the impact of relative income upon well-being might be dependent on geographic factors. For example, in a study examining the relationships among
income, relative income and happiness across 19 European countries, Caporale et al. (2009) reported a negative effect of relative income on people’s well-being in Western Europe, and a positive effect of relative income on people’s well-being in Eastern Europe. Similarly, in a German Socio-Economic Panel study, Knies (2012) found a positive effect of relative (neighbourhood) income in West Germany but a negative effect of relative income in East Germany. The findings in East Germany support Dittmann and Goebel (2010) who found that individuals surrounded by others with relatively higher social-economic status tend to have lower levels of life satisfaction.

In the literature, employment status emerges as a consistent strong predictor of happiness and other indices of subjective well-being. Previous research findings have demonstrated that unemployment is strongly and negatively associated with happiness, and has severe and long-lasting negative impacts on well-being (Clark and Oswald, 1994; Oswald, 1997). These results cannot be interpreted only in terms of loss of income; there are significant non-pecuniary effects as well. Using data from the British Household Panel Survey, Clark and Oswald (1994) examined whether unemployed people tend to be happy or unhappy. Findings showed that unemployed people generally have poorer mental health compared to employed people, with the long-term (as opposed to short-term) unemployed experiencing the poorest mental health. These effects are particularly pronounced among men (Clark et al., 2010).

In general, being in a partnership appears to be better for well-being than being alone. Two possible explanations are that being in a partnership may provide good social support as well as regular sex, both of which are positively associated with well-being (Blanchflower and Oswald, 2004). In a study that examined the causal relationship between marriage and subjective well-being, Stutzer and Frey (2004) concluded that happier singles are more likely to marry but that married people are no happier than singles. This evidence
suggests that, in contrast to the findings reviewed above on the relationship between companionship and happiness, it is happiness that causes companionship rather than vice versa. Stutzer’s findings are also supported by Lucas (2005) who found evidence of selection effects: people who become divorced are less happy than people who do not divorce, even before being married. Findings from this study also revealed that well-being tends to drop in the early stages of divorce and widowhood, but returns to pre-divorce (and pre-widowhood) levels of well-being over time. The adaptation mechanism applies for this suffering circumstances.

In a study examining the role of social context in well-being, Helliwell and Putnam (2004) analysed data from three waves of the World Values Study (1980, 1991-1992 and 1999-2000) in their Social Capital Benchmark Survey in the United States. The particular aspect of social context addressed in this research was social capital. Social capital is measured by various indicators such as association membership, as well as ties to family, friends, and neighbours, and trust. Findings show that social capital is positively associated with well-being through many independent channels, including marriage and family, ties to friends and neighbours, workplace ties, civic engagement, trustworthiness and trust. Relatively similar results were obtained by Bjornskov (2006) in a study that used data from the World Values Survey 1999. Specifically, the study suggested that social capital and generalised trust are positively associated with life satisfaction.

More recently, Helliwell et al. (2013) investigated how community or national social capital buffers individuals’ well-being during times of crisis. Using data from five rounds of the European Social Survey, they measure social capital indicators using three components of trust: generalised trust, trust in the police and trust in legal systems. This study also examines the moderating role of the transition status (transition versus non-transition) of the countries.
targeted in the survey. The results showed that among transition countries— that is, Eastern European and former Soviet countries— generalised trust is related to enhanced well-being. These latter findings suggest that individuals’ responses to economic crisis may depend upon the transition status of the country in which they live, with transition (as opposed to non-transition) acting as a buffer in times of financial crisis.

In terms of lifestyle, particularly with regard to digital use, there are two strands in the literature examining how Internet use affects well-being. First strand hold the position that Internet use is beneficial for well-being. Cotten et al. (2012) examine the association between Internet use and depression among older adults. This study concludes that Internet use is associated with reduced depression among older people. At contextual level, Kavetsos and Koutrompis (2011) investigate whether technology affluence affects well-being across Europe. Using the Eurobarometer survey from 2005 to 2008, they conclude that having Internet connection is associated with a higher level of well-being. In contrast, some studies maintain a different position: Internet use decreases subjective well-being. Stepanikova et al. (2010) investigate how time spent online at home can explain loneliness and life satisfaction. The results suggest that spending more time online at home are related to increased loneliness and decreased life satisfaction.

1.2.5 Contextual determinants

Since people live in certain places all of which have specific characteristics, it is important to investigate how contextual factors affect well-being. Two approaches are usually used in studying well-being, particularly health outcomes, to examine the association between individuals and their contextual/geographical settings: the compositional approach and the contextual approach. The compositional approach refers to the effect of individuals’ per-
sonal characteristics on their well-being or health status, while the contextual approach focuses on the effect of social, external or geographical context on individuals’ well-being (Duncan et al., 1998; Jen et al., 2009). The contextual approach has been criticized in cases considering mixed communities which are composed of diverse characteristics of neighbourhood (Cheshire, 2009). Several studies have reported that economic (Di Tella et al., 2001), geographic (Ballas and Tranmer, 2012), environmental (Luechinger, 2009) and cultural (Sagiv and Schwarz, 2000) factors are significant in predicting well-being.

The relationship between per capita GDP and well-being is generally positive, although not as strong as that between unemployment rates and well-being. Findings from studies conducted by Helliwell et al. (2013) and Di Tella et al. (2003) show that people who live in countries with higher per capita GDP have higher levels of well-being.

Studies have yielded mixed results regarding the effect of economic growth on well-being (Graham, 2009). Economic growth may have negative effects on well-being, a finding that has been explained in terms of the ‘unhappy paradox’. Using the entire dataset from the Gallup World Poll, Deaton (2008) and Stevenson and Wolfers (2008) found no significant effect of economic growth upon well-being overall, although negative effects of growth upon well-being were evidenced in the early stages of growth in newly developed countries such as Ireland and South Korea.

Research findings relating to the effect of income inequality upon well-being are mixed. For example, both Fahey and Smith (2004), using the 1999 European Values Study, and Alesina et al. (2004), in a study based upon Eurobarometer data, show that inequality reduces life satisfaction. Specifically, Alesina et al. (2004) find that the relationship between income inequality and life satisfaction was stronger among people with left wing political leanings and the poor. Hagerty (2000) reported a negative relationship between income
inequality and well-being, while Senik (2004) showed no significant relationship between inequality and well-being among people living in Russia. In their book, Wilkinson and Pickett (2009) propose the income inequality hypothesis which refers to the tendency to experience lower levels of well-being when living in an unequal society.

In contrast, some studies have found a positive association between income inequality and well-being (O’Connel, 2004), whereas Clark (2003), using British Household Panel data, reported that among individuals employed full time, income inequality in one’s reference group (based on gender, region and year) increases life satisfaction; this effect was found to be particularly strong for those aged under 40 years, those with below-average incomes, and those who had experienced their greatest increase in income over the preceding three years.

In Europe, unemployment rates are negatively associated with well-being (Di Tella et al., 2001). Using Euro-Barometer Survey series collected between 1975 and 1991, the study suggested that people are happier when living in countries with lower levels of unemployment and lower inflation rates. A potential explanation for this finding is that high national unemployment rates elicit fears of personal unemployment which, in turn, reduces individuals’ subjective well-being (happiness and life satisfaction). However, in a more recent study based upon the same European data, Alesina et al. (2004) show no significant effect of the unemployment rate on well-being. Further research is clearly needed in order to arrive at more definitive conclusions concerning the effect of unemployment rates on well-being.

The relationship between regional unemployment and individuals’ well-being is complex. For example, in a study that used data from the first 23 waves (1984-2006) of the German Socio-Economic Panel, Clark et al. (2010) demonstrated that both employed and unemployed men with good job pro-
pects are strongly negatively affected by regional unemployment. In contrast, regional unemployment appears to have a less negative, and even a positive, influence on the well-being of insecure employed men and unemployed men with poor job.

Continuing on the spatial issue, Knox (1975) suggests that improving the well-being of a specific neighbourhood, city or region requires the information gathered from a spatial study in order to design effective policy. Pittau et al. (2010); Ballas and Tranmer (2012); Rampichini and D’Andrea (1997); Aslam and Corrado (2012) are among the researchers who have attempted to understand the spatial dimension of well-being.

Aslam and Corrado (2012) explore regional variations in well-being using data from the 2006 European Social Survey and found that both individual and regional factors are important in predicting well-being. In a study applying multilevel modelling techniques to data from the Eurobarometer survey, Pittau et al. (2010) examine how regional economic factors affect well-being and the regional-level variance of well-being among EU countries. Their findings suggest that personal income matters more in poor regions than in rich regions. Moreover, the unexplained regional-level variance remains high, even after controlling for standard covariates of well-being. Regional per capita GDP and unemployment rates may help in explaining levels of individual well-being. The results also show the variability of life satisfaction within countries which can be found more obvious in Belgium, Germany, Spain, Italy and Portugal. These results can be used to justify the choice of regions as a unit of analysis. The unobserved variability across regions in Europe needs to be taken into account.

In terms of environmental conditions, Brereton et al. (2008) investigated how climate, environmental, and urban conditions affect life satisfaction. Drawing from the 2001 Urban Institute Ireland National Survey on Quality of Life,
these researchers used geographical information systems to measure whether proximity to disadvantaged places might lower well-being. Their results showed that location-specific factors such as proximity to an airport may have a direct impact on life satisfaction. In a study that applied both standard regression and instrumental variable estimation to GSOEP data, Luechinger (2009) found a negative effect of air pollution upon well-being; however, this effect was stronger when the statistical technique involved instrumental variable estimation.

Research evidence indicates that societies differ in terms of a wide variety of values. For example, societies differ in terms of degrees to which they recognise religious life, emphasize the parent-child relationship, and profess national pride (Inglehart and Baker 2000). Research has shown more traditional values to be associated with lower levels of well-being (Li and Bond 2010; Sagiv and Schwarz 2000).

Living in different welfare states may also affect subjective well-being. La-pinski et al. (1998) concluded that residents of liberal countries seem to have lower levels of subjective well-being than residents of continental and social democratic countries; however, no such difference emerges between these two types of welfare states. This latter finding may be due to the fact that citizens of continental and social democratic countries receive similar levels of support from their governments. In terms of health, Eikemo et al. (2008a) showed that income-related health inequalities vary among welfare states. However, social democratic countries are not always the most successful at reducing health inequalities.
1.3 Research gaps

Having reviewed previous studies on the determinants of well-being and its studies during the crisis, this section briefly explains three research gaps arising from previous research on the determinants of well-being on which this study aims to improve. First, there is a limited number of studies focusing on the determinants of well-being at the time of crisis, particularly in Europe. Prior studies have investigated the determinants of well-being in the non-crisis context (e.g. Graham 2009; Frey and Stutzer 2002; Dolan et al. 2008). A few studies have examined the determinants of well-being in the context of a financial crisis (Veenhoven and Hageenars 1999; Graham and Sukhtankar 2004; Deaton 2012). However, these focused only on the United States and Latin America. In Europe, several studies on the effect of economic crisis on well-being mainly focused on mental health problems (Avcin et al. 2011; Gili et al. 2012; Bernal et al. 2013).

Other studies have investigated the effect of crisis on well-being in a single country. For example, Gudmundsdottir (2013) explores well-being before and during the crisis in Iceland; while Avcin et al. (2011) examine the effect of financial crisis on well-being in Slovenia. Bernal et al. (2013), using Spanish national data between 2005 and 2010, investigate the association between financial crisis and suicide rates in Spain. Gili et al. (2012) examine the associations of the economic crisis on mental health problems among patients in primary care in Spain. To the best of my knowledge, there are only two studies that investigate well-being during the crisis in Europe. These studies are conducted by Helliwell et al. (2013) and Evans-Lacko et al. (2013). Helliwell et al. (2013) focus on how social capital helps to maintain individuals’ well-being during the crisis, while Evans-Lacko et al. (2013) examine the contributing factors of mental health during the crisis.

Second, only a few studies have addressed the variations of well-being
between regions across countries in Europe. Well-being may be influenced by the socio-economic context in which individuals live. Logan (2012) argues that social facts shaped the socio-historical context in which individuals live; this indicates that places matter. One problem that arises from this perspective is that one must determine how to decide the scale of place. Previous research on well-being shows that factors at the country level play an important role in explaining well-being (e.g. Graham 2009). Several studies explore the variations across countries worldwide. For example, Diener et al. (1995) explored the factors predicting well-being across 55 nations, and found that high income, individualism, human rights, and societal equality are strong predictors of subjective well-being. A quite comprehensive study conducted by Veenhoven (1993) compared subjective well-being across 56 nations worldwide. More recently, Stanca (2010), using 94 countries from the World Values Survey, explores the cross-country distribution of the association between economic conditions and well-being. The study concludes that the effect of income on well-being is larger in relatively rich countries.

However, some scholars have suggested that there is a variation in terms of socio-economic conditions across areas within country (e.g. Rampichini and D’Andrea 1997). This argument is needed to investigate the variations of well-being across areas within a country. Since well-being varies within countries, examination of smaller areas such as regions will be beneficial in arriving at an understanding of well-being. Such an approach was suggested by Rampichini and D’Andrea (1997), who advocated the inclusion of the regional level in explaining well-being because a region has a common socio-economic, political and cultural environment not observed at the national level. The decision to include regions rather than only countries may thus better provide a detailed explanation of well-being in Europe. Only a few previous studies have explored regional dimension. Two were conducted in a single country (Ballas and Tran-
mer, 2012; Rampichini and D’Andrea, 1997), while four studies were carried out using cross-country samples (Pittau et al., 2010; Aslam and Corrado, 2007, 2012; Okulicz-Kozaryn, 2011). To sum up, although previous studies have explored cross-national variations in well-being, they have rarely focused on the regional dimensions of well-being. This study follows the strand of research by including regional factors affecting well-being; it focuses on both economic and geographic factors in regions and nations across Europe.

Third, numerous well-being studies examining the determinants of well-being have been mainly based on either aggregate analysis or individual analysis. Most previous studies have made use of single level regression, using both individual and aggregate data (Dolan et al., 2008). Although the resultant findings are important, previous studies have not attempted to account for ecological variations in explaining how the areas in which individuals live may explain well-being. It is well known that such aggregate analyses risk an invalid transfer of results observed at the aggregate level to the individual level (Robinson, 1950; Susser, 1994). Robinson (1950) noted that this risk may lead to a biased inference due to a significant loss of information when using ecological correlations as a substitute for individual correlations. At the same time, individual analyses of determinants of well-being take less into account the socio-economic context in which individuals reside.

A few studies have used a multilevel model to attempt to understand well-being (Ballas and Tranmer, 2012; Pittau et al., 2010; Schyns, 2002). Pittau et al. (2010) use multilevel model to examine the ways in which regional economic factors affect individuals’ well-being. Since individuals are nested within regions, the nested structure needs to be taken into account; if ignored, an analysis may yield overestimated precision parameters. Ballas and Tranmer (2012) apply multilevel model to explore district, region, household, and individual variations in explaining well-being and happiness. Departing from this
strand of research, this study uses the variants of multilevel models to capture the variations in well-being. Moreover, the present study fills these gaps by investigating nested and spatial structure of well-being data.
<table>
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<tr>
<th>Chapter</th>
<th>Key references</th>
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<th>Gap 2: Regional studies</th>
<th>Gap 3: Multilevel analysis</th>
</tr>
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<td>Graham and Sukhtankar (2004)</td>
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<td>Subramanian et al. (2005)</td>
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<td>Eikemo et al. (2008b)</td>
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</tr>
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<tr>
<td></td>
<td>Brehm and Rahn (1997)</td>
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<td></td>
<td>Shah (1998)</td>
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</tr>
<tr>
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<td>Paxton (2007)</td>
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<td></td>
<td>Ballas and Tranmer (2012)</td>
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</table>

Yes: Gap has been fulfilled
No: Gap has not been fulfilled
Table 1.2 provides a summary of the gaps that will be addressed in the empirical chapters of this study. Given the importance of certain factors contributing to well-being, it is worthwhile to address four issues in well-being. First, given the ubiquitousness of the Internet, it is worthwhile to explore how Internet use explains well-being before and during the crisis. Studies have yet to examine the effect of Internet use on well-being before and during the current financial crisis. Most studies focus on a single country (Kraut et al., 1998; Gross et al., 2002; Kraut et al., 2002; Stepanikova et al., 2010; Mitchell et al., 2011; Cotten et al., 2012; Penard and Pousing, 2010). Second, since health is among the important predictors of well-being, investigating how happiness and health correlate to each other is necessarily among the important topics. To best of my knowledge, there are three studies that have examined the determinants of both happiness and health simultaneously (Subramanian et al., 2005; Oshio and Kobayashi, 2010; Eikemo et al., 2008b). The present study extends Subramanian’s study by adding one higher level in the multivariate multilevel model and expands upon Eikemo’s study by introducing regional factors for explaining happiness and health.

Third, the study of social capital needs to explore on how relationship between its two components: association membership and generalised trust. A few studies have already addressed reciprocal relationship between those two (Brehm and Rahn, 1997; Shah, 1998; Claibourn and Martin, 2000), and the findings show mixed results. None of them, however, has explored the relationship between association membership and generalised trust in a European context. Fourth, since geographical factors may affect well-being, understanding the spatial structure of well-being across regions in Europe is necessary. Previous studies have suggested that well-being is indeed spatially structured (Okulicz-Kozaryn, 2011; Stanca, 2010). However, they do not address the nested structure of well-being data. To address this issue, Pittau et al. (2010), for
example, use a multilevel model to examine economic disparity and individual life satisfaction across regions in Europe. The present study explores how the nested and spatial structures explain variations in individual well-being across regions in Europe.

1.4 Research contributions

This study makes several contributions to the existing literature on the determinants of well-being. First, its adds to the existing literature on well-being by examining the determinants of well-being during the recent financial crisis in Europe. Building upon some previous studies (e.g. Graham and Sukhtankar 2004, Helliwell et al. 2013, Deaton 2012), this study gives new evidence as to the factors that contribute to well-being during a crisis.

In addition, this study adds to the existing body of literature by assessing individual as well as regional and national determinants. Prior studies have focused on cross-national investigation of well-being (e.g. Diener et al. 1995, Veenhoven 1993) while this study follows a relatively new tradition in the literature by examining regional dimensions of well-being (Pittau et al. 2010, Ballas and Tranmer 2012, Aslam and Corrado 2012). Moreover, this study includes both regional and national determinants in the analyses.

Lastly, this study addresses the nested structure of the data in which individuals nested in regions and countries. In doing so, it takes multilevel models as a primary means of analysis. Since these nested structures may have their own error terms, the use of multilevel models may improve the estimations of well-being. In addition, by using multilevel models, the effects of regional and national conditions on individual well-being can be precisely examined. Moreover, this study provides an understanding of how spatial structure among regions can explain well-being. Using a spatial dependence multilevel model,
the nested and spatial structures of well-being can be investigated simultaneously.

1.5 Research aim, objectives and questions

This study aims to explore the individual and contextual determinants in explaining well-being across regions in Europe during a time of economic crisis. The fact that the study focuses on well-being during the crisis in Europe is important because it can help researchers and policy-makers understand what the context of crisis tells us about individual well-being. More specifically, this study proposes the following objectives: (1) to examine the individual and contextual determinants of well-being during the 2007-2008 economic crisis in Europe; (2) to identify the contextual explanations that capture regional variations; (3) to examine the association between Internet use and well-being in the time before and during the crisis in Europe; (4) to explain the extent to which happiness and health are correlated; (5) to test the hypothesis positing a virtuous circle between association membership and trust; and (6) to investigate the spatial mechanisms of well-being across regions in Europe.

To achieve the aim of the study, I identify three general research questions: (1) To what extent do the individual and contextual determinants affect well-being during the 2007-2008 economic crisis in Europe? (2) To what extent are the regional and national explanations able to capture variations in well-being? (3) How do multilevel models explain variations of well-being across regions and countries in Europe? To elaborate these research questions, I break them down into more specific questions which are answered in the empirical chapters.

Specifically, chapter two answers the following research questions: (1) Does Internet use increase or decrease well-being? (2) Does Internet use explain
well-being in different ways in the time before and during the crisis in Europe? Chapter three answers the questions: (1) To what extent do happiness and health correlate after controlling some covariates that affect both? (2) To what extent do individual factors influence happiness and health? (3) To what extent do contextual factors affect happiness and health? Chapter four answers the research questions: (1) What is the pattern of relationships between association membership and trust? (2) Does association membership lead to trust or the reverse? (3) What are the determinants of association membership and trust? The research questions raised in chapter five are: (1) Is well-being spatially dependent across regions in Europe? (2) What is the mechanism through that explains the process? (3) Does spatial dependence multilevel model improve estimates and inference of well-being?

1.6 Data, measures and methods

1.6.1 Individual data

The 2008 European Values Study To capture and understand well-being during the crisis, this study uses the 2008 European Values Study (EVS) and the 2004-2010 European Social Survey (ESS). EVS is a large scale survey that is designed for measuring and understanding European values. It provides data in a number of categories related to well-being: happiness, life satisfaction, health, social participation and trust. Since this thesis focuses on well-being during the 2007-8 crisis in Europe, the 2008 EVS is one of the most suitable data sources to use.

To better understand well-being during the crisis, this study uses the 2008 European Values Study (European Values Study, 2008) and the 2004-2010 European Social Survey (European Social Survey, 2010). The EVS is a large-
scale survey that attempts to measure and understand European values. It provides data in a number of categories related to well-being: happiness, life satisfaction, health, social participation and trust (European Values Study, 2008). Since this study focuses on well-being during the 2007-2008 crisis in Europe, the 2008 EVS is one of the most suitable sources of data.

More specifically, the 2008 EVS provides the questions on the main dependent variables used in this study. In addition, the EVS provides the questions regarding the standard covariates of well-being (such as gender, age, level of education, employment status and household income) used in previous studies. More importantly, this survey makes use of various geographic codes which indicate where individuals live, including country, NUTS1, NUTS2 and NUTS3 codes. The NUTS identifiers allow for matching the individual data with the contextual data provided by other institutions, which in turn makes it possible for researchers to capture the nested structure of the data.

Table 1.3 describes the distribution of respondents living in regions within each country. Although there are a different number of observations in regions across Europe, this study follows Pittau et al. (2010); Aslam and Corrado (2012) to include regions into multilevel model.

Table 1.3: Distribution of respondents and regions from EVS

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<td>Sweden</td>
<td>1,187</td>
<td>8</td>
<td>52</td>
<td>232</td>
</tr>
<tr>
<td>Switzerland</td>
<td>1,272</td>
<td>7</td>
<td>30</td>
<td>276</td>
</tr>
<tr>
<td>Turkey</td>
<td>2,384</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ukraine</td>
<td>1,507</td>
<td>31</td>
<td>23</td>
<td>121</td>
</tr>
<tr>
<td>Macedonia</td>
<td>1,500</td>
<td>1</td>
<td>1,500</td>
<td>1,500</td>
</tr>
<tr>
<td>Great Britain</td>
<td>1,561</td>
<td>36</td>
<td>6</td>
<td>109</td>
</tr>
<tr>
<td>N. Ireland</td>
<td>500</td>
<td>1</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>Kosovo</td>
<td>1,601</td>
<td>1</td>
<td>1,601</td>
<td>1,601</td>
</tr>
<tr>
<td>Total</td>
<td>67,000</td>
<td>351</td>
<td>4</td>
<td>1,601</td>
</tr>
</tbody>
</table>

The **2004-2010 European Social Survey** (ESS) is an academically-driven social survey designed to chart and explain the interaction between Europe’s changing institutions and the attitudes, beliefs and behaviour patterns of its diverse populations (ESS, 2010). The ESS is conducted every two years and consists of five waves, ranging from 2002 to 2010. The ESS provides the questions on the main variables of this study: happiness and life satisfaction. In addition, the ESS covers the time before and during the crisis, which means that it provides material enabling identification of the different patterns of well-being among Europeans in those periods. The 2004 and 2006 ESS cover the period before the crisis, while the 2008 and 2010
ESS cover the period during the crisis. Moreover, the ESS includes questions on Internet use as one of the important predictors of well-being. Similar to the 2008 EVS, the ESS gives geographic codes that consist of country, NUTS1 and NUTS2 codes. These identifiers allow researchers to combine the individual data provided by the ESS with the contextual data from other institutions such as Eurostat, making it possible to clearly show the nested structure of the data. Table 1.4 shows the distributions of ESS data, consisting of respondents participating in the surveys along with their regions and countries.

Table 1.4: Data sources for individual data

<table>
<thead>
<tr>
<th>Variables</th>
<th>Respondents</th>
<th>Regions</th>
<th>Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>European Social Survey 2004</td>
<td>45,731</td>
<td>143</td>
<td>26</td>
</tr>
<tr>
<td>European Social Survey 2006</td>
<td>43,000</td>
<td>155</td>
<td>25</td>
</tr>
<tr>
<td>European Social Survey 2008</td>
<td>56,752</td>
<td>160</td>
<td>30</td>
</tr>
<tr>
<td>European Social Survey 2010</td>
<td>39,160</td>
<td>151</td>
<td>28</td>
</tr>
</tbody>
</table>

1.6.2 Contextual data

The contextual level data were obtained from various sources such as Eurostat regional statistics and the EuroGeographics database (see Table 1.5). Eurostat is the statistical office of the European Union, and it aims to provide the European Union with statistics at the European level that enable comparisons between countries and regions. Eurostat offers a wide range of important and interesting data that governments, businesses, the education sector, journalists and the public can use for their work and daily life (Eurostat, 2011). Eurostat regional statistics provide unemployment rates, the number of Internet connections for every 100 households, GDP growth and regional per capita GDP.

The EuroGeographics database provides longitude and latitude points for creating a map across Europe at the regional level. One of their data is EuroBoundaryMap. It is a seamless geo-database at the scale of 1:100,000 covering 41 countries. It contains geometry, names and codes of administrative
Table 1.5: Data sources for contextual data

<table>
<thead>
<tr>
<th>Variables</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>Eurostat</td>
</tr>
<tr>
<td>GDP growth</td>
<td>Eurostat</td>
</tr>
<tr>
<td>Internet numbers</td>
<td>Eurostat</td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>Eurostat</td>
</tr>
<tr>
<td>Digital Boundary</td>
<td>EuroBoundaryMaps</td>
</tr>
<tr>
<td>Income inequality</td>
<td>UNU-WIDER</td>
</tr>
<tr>
<td>Welfare States</td>
<td>Esping-Andersen (1990)</td>
</tr>
<tr>
<td>Traditional values</td>
<td>Inglehart and Baker (2000)</td>
</tr>
</tbody>
</table>

and statistical units continuously updated by members, the national mapping and cadastral authorities (NMCAs) of Europe. It links to the updated statistical LAU- and NUTS-codes for all local administrative units of the 27 member states of the European Union [EuroBoundaryMap, 2008].

The data on income inequality used in the present study was obtained from UNU-WIDER, a part of United Nations University which undertakes projects in multidisciplinary research and conducts policy analysis on structural changes affecting the living conditions of the world’s poorest people. One of the data provided from this part is income inequality at the country level [UNU-WIDER, 2008].

The classification of welfare states used in this study was first offered by Esping-Andersen (1990). Later, some scholars modified the classification based on ongoing development and the region around the world (e.g., Arts and Gelissen, 2010; Bambra and Eikemo, 2009). Arts and Gelissen (2010) identified four categories of welfare states in Europe: social democratic, continental, liberal and Central/Eastern Europe.

Traditional/secular values is a measure of cultural differentiation in cross-cultural settings. This measure denotes a contrast between societies in terms of whether a society espouses an awareness of religious life, whether or not the parent-child relationship is emphasised, and whether individuals have a high level of national pride (Inglehart and Baker, 2000).
1.6.3 Well-being measures

In measuring well-being particularly with respect to geographical issues, there are at least two approaches used in the literature. First is that of subjective measures, which use happiness questions in many social surveys. The second approach involves quality of life measures, an approach pertaining to more objective factors including the availability of amenities in certain areas such as recreation facilities, education and health services and other objective factors such as climate and unemployment rate (Ballas, 2013). The availability of amenities, for example, is considered a key variable in understanding well-being and provides a comprehensive measure of how convenient it is to live in certain places. The more amenities an area has, the higher the levels of well-being of residents (Mulligan and Carruthers, 2011).

In terms of subjective well-being, the debate on how to measure happiness continues, in particular with respect to whether happiness can be measured at all. Many attempts have been made to deal with this problem. In 1983, Larson and Csikszentmihalyi developed the Experience Sampling Method (ESM), which is used for measuring individual emotion and mood (Larson and Csikszentmihalyi, 1983). The ESM is considered the gold standard measure of well-being. Since this measure is time consuming and costly to implement, Kahneman et al. (2004) established a set of questionnaires to measure happiness. They pioneered the day reconstruction method (DRM), which links the activities performed by respondents on a daily basis with respondents’ feelings while performing those activities. However, this method is not popular in large surveys because of the length of the questionnaire.

Some of the most commonly-used questions for measuring well-being are those addressing happiness and life satisfaction as well as Cantril’s Ladder questions. The happiness question is: ‘Taking all things together, would you say you are: very happy, quite happy, not very happy or not at all happy?’
The life satisfaction question is: ‘All things considered, how satisfied are you with your life as a whole these days?’ The answer is given on a 10-point scale, ranging from dissatisfied to satisfied. The Cantril’s Ladder question, also measured on a 10-point scale, is: ‘In general, where on the ladder do you feel you stand at the moment?’

Following previous studies on well-being, two subjective well-being measures, both for measuring happiness and life satisfaction, are used in this study. For measuring happiness, the question is: ‘Taking all things together, would you say you are: very happy, quite happy, not very happy or not at all happy?’ Meanwhile, for measuring life satisfaction, the question is: ‘All things considered, how satisfied are you with your life as a whole these days?’ The answer is given on a 10-point scale, ranging from dissatisfied to satisfied. This study also uses subjective evaluation of individual health using the question: ‘All in all, how would you describe your state of health these days?’ The response is chosen from among five options: very good, good, fair, poor or very poor.

To measure social well-being, several cross-national surveys such as the World Values Study use two components of social capital: association membership and generalised trust (van Deth, 2008). Although some other indicators have been identified in previous studies, we use these two because of the availability in the survey.

Methodological issues arise in examining subjective measure of well-being. The first challenge is ensuring the reliability of subjective measure in happiness and health. Some studies assert that happiness can be measured subjectively, resting on the empirical findings that the reliability measures of happiness are relatively high (Krueger and Schkade, 2008; Kahneman and Krueger, 2006). These results are echoed in studies of self-rated health which is highly correlated with objective measures of health (Idler and Benyamini, 1997; Huisman...
Previous studies in Europe provide evidence of the reliability of subjective measures of happiness and health (Bray and Gunnell 1996; Huppert et al. 2009; Lundberg and Manderbacka 1996; DeSalvo et al. 2005). Bray and Gunnell (1996) conducted an ecological study to investigate the correlation between life satisfaction and happiness with suicide rates in 32 countries in Europe. Analyses suggest that there is a negative association between suicide rates and life satisfaction ($r = -0.44$) and between suicides rates and happiness ($r = -0.41$), the results which show how useful the subjective measure is as an indicator of population mental health. A study conducted by Huppert et al. (2009) uses Wave 3 of the European Social Survey, which included 23 countries in Europe. The findings show a negative and significant association between subjective measures of well-being and depression scales using CES-D ($r = -0.56$).

With regard to self-rated health, DeSalvo et al. (2005) conducted a meta-analysis including some European countries to examine the association between a single item assessing self-rated health and general health. The results suggest a statistically significant relationship between poor self-rated and an elevated risk of death. In addition, Lundberg and Manderbacka (1996) examined the reliability measure of self-rated health using the 1991 Swedish Level of Living Survey and the 1989 Survey of Living Conditions. Reliability tests show a significant correlation self-rated health with objective health indicators such as functional abilities, diseases, aches, psychological well-being and common illness.

The second methodological issue concerns the treatment of the scale of measurement. Reported well-being is ordinal in nature, and to estimate this ordinal data, well-being studies need to use ordered logit or probit estimators (Pittau et al. 2010). However, Praag and Ferrer-i-Carbonell (2007) as well as Frey and Stutzer (2002) argued that the cardinality and ordinality of well-being
make little difference compared to linear regression.

Although the subjective measures of happiness and health are relatively convincing, there is debate as to whether these subjective measures can be compared across countries and cultures (Gundelach and Kreiner 2004; Mitchell 2005; Jylha et al. 1998; Veenhoven 2012). Gundelach and Kreiner (2004) argue that cultural factors are important in assessing perceived well-being. However, the production of culturally sensitive data is difficult. According to Veenhoven (1991, p.17), ‘the role of the cultural factors is a blind spot in studies of subjective well-being. Consequently, such factors are not very often addressed in the literature, probably because researchers feel that they are unable to find valid operationalizations on such variables’.

Kunst et al. (2005) examined inequalities in self-assessed health in 10 European countries. Using self-rated health to assess health, they found a significant difference in self-rated health according to educational level and household income. In criticising this study, Mitchell (2005) argued that the use of self-rated health to measure health can be interpreted differently based on culture. Jylha et al. (1998) concluded that self-rated health can be used to measure health, at least in Western countries. Culture and language factors may affect how people interpret self-rated health. Therefore, the self-rated measure should be used with caution.

1.6.4 Multilevel model and its extensions

The application of multilevel model in the social sciences started in the field of education, in which the hierarchical nature of the data can be explicitly observed. For example, students are nested within classes and classes are nested within schools. One of the advantages of this model is that the precision parameters of the estimates will be correctly estimated even if the observations are clustered at various levels. Moreover, by explicitly modelling the data gen-
erating process, the estimated coefficients are less likely to be biased because of the nested structure of the data (Snijders and Bosker 2011). These imply that, for example, the significance of the association between the regional and national covariates and well-being can be properly tested because their estimated coefficients are less likely to be biased.

Multilevel models are becoming increasingly popular in well-being studies (Pittau et al. 2010; Aslam and Corrado 2012; Schyns 2001). Since individuals are hierarchically clustered within regions, the use of ordinary regression analyses which neglect the nested structure of the data may lead to an underestimation of standard errors of the ecological regressors. As a result, in ordinary regression analyses the significance of such effects is overestimated. More specifically, multilevel analyses are able to account for this clustering of individuals within regions by separating individual variance in people’s well-being from regional variance. Hypotheses regarding the effect of regional characteristics can thus be tested appropriately using these analyses.

One of the important issues to be addressed in using a multilevel model is how to identify groups at the higher levels. Aslam and Corrado (2012) argue that one of the most suitable data groupings 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 result in individual clustering across countries. In addition, Veenhoven (2009) posited that institutional variations across regions within nations tend to be similar. Therefore, identifying these smaller areas within nations may lead to a better understanding of well-being. Second, Rampichini and D’Andrea (1997) suggested that regions should be considered as the macro-level since individuals living in a given region have a relatively similar socio-economic, political and cultural environment. Figure 1.3 shows the variability of well-being across regions in Europe. Germany,
Spain and Ukraine are among the most diverse countries in terms of well-being. The regional variations shown in Figure 1.3 support the decision to use the NUTS2 or regional level instead of the country level as level 2 units.

Figure 1.3: Variability of happiness across regions in Europe

Maas and Hox (2005) argued that the sample size at level two needs to be considered carefully. A sample of 50 or fewer may lead to biased estimates coming from second level standard errors. However, a large number of groups at level two support the use of small samples within level two units.

Standard multilevel model In this research, a standard multilevel model is used to test whether Internet use increases or decreases individuals’ well-being, including how other individual and contextual factors affect well-being. To understand how the context of crisis may affect the association between Internet use and well-being, the each wave of the ESS is analysed separately. The 2004 and 2006 ESS represent the period before the crisis, while the 2008 and 2010 ESS represent the time during the crisis itself.

Since the scale of well-being used in this paper is ordinal, we use a model that is suitable for use with such a scale. Among the available models, GLLAMM (Generalised Linear Latent and Mixed Models) appears to be the ideal one.
GLLAMM is a class of multilevel latent variable model in which a latent variable is either a) a factor or a random effect (intercept or coefficient) or b) a disturbance/residual (Rabe-Hesketh et al., 2004). To perform a robustness check of the analysis, we also use multilevel linear regression where the dependent variable is treated as continuous for the sensitivity analysis.

**Multivariate multilevel model** Since individuals report their happiness and health subjectively and since happiness and health are closely related, an analytical tool which can accommodate the joint covariance of these two outcomes is needed. Multivariate multilevel model is appropriate for this study because of its ability to account for results drawn from a multilevel setting (that is, individuals nested in regions) and to explain two outcomes simultaneously (Goldstein 2011). The model can estimate the residual correlation between happiness and health after controlling for their standard covariates. More specifically, this model reveals whether the effect of covariates on health and happiness can be compared (Snijders and Bosker 2011).

**Multilevel simultaneous equations model** One important issue in social capital literature is to examine the relationship between association membership and generalised trust. A few scholars used structural equation models to do so (Shah 1998; Brehm and Rahn 1997). However, their investigations are limited to the individual level without taking into account the nested structure of the data. To improve on this, this study follows Paxton et al. (2011) and at the same time addressing the nested structure of the data. To estimate the multilevel simultaneous equations model, it is necessary to identify exclusion restrictions which refer to the explanatory variables in the selection equation that are not in the equation of interest (Sartori, 2003). More detailed specification is available in section 4.3.3.
Spatial dependence multilevel model  This model is a combination of a spatial dependence model and a multilevel model. The first attempt is to examine the nested structure of data using multilevel model, then including spatial structure among the group or level 2 data. Since this model is a combination of a multilevel model and a spatial dependence model, we shall briefly describe both methods.

Multilevel model can be used to account for the nested or vertical spatial structure of data. However, this model only captures the vertical spatial structure where level 1 units reside in level 2 units. To improve on this, spatial dependence model is considered and applied. This model captures horizontal spatial dependence among geographical areas or neighbouring areas [Anselin 1988]. Savitz and Raudenbush (2009) propose a spatial dependence multilevel model, in which the spatial structure of level 2 units (e.g. regions) is taken into account. Spatial dependence multilevel model is able to capture the nested and spatial structure of the data at the same time.

1.6.5  Multilevel multiple imputation

Problems of missing data are common in the survey. There are several types of techniques available for dealing with this problem, such as listwise deletion, pairwise deletion, mean imputation, regression imputation and stochastic regression imputation. The issue arising from these imputation methods, however, with the exception of pairwise deletion, is that the standard errors they produce are too small [van Buuren 2012]. To overcome this problem, Rubin (1987) offered a technique called multiple imputation. Apart from its ability to deal with missing data problems, another reason to use multiple imputation is its usefulness in separating into stages the solutions of missing data problems and the complete data problems. It solves missing data problems first and complete data problems second. More specifically, this method consists
of three steps. First, it imputes data with plausible values and thus creates 10 complete data sets. Second, it analyses each imputed dataset using the complete-data method. Lastly, combining the results from the analysis, it adjusts for the additional uncertainty introduced by the process of imputation. To calculate the final result, Rubin’s rule is applied (Little and Rubin 2002; Enders 2010).

In the EVS, a large amount of data is missing. For example, 10,740 of 60,232 respondents (17.83%) failed to report their income. When matched with contextual data, missing data pertaining to regional level variables appear in terms of unemployment rates (22.22%) and GDP (33.62%). Since the structure of the data is multilevel, standard multiple imputation may not be appropriate. Carpenter and Kenward (2013) have suggested the use of multilevel multiple imputation in the case of data that is multilevel in nature. Single-level multiple imputation may result in biased estimation if it is used for multilevel data. To avoid such a bias, multilevel multiple imputation is used. The process is carried out using Mplus software because it provides a Bayesian estimator, one of the most reliable estimators for imputing the data (Asparouhov and Muthen 2010).

1.7 Chapters description

Having presented an overview of the research background, the research gaps in the literature and the research questions of the present study, this section describes the structure of the study. Chapter two reports the results of our investigation of the association between Internet use and well-being before and during the crisis. Using a multilevel model, this chapter aims to examine whether Internet use is associated with well-being before and during the crisis in Europe. The results suggest that Internet use is associated with higher levels of well-being under certain conditions; in the period before the crisis
from 2004 to 2006, Internet use had no association with well-being, while from 2008 to 2010, at the height of the crisis, it resulted in a positive and significant association with well-being. In addition, multilevel analysis shows that the density of Internet users in a region has the same positive association with well-being.

Chapter three intends to examine individual, regional and national covariations in happiness and health. Given that health assessment may involve affect (happiness) and happiness assessment may involve the consideration of health, it is worthwhile to address both jointly. Moreover, since individuals are nested within regions, multivariate multilevel model is the most appropriate one for the performance of this analysis. The results suggest that happiness and health are positively correlated. Happier people tend to be healthier and vice versa. Trust, being in a union and relatively high household income are among the important covariates that are positively associated with both happiness and health. Meanwhile, individual unemployment, relatively high unemployment rates and living in a country with high levels of inequality are negatively associated with happiness and health.

Chapter four contributes to the existing social capital literature by investigating the reciprocal relationship between association membership and trust in a multilevel setting, where individuals are nested at the regional level. The main finding of this chapter is that association membership and generalised trust are reciprocally associated. Results suggest that at the individual level, education and social class are the most notable covariates predicting both association membership and trust. At the regional and national levels, high unemployment rates and living in non-social democratic states have negative associations with both aspects of social capital.

Chapter five aims to examine how the spatial and multilevel structures explain variations in individual well-being in Europe. Based on the use of
a spatial dependence multilevel model, the results suggest that well-being is spatially dependent; the well-being of individuals in a region tends to be at a similar level to that of individuals in surrounding regions, which is due to the spatial dependence of unobserved factors.

Finally, chapter six considers key findings of this study and discusses directions that further research may take in order to overcome the limitations of this study. The chapter concludes with an elaboration of the main contributions and a discussion on academic and societal implications for both researchers and policy-makers in Europe.
Chapter 2

Internet use and well-being before and during crisis in Europe\(^1\)

**Summary:** The debate about whether Internet use increases or decreases subjective well-being is growing. However, previous studies rarely explore either this association at the time of financial crisis or the mechanisms by which contextual factors affect well-being. This chapter examines the association between Internet use and well-being before and during the financial crisis in Europe which started in 2007. Using the four waves of the European Social Survey 2004-2010, we apply multilevel model. Results suggest that before the crisis, Internet use is not associated with well-being, in contrast with during the period of crisis. Beyond documenting the associations between Internet use and well-being, we find that using the Internet to respond to a situation of unemployment may help individuals for improved well-being. In addition, the density of Internet users in regions across Europe has positive and significant association with well-being. The findings also show that Internet use by individuals and the provision of the Internet access may be beneficial for maintaining well-being especially during the crisis.

**Keywords:** Internet use, well-being, crisis in Europe, multilevel model

2.1 Introduction

The debate in literature on whether Internet use increases or decreases well-being began in the 1990s, and continues to grow (e.g. [Kraut et al., 1998] Gross et al., 2002 [Kraut et al., 2002] Stepanikova et al., 2010) Penard and Pousing

Internet applications such as email and social networking sites encourage people to maintain their existing social networks and to create new social ties. These processes are said by some to be beneficial to well-being. For instance, Cotten et al. (2012) show a positive contribution of Internet use in reducing depression among older people. Kavetsos and Koutroumpis (2011) conclude that having a cell phone or an Internet connection at home is associated with higher levels of well-being. Others, however, maintain that Internet use may have detrimental effects on well-being. Its use may trigger loneliness and may reduce face-to-face social interaction. For people who have few friends, Internet use seems to create social isolation and in turn to decrease well-being (Kraut et al., 1998, 2002). Time spent online can also reduce the time available for face-to-face interaction (Nie et al., 2002).

Some limitations are evident in this emerging literature. Firstly, studies have yet to examine the effect of Internet use on well-being before and during the current financial crisis. Although recent works study well-being during times of crisis (Deaton, 2012; Graham and Sukhtankar, 2004; Shapiro, 2010; Christelis et al., 2011), none of these include the Internet as a predictor. Secondly, previous studies offer a limited understanding on how contextual factors affect individual well-being. The distribution of economic resources and Internet connections across regions may influence subjective well-being; regions with more dense Internet connections may simply offer better access. In addition, since individuals surveyed in these studies are nested within regions, it is important to consider this nested or multilevel structure of the data. Thirdly, most studies focus on a single country (Kraut et al., 1998; Gross et al., 2002; Kraut et al., 2002; Stepanikova et al., 2010; Mitchell et al., 2011; Cotten et al., 2012; Penard and Pousing, 2010). For instance, Stepanikova et al. (2010) use a representative sample of US adults, while Penard and Pousing (2010) fo-
focus on Luxembourg. Few studies however have investigated the relationship across several countries despite the importance of country variations, in particular in terms of the overall level of economic development and its potential role in conditioning this relationship.

The chapter aims to fill these gaps by examining whether Internet use is associated with well-being before and during the crisis in Europe using a multilevel model. We use data from the European Social Survey (ESS), a series of cross sectional surveys of Europeans from 2004 to 2010, which collect information on Internet use, social companionship and happiness and provide an opportunity to explore the relationships between Internet use and well-being. The data also gives region codes (NUTS 2) to identify regions within countries, allowing us to merge individual and regional data and to use multilevel models to understand how contextual factors at a more immediate level (i.e. region) affect well-being.

The results suggest that Internet use is associated with higher levels of well-being under certain conditions. We find that in the period before the crisis from 2004 to 2006, Internet use has no association with well-being, while from 2008 to 2010, at the height of the crisis, it results in a positive and significant association with well-being. We also find that the density of Internet users in a region has the same positive association.

This chapter is organised as follows. The next section suggests a general framework to attempt an understanding the relationship between Internet use and well-being in the period of crisis. Next we present the specific data and methods we used to empirically examine questions raised in this framework. The Results section provides descriptive statistics, maps and the estimation results of the multilevel model. The final section discusses the results and presents our conclusion.
2.2 Well-being and its correlates

The literature analysing almost every aspect of well-being is vast and still growing: our review is thus necessarily selective (Lane, 2000; Clark and Oswald, 1994; Frey and Stutzer, 2002; Frey, 2008; Blanchflower and Oswald, 2008; Graham, 2009). In terms of demographic determinants, gender and age are significant factors for predicting well-being. Oswald (1997) notes that women are more likely to be happy. Association between age and happiness is slightly positive (Argyle, 2001); older people are likely to be happier than younger ones. However, previous studies have also found a U-shaped relationship between age and well-being (Clark, 2003; Blanchflower and Oswald, 2008): people tend to be happier when younger or older, rather than when they are middle-aged.

Education and income are two determinants of well-being that have been widely debated. Education, as a human capital indicator, predicts well-being status. A number of studies have also investigated the relation between education and happiness (Diener et al., 1993; Stutzer and Frey, 2008). Results suggest that education is positively correlated with well-being, since education provides a set of tools to achieve a higher level of well-being. In contrast, some studies demonstrate a negative relation between them (Clark and Oswald, 1994; Stutzer and Frey, 2008). This difference in the association between education and well-being is said to depend on the fulfillment of aspiration. Higher level of education may lead to higher aspiration (Frey and Stutzer, 2002). Ultimately, the resulting unmet expectation may drive the negative correlation between education and well-being.

The effect of income on well-being has spawned a major debate in the literature on well-being. Easterlin (1974) shows that personal income has positive effect on happiness, but as GDP grows over time, happiness fails to follow. This is known as the Easterlin paradox. However, several studies examining this paradox have shown evidence to the contrary. Deaton (2008)
demonstrates a positive relationship between per capita income and average happiness. Similarly, Inglehart et al. (2008), using World Values Survey for 1981-2007, finds that as GDP per capita grows, well-being increases as many as 77% among 52 countries across the world.

Unlike education and income, unemployment has been recognised as a consistent predictor for unhappiness. Previous studies (Clark and Oswald, 1994; Oswald, 1997) point out that unemployment is strongly and negatively associated with happiness. Being unemployed has severe and long lasting negative impacts on well-being, and these should not be interpreted only in terms of loss of income; there are significant non-pecuniary effects, as well.

Among the social factors, companionship and social relations are determinants which consistently predict well-being. Empirical studies within and across countries repeatedly show that family solidarity and friendship are strong predictors of well-being (Lane, 2000; Argyle, 2001). The impact of marital status on happiness is reported in some studies. Being married has a positive correlation with well-being as married people benefit socially and emotionally from their spouses. Conversely, being widowed and divorced are detrimental to happiness, because the dissolution of such relationships is damaging. Clark and Oswald (2002) and Graham (2009), for instance, show the positive effect of marriage on happiness, and the negative effect of widowhood and divorce on happiness.

Some contextual covariates that affect happiness have also been identified including Internet density in every 100 households and unemployment rate in regions. Kavetsos and Koutrompis (2011) demonstrate that broadband penetration in a country may have a beneficial effect on well-being, because people who live in that country are more likely to use the Internet for contacting family and friends and making purchases. In addition, we are told that the unemployment rate may be harmful for well-being. Frey (2008) points out that
the unemployment rate may raise concerns in individuals about the future and this in turn may decrease their well-being.

2.2.1 Does Internet increase or decrease well-being?

There are two lines taken by the literature seeking to explain how Internet use affects well-being. Because the Internet provides useful applications that enable individuals to maintain their social networks and to create new social ties, some have argued that this means the Internet may increase well-being. Kavetsos and Koutrompis (2011), examining whether technology affluence affects well-being across Europe, using the Eurobarometer survey from 2005 to 2008, conclude that having Internet connection is associated with a higher level of well-being.

In a very recent study, Cotten et al. (2012) examine the association between Internet use and depression among older adults. They use the 2006 Health Retirement Study, a nationally representative study among Americans aged over 50. This study uses a single question regarding Internet use: ‘Do you regularly use the World Wide Web, or the Internet, for sending and receiving e-mail or for any other purposes?’ Using propensity score matching methods to address selection bias and heterogeneity in the covariate distribution, this study concludes that Internet use reduces the probability of being depressed in older adults by about 20-28%. Although this study focuses on a single country, it presents strong evidence that Internet use may benefit well-being.

A different position maintains that Internet use decreases subjective well-being, since the time consumed in using the Internet may decrease people’s time available to maintain their social contacts and to create new social ties. Kraut et al. (1998) use longitudinal data to examine the effects of the Internet on social involvement and psychological well-being. In this study, 169 respondents were given a home computer and Internet connection and their Internet
use was also tracked for two periods in 1995 and 1996. Although results confirm that most respondents use the Internet as a medium of communication, this study concludes that Internet actually decreases social involvement and leads to increased loneliness and increased depression. The reason for this is quite basic: spending a lot of time online leaves, less time offline relationships such as visiting relatives and meeting friends.

A more recent study by Stepanikova et al. (2010), using panel-time diary data of 13,776 adult U.S. residents in 2004 and 2005, investigate how time spent online at home is associated with loneliness and life satisfaction. It concludes that time spent online at home web-browsing and with other communication tools such as instant messenger, chat rooms and newsgroups are related to increased loneliness and decreased life satisfaction. Stepanikova et al. (2010) explain that since the Internet does not provide the nonverbal cues provided by traditional social relations, its use may result in negative emotions, such as feelings of anonymity and isolation.

Given these conflicting findings, we ask: does Internet use increase or decrease well-being among Europeans?

2.2.2 Companionship: migrating to the Internet and well-being at the time of crisis?

To understand the mechanism by which the Internet affects well-being, we can usefully examine the relationship between Internet use and social companionship. Franzen (2000) presents that there are three reasons why the Internet may enhance an individuals’ social networks. Firstly, its use can reduce the time used for many everyday transactions. Online shopping, for example, facilitates flexible time, any time saved can be spent with family, friends and colleagues. Secondly, for many professions (e.g. journalism, research, computer programming, online marketing) the Internet is an essential tool for their jobs.
and can establish a flexible, home-based office. This also can increase the time available to spend with social networks. Thirdly, the Internet is a very cost-efficient communication tool compared to other communication such as mail and telephone. By providing such an efficient tool, the Internet thus becomes the first choice for contacting family, friends and colleagues. Thus, it seems likely that Internet use has a positive effect on individuals’ well-being.

The context of crisis may however modify this association between Internet use and well-being. Some studies find that well-being is adversely affected by financial crisis. Deaton (2012), using Gallup Healthways Wellbeing Index Poll 2010, reports that from 2008 the financial crisis has led to an increase in the unemployment rate from 4.8 to 10.6%, and his examination of 163,000 observations from January 2010 to August 2010 finds that being unemployed has a negative effect on individual well-being.


The decrease in household consumption as a consequence of financial crisis is likely to affect household expenditure available for social companionship, such as visiting family or meeting friends. To overcome this constraint and to maintain the same level of companionship, many people may explore alternatives such as the Internet. Since the Internet is now an integral part of everyday life, many people can quite easily keep in touch through this medium.
Thus, the Internet provides a low-cost way to maintain social companionship in straitened times. In times of crisis people tend to use Internet to maintain their existing social ties and even to create new ones. At the time of crisis, migrating to the Internet to maintain companionship may have beneficial effect for individuals’ well-being. Therefore we ask: does Internet use increase well-being at the time of crisis?

2.3 Data and Methods

The European Social Survey is an academically-driven social survey designed to chart and explain the interaction between Europe’s changing institutions and the attitudes, beliefs and behaviour patterns of its diverse populations ([European Social Survey](https://www.europeansocialsurvey.org) 2010). The ESS is two-yearly and consists of five waves, ranging from 2002 to 2010. The ESS provides the questions on main variable of this study which are happiness and life satisfaction. In addition, the ESS covers the time before and during the crisis which provides material to identify the different patterns of well-being among Europeans in those periods. The 2004-06 ESS is used to capture the period before the crisis, while the 2008-10 ESS is to capture the period during the crisis. Moreover, the ESS provides the questions on the Internet use as one of important predictors of well-being and gives the geographic codes that consists of country, NUTS1 and NUTS2 codes. This coding allows us to combine the individual data provided by the ESS with the contextual data from Eurostat, to clearly show the nested structure of the data.

2.3.1 Dependent variable

Subjective well-being is usually measured by subjective questions on happiness and life satisfaction. The term happiness tends to reflect short-term emotion,
while life satisfaction refers to long-term and stable evaluations of quality of life (Frey and Stutzer, 2002). Although looking at the different measures of well-being may increase understanding, earlier studies find that happiness and life satisfaction produce consistent results in multivariate analysis (Lim and Putnam, 2010). In this study, we use the happiness question: ‘Taking all things together, how happy would you say you are?’ The answer has 10-point scale, ranging from extremely unhappy to extremely happy, and is taken as ordinal.

2.3.2 Independent variables

Although previous studies use multiple items to measure Internet use (Kraut et al., 1998; Mitchell et al., 2011), we follow Cotten et al. (2012) and use a single question: ‘how often do you use the Internet, the World Wide Web or e-mail -whether at home or at work- for your personal use?’ The possible answers include no access at home or work, never use, less than once a month, once a month, several times a month, once a week, several times a week, and every day. They are coded into three dummy variables: rare (less than once a month and once a month), medium (several times a month and once a week) and frequent (several times a week and everyday). The reference is no access at home or work and never use the Internet. The measure of Internet use may be influenced by the different patterns of use over time. For example, Internet use in 2004 may differ from use in 2010 because of the growing features available in 2010. More specifically, social media is much more common in 2010 compared to 2004. Consequently, when interpreting the patterns of Internet use over time, it is important to consider this issue carefully.
2.3.3 Control variables

To avoid confounding the association between Internet and well-being, we include standard covariates of well-being: social capital, self-rated health, gender, age, marital status, education, social class, employment status, household income, Internet density in every 100 households and unemployment rates in regions.

To measure social capital, we use questions to identify the degree of respondents’ levels of trust and social relationships: (1) ‘generally speaking, would you say that most people can be trusted, or that you can’t be too careful in dealing with people?’ (2) ‘how often do you meet socially with friends, relatives or work colleagues?’ Self-rated health is measured by the question: ‘how is your health in general?’ Answers rated according to a 5-point scale, ranging from very good to very bad. The variable for income use a variable reflecting twelve household income categories ranging from 1,800 Euros to 120,000 Euros.

We create a dummy variable for gender (1 for female, 0 for male). Education is measured by the level attained by respondents, ranging from pre-primary education to the second stage of tertiary education. Marital status use dummy variables for never married, widowed, and divorced with union as the reference group. Another measure of socio-economic covariate is employment status, differentiated as retired, houseworker, unemployed, and disabled. They are used as dummy variables with employed/self employed as the reference group.

Given the significance of the effect of unemployment on life satisfaction, we examine whether the Internet can help in dealing with such a condition. We interact unemployment and Internet use to understand whether doing some-
thing about unemployment via the Internet, searching for jobs, for example, can have a net association with well-being. For the reason of parsimony, we interact unemployment status and the frequency of Internet use as the origin question in the survey.

At contextual level we include Internet density in every 100 households to measure the diffusion of information technology in a region and regional unemployment rate (Frey and Stutzer, 2002).

2.3.4 Multilevel model

A standard multilevel model is used to test whether Internet use increases or decreases an individuals’ well-being. The analysis proceeds in two stages: first, we describe the distribution of each covariate and present maps showing the distribution of Internet use and well-being in regions across Europe. Second, we examine the association between Internet use and well-being before and during the crisis. Since we need to understand how the context of crisis may affect that association, we analyse each wave of the ESS separately. The 2004 and the 2006 ESS represent the period before the crisis, while the 2008 and 2010 ESS represent the time during the crisis itself.

Before fitting multilevel model, there are several choices regarding the scale of dependent variable: either treating it as linear or ordinal scale. Since the scale of well-being used in this study is ordinal, we use a model that is suitable with this scale. Among the models, GLLAMM (Generalised Linear Latent and Mixed Models) seems to be suitable. GLLAMM is a class of multilevel latent variable model, where a latent variable is either (1) a factor or a random effect (intercept or coefficient) or (2) a disturbance/residual (Rabe-Hesketh et al., 2004). Penalized Quasi-Likelihood (PQL) is used to derive the estimates. The model is fitted using link logit. In addition, to perform a robustness check of the analysis, we also use multilevel linear regression, where the dependent variable
is treated as continuous. The results from both analyses are fairly similar, and the multilevel linear regression results can be found in the appendix.

2.4 Results

Our task is to examine whether Internet use increases or decreases subjective well-being before and during the financial crisis in Europe. First, we present descriptive statistics, including any change in Internet use and well-being over the four waves of ESS. Second, we present the results of multilevel analyses.
Table 2.1: Descriptive results

<table>
<thead>
<tr>
<th></th>
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<tbody>
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<td>Well-being</td>
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<td>2.03</td>
<td>7.14</td>
<td>2.06</td>
<td>6.94</td>
<td>2.13</td>
<td>6.92</td>
<td>2.14</td>
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<tr>
<td>Frequently use</td>
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<td>0.46</td>
<td>0.39</td>
<td>0.48</td>
<td>0.44</td>
<td>0.49</td>
<td>0.53</td>
<td>0.49</td>
</tr>
<tr>
<td>Medium use</td>
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<td>0.29</td>
<td>0.08</td>
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<td>0.06</td>
<td>0.24</td>
<td>0.06</td>
<td>0.24</td>
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<tr>
<td>Rarely use</td>
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<td>0.21</td>
<td>0.04</td>
<td>0.19</td>
<td>0.03</td>
<td>0.16</td>
<td>0.02</td>
<td>0.13</td>
</tr>
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<td>Unemployed*Net</td>
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<td>0.78</td>
<td>0.09</td>
<td>0.76</td>
<td>0.15</td>
<td>1.21</td>
<td>0.18</td>
<td>1.08</td>
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<td>5.00</td>
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<td>4.84</td>
<td>1.63</td>
<td>4.88</td>
<td>1.64</td>
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<td>Trust</td>
<td>4.91</td>
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<td>4.99</td>
<td>2.52</td>
<td>4.70</td>
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<td>5.09</td>
<td>2.43</td>
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<td>3.71</td>
<td>0.93</td>
<td>3.72</td>
<td>0.95</td>
<td>3.62</td>
<td>0.93</td>
</tr>
<tr>
<td>Female</td>
<td>0.54</td>
<td>0.49</td>
<td>0.54</td>
<td>0.49</td>
<td>0.55</td>
<td>0.53</td>
<td>0.53</td>
<td>0.49</td>
</tr>
<tr>
<td>Age</td>
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<td>47.7</td>
<td>18.5</td>
<td>47.5</td>
<td>18.5</td>
<td>45.5</td>
<td>16.7</td>
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<tr>
<td>Separated</td>
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<td>0.28</td>
<td>0.09</td>
<td>0.29</td>
<td>0.09</td>
<td>0.29</td>
<td>0.11</td>
<td>0.31</td>
</tr>
<tr>
<td>Widow</td>
<td>0.09</td>
<td>0.29</td>
<td>0.10</td>
<td>0.30</td>
<td>0.11</td>
<td>0.31</td>
<td>0.12</td>
<td>0.33</td>
</tr>
<tr>
<td>Never married</td>
<td>0.28</td>
<td>0.45</td>
<td>0.26</td>
<td>0.44</td>
<td>0.25</td>
<td>0.43</td>
<td>0.29</td>
<td>0.45</td>
</tr>
<tr>
<td>Education</td>
<td>11.5</td>
<td>4.03</td>
<td>12.1</td>
<td>4.11</td>
<td>11.9</td>
<td>4.17</td>
<td>12.2</td>
<td>3.98</td>
</tr>
<tr>
<td>Professional</td>
<td>0.31</td>
<td>0.46</td>
<td>0.33</td>
<td>0.47</td>
<td>0.32</td>
<td>0.46</td>
<td>0.31</td>
<td>0.46</td>
</tr>
<tr>
<td>Intermediate</td>
<td>0.22</td>
<td>0.41</td>
<td>0.23</td>
<td>0.42</td>
<td>0.21</td>
<td>0.41</td>
<td>0.22</td>
<td>0.42</td>
</tr>
<tr>
<td>Unemployment</td>
<td>0.04</td>
<td>0.20</td>
<td>0.03</td>
<td>0.18</td>
<td>0.04</td>
<td>0.20</td>
<td>0.05</td>
<td>0.21</td>
</tr>
<tr>
<td>Disabled</td>
<td>0.02</td>
<td>0.16</td>
<td>0.03</td>
<td>0.17</td>
<td>0.03</td>
<td>0.17</td>
<td>0.03</td>
<td>0.16</td>
</tr>
<tr>
<td>Retired</td>
<td>0.24</td>
<td>0.43</td>
<td>0.25</td>
<td>0.44</td>
<td>0.25</td>
<td>0.43</td>
<td>0.28</td>
<td>0.45</td>
</tr>
<tr>
<td>Home makers</td>
<td>0.21</td>
<td>0.41</td>
<td>0.20</td>
<td>0.40</td>
<td>0.17</td>
<td>0.38</td>
<td>0.18</td>
<td>0.38</td>
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<tr>
<td>Income group</td>
<td>6.07</td>
<td>2.62</td>
<td>6.15</td>
<td>2.75</td>
<td>5.26</td>
<td>2.77</td>
<td>5.00</td>
<td>2.77</td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>8.08</td>
<td>4.69</td>
<td>7.12</td>
<td>3.6</td>
<td>6.18</td>
<td>2.98</td>
<td>9.59</td>
<td>4.89</td>
</tr>
<tr>
<td>Internet density</td>
<td>40.0</td>
<td>18.6</td>
<td>51.0</td>
<td>19.1</td>
<td>56.9</td>
<td>19.7</td>
<td>66.9</td>
<td>17.0</td>
</tr>
<tr>
<td>Observations per regions</td>
<td>187</td>
<td>103</td>
<td>172</td>
<td>97</td>
<td>15,384</td>
<td>15,934</td>
<td>17,000</td>
<td>16,187</td>
</tr>
</tbody>
</table>

Respondents
Table 2.1 presents descriptive statistics of Internet use and well-being from 2004 to 2010, which represent the period before and during the crisis. The mean of well-being score before the crisis in 2004 is 7.19, while in 2004 is 7.14. During the crisis in 2008 the mean of well-being is 6.94, while in 2010 is 6.92. The percentage of respondents who use Internet with higher frequency in 2004 is 31%, while in 2006 is 39%. At the time crisis, the percentage becomes 44% in 2008 and 53% in 2010.

Figure 2.1: Internet use, social meeting and well-being

Figure 2.1 shows how Internet use, social meeting and well-being change over time from 2004 to 2010. We rescale all scores to range from 1-10 to ease comparison. From 2004 to 2006, well-being remains stable, changing only slightly from 7.19 to 7.14. From 2006-2008 it then decreases slightly from 7.14 to 6.94, indicating that the deepening crisis is accompanied by a discernible change in well-being. Social relationships or individual involvement in social interaction remains stable. Remarkably, over the whole period, Internet use
by individuals, increases monotonically, a trend which seems not to be affected by the crisis at all.

Figure 2.2: Spatial distribution of individuals’ Internet use across regions in Europe in 2010

Figure 2.2 illustrates the spatial distribution of individuals’ Internet use across selected regions in Europe and shows at a glance that Internet use varies within countries. Utrecht in the Netherlands and Hovedstaden and Midtjylland in Denmark have the highest level of Internet use, whereas Algarve (Portugal) and Severozapedan dan Yugozapedan (Bulgaria) have the lowest. A more detailed look shows that the level of Internet use varies within each country, suggesting the need to examine region-level factors which may be responsible for this.
Figure 2.3 shows the spatial distribution of well-being across selected regions in Europe and also demonstrates a variation within countries. Syddanmark and Midtjylland (in Denmark) and West Finland (Finland) have the highest levels of well-being across Europe, whereas Algarve (Portugal), Severozapovedan (Bulgaria) and Northern Hungary (Hungary) have the lowest. Taken with the variation in the Internet use shown in Figure 2.2, a contextual or multilevel examination of the relationship between Internet use and well-being is clearly needed.
Table 2.2: Internet and happiness across Europe using multilevel ordinal logit

<table>
<thead>
<tr>
<th></th>
<th>Before crisis</th>
<th>During crisis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2004</td>
<td>2006</td>
</tr>
<tr>
<td></td>
<td>OR(95% CI)</td>
<td>OR(95% CI)</td>
</tr>
<tr>
<td>Fixed Part:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Internet access</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Frequently use</td>
<td>0.95(0.89-1.03)</td>
<td>0.95(0.87-1.03)</td>
</tr>
<tr>
<td>Medium use</td>
<td>0.98(0.89-1.07)</td>
<td>0.93(0.83-1.04)</td>
</tr>
<tr>
<td>Rarely use</td>
<td>0.86(0.77-0.97)</td>
<td>0.87(0.74-1.01)</td>
</tr>
<tr>
<td>Unemployed*Net</td>
<td>1.00(0.96-1.05)</td>
<td>0.99(0.94-1.04)</td>
</tr>
<tr>
<td>Social meeting</td>
<td>1.19(1.17-1.21)</td>
<td>1.22(1.19-1.24)</td>
</tr>
<tr>
<td>Trust</td>
<td>1.11(1.10-1.12)</td>
<td>1.12(1.10-1.13)</td>
</tr>
<tr>
<td>Health</td>
<td>1.82(1.77-1.88)</td>
<td>1.84(1.77-1.91)</td>
</tr>
<tr>
<td>Male</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Female</td>
<td>1.22(1.16-1.29)</td>
<td>1.18(1.11-1.26)</td>
</tr>
<tr>
<td>Age</td>
<td>0.99(0.99-1.00)</td>
<td>0.99(0.99-0.99)</td>
</tr>
<tr>
<td>Married</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Separated</td>
<td>0.48(0.44-0.53)</td>
<td>0.58(0.53-0.65)</td>
</tr>
<tr>
<td>Widow</td>
<td>0.54(0.49-0.59)</td>
<td>0.56(0.49-0.62)</td>
</tr>
<tr>
<td>Never married</td>
<td>0.65(0.61-0.70)</td>
<td>0.59(0.55-0.64)</td>
</tr>
<tr>
<td>Education</td>
<td>0.99(0.98-1.00)</td>
<td>0.98(0.97-0.99)</td>
</tr>
<tr>
<td>Manual</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Professional</td>
<td>1.02(0.96-1.10)</td>
<td>1.00(0.93-1.09)</td>
</tr>
<tr>
<td>Intermediate</td>
<td>1.08(1.02-1.16)</td>
<td>0.97(0.90-1.05)</td>
</tr>
<tr>
<td>Unemployed</td>
<td>0.52(0.43-0.62)</td>
<td>0.72(0.57-0.90)</td>
</tr>
<tr>
<td>Disabled</td>
<td>0.93(0.80-1.08)</td>
<td>0.90(0.76-1.07)</td>
</tr>
<tr>
<td>Retired</td>
<td>1.45(1.33-1.58)</td>
<td>1.44(1.30-1.59)</td>
</tr>
<tr>
<td>Homemakers</td>
<td>1.14(1.07-1.21)</td>
<td>1.09(1.04-1.07)</td>
</tr>
<tr>
<td>Income</td>
<td>1.08(1.06-1.09)</td>
<td>1.06(1.04-1.08)</td>
</tr>
<tr>
<td>Region</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>1.01(0.99-1.01)</td>
<td>1.02(1.01-1.04)</td>
</tr>
<tr>
<td>Internet density</td>
<td>1.01(1.00-1.01)</td>
<td>1.02(1.01-1.02)</td>
</tr>
</tbody>
</table>

Variances at level 2: 0.081 0.190 0.133 0.231
Respondents: 15,384 15,934 17,000 16,187

Significance: †:5% ‡:1%
Table 2.2 presents the results of multilevel analyses of Internet use and well-being across Europe from 2004 to 2010. Columns 1 and 2 describe the model for 2004 and 2006 - the time before the crisis - while column 3 and 4 describe the model for 2008 and 2010, the time during the crisis.

The results from 2004 show that after controlling for standard covariates of well-being, Internet use has no significant association with well-being. Frequent Internet users are likely to have similar level of well-being compared to those who do not have access to the Internet. However, rarely Internet users tend to have a lower level of well-being compared those who do not have access to the Internet. Among individual covariates of well-being, meeting socially, being trustful and being healthy are positively and significantly associated with well-being. In contrast, being unemployed, being separated, being single and being widowed have negative and significant associations with well-being. Among the contextual covariates, Internet density is positively related to well-being.

The results from 2006 are similar to those results from 2004, namely that Internet use has no significant effect on subjective well-being. People who frequently use the Internet tend to have similar level of well-being compared to those who do not have Internet access. In terms of individual covariates, being healthy is positively associated with well-being. Similarly, meeting socially and being trustful are likely to have higher level of well-being. Meanwhile, being unemployed is harmful for well-being. With regard to demographic factors, being female is positive and significantly associated with well-being. However, education is negatively associated with well-being. In terms of contextual factors, Internet density and unemployment rate have positive association with well-being.

Column 3 presents the results from 2008 which represent the onset of the crisis. In this time people who use the Internet are likely to have higher
level of well-being. People who rarely, somewhat frequently and frequently connect to the Internet tend to have higher level of well-being compared to those who do not have access to the Internet. In terms of individual covariates, meeting socially, being trustful and being healthy are positively related to well-being. Meanwhile, being unemployed, being divorced, being separated and being single are negatively associated with well-being. Contextual factors show that Internet density and unemployment rate have positive and significant association with well-being.

The last column presents the results from 2010 which suggest that high level of Internet use has positive and significant association with subjective well-being. Meeting socially, being trustful and being healthy are positively associated with well-being. Meanwhile being unemployed, being widowed, being single and being separated are negatively and significantly associated with subjective well-being. However, the interaction term between unemployment and Internet use has positive association with well-being. Similar to the findings from the previous waves, both Internet density and unemployment rate have positive and significant correlations with well-being.

Comparing the coefficient of well-being from 4 waves of ESS, we find the results: in terms of social capital, the coefficients at the time before the crisis and during the crisis seem to be similar. From demographic factors, we find no patterns before and during the crisis. The association between marital status and well-being show no difference between the period of before and during the crisis.

Looking at the intraclass correlation based on linear multilevel model (see Appendix A, Table A.1), we find that the regional contribution for individual well-being is ranging from from 2.2% to 9.4%, indicating the contributions vary at the time before and during the crisis. To check robustness of the results, we also provide the model using imputed data which show relatively similar
results (see Appendix A, Table A.3).

2.5 Discussion

In this chapter we examine whether Internet use increases or decreases subjective well-being at time before and during crisis in Europe. Using four waves of the European Social Survey (ESS) 2004, 2006, 2008 and 2010, we address the gap in the literature on the connection between Internet use and well-being. Previous studies find mixed results in explaining that connection (Kraut et al., 1998, 2002; Mitchell et al., 2011).

We find that Internet use explains well-being differently at different times. Before the crisis, Internet use has no significant association with well-being, while during the crisis, it has a positive association. Thus it supports some studies (Kavetsos and Koutrompis, 2011; Cotten et al., 2012) and contradicts others (Kraut et al., 1998, 2002).

Why does Internet use have different effects at different times? If we visit some literature on well-being, we find that one of the most consistent predictors of well-being is social companionship (Lane, 2000; Argyle, 2001; Graham, 2009), and this can be made and maintained both online and offline. Because of financial constraints that at a time of crisis, many people tend to substitute offline companionship with online social interaction. The results might capture the effect of financial constraints occurred in the period of crisis compared to those the time before the crisis. The data indicates that the mean of household income in the time before the crisis was 6.07 in 2004 and 6.15 in 2006, dropping during the crisis to 5.26 in 2008 and 5.0 in 2010. These financial constraints may have led to the decrease in household consumption during the crisis period confirming the finding of Shapiro (2010) who concludes that the recent financial crisis led to a decrease in household consumption among older people in America. Limited consumption may then lead to a decrease in leisure
and social activity consumption, to overcome which, people experiencing crisis
tend to change their way of consuming their social needs (for example, substi-
tuting face-to-face meetings with friends with online meetings). In this way,
online companionship becomes increasingly important for maintaining subject-
ive well-being, and it follows that those with Internet access find it easier to
maintain online social relationships and thus maintain well-being.

Alternatively, the positive association between Internet use and well-being
could be explained by the increase in Internet access in Europe. In 2006, in
the period before the economic crisis, only 49% of households had an Internet
connection, while in 2008 the percentage had increased to more than 60%.
The percentage increased to 70% in 2010 (European Commission, 2012). An
increase in Internet access may lead people to engage in activities online that
were previously performed offline. It is almost indisputable that by providing
applications that facilitate job searches, banking, and shopping online, the
Internet can simplify life. One conclusion is that this contributes to an increase
in well-being. Internet users can perform essential routine tasks (which by
definition tend to be mundane, and thus with fairly strong potential to decrease
one’s sense of well-being) more easily and efficiently than those who do not.
The results also suggest that over the period before and during the crisis,
Internet density in European regions has a positive association with well-being.
Living in a region with a high rate of Internet connection is associated with
increased well-being.

Financial crisis in Europe may have different patterns in certain areas in
Europe. Some countries suffer more from crisis than other countries. At
the same time, some countries may have a rising in economic indicators, for
example Germany. Internet users who live in those areas may have different
mechanisms in responding the crisis. Internet users in more suffered countries
may get benefit by using online social networks\textsuperscript{3}. Meanwhile, Internet users who live in emerging countries would gain the benefit of purchasing goods\textsuperscript{4}.

Beyond documenting associations between Internet use and well-being, the findings suggest a process linking the two, shown by the interaction term of individual unemployment and Internet use, which during the financial crisis has a positive association with well-being. The reason for this is unclear and may vary. One possible explanation is that since the Internet facilitates a search for work, using it to respond to unemployment may give a sense of increased competency and efficacy to one’s search which may manifest in increased well-being.

Our analyses also suggest that standard covariates of well-being do not differ substantially in the period before and during the crisis. We find that social capital, measured by social meeting and trust, has a positive association with well-being, regardless of the times, and these results support previous studies \cite{Graham2009, Helliwell2004}. Social interaction as a form of companionship provides social support which enhances quality of life and acts as a buffer to stress. Moreover, as \cite{Lane2000} concludes, the major benefit of companionship is freedom from loneliness, a factor which by definition has a detrimental effect on well-being. Likewise, marriage becomes an important predictor of well-being because of its provision of emotional and social support from their spouses and children \cite{Diener2008}.

Not surprisingly, being unemployed tends to have a negative effect on well-being: this is consistent with several earlier studies \cite{Clark1994, DiTella2001}. This can be explained in terms of two mechanisms:

\textsuperscript{3}Data from Eurostat shows that Spain and Greece have higher level of the use of social network activities than that of EU rate \cite{EuropeanCommission2012}.

\textsuperscript{4}The data of Internet use published by EU shows that 65\% of Germans have purchased a good or a service online in the time during crisis. Meanwhile, the figures of Greece and Spain, which are more suffered from crisis, show that 20\% and 30\% of them have purchased a good or a service online during the time of crisis.
the psychological cost and the compromising of social norms. With regard to psychological cost, unemployment may lead to depression and anxiety and in turn to a decrease in well-being. In terms of social norms, the internal pressure to comply with the work ethic rather than depending on the state or on others may be implicated in the link between unemployment and decrease in well-being (Frey 2008).

The findings of this study largely confirm those of previous investigations. However, we find the puzzle that the association of unemployment rate and well-being is positive. This may be explained by the habituation process, which according to Roed (2002), happens when widespread unemployment persists, causing a decrease in any associated stigma and thus an increase in subjective well-being (Clark et al. 2010). Blanchard (2006) concludes that unemployment rate in Europe started to increase in the 1970s and increased further in the 1980s. It reaches a peak in the 1990s and still high in the mid 2000s. The positive association between unemployment rate and well-being has also been shown by Clark et al. (2010), who concludes that the regional unemployment rate has a positive association with well-being among poor-prospect unemployed men.

2.6 Conclusion

We conclude that the association between Internet use and well-being depends on the context of the economy, whether in a time of crisis or not. Internet use is not associated with well-being during the period before the crisis, but it is associated during the crisis period. Moreover, we also find that Internet density in regions is positively associated with well-being irrespective of the context.

Comparing the determinants of well-being, we find that before and during the crisis well-being can be explained by relatively similar determinants.
For example, the coefficient of social meeting before and during the crisis remains stable. These findings provide the evidence that at the period before and during the crisis, well-being is explained by relatively similar predictors. Although this is preliminary results, future works could compare the determinants of well-being before and during the crisis using suitable method.

Our research has several limitations. Although we analyse multiple waves of cross-sectional data, we do not analyse individual changes in well-being over time. This is not satisfactory, and further study of longitudinal design would help to resolve this. If we analyse longitudinal data, we can further examine the specific effect of Internet use on subjective well-being. Further research could also investigate the causal effect of Internet use on well-being to address the question of whether Internet use affects well-being or vice versa. Although there is wide ranging analysis of Internet use, it tends to be based on a single item, namely, frequency of use. More specific questions –such as the applications used, the purpose of each occasion of use, and the time spent online– could enrich the findings for further research.

This study suggests that individuals could gain from using the Internet even –and especially– during crisis, and that governments in Europe, through improving regional Internet access, can contribute to an improvement in subjective well-being. This study also suggests that overcoming the digital divide (particularly in terms of Internet access) is an issue which needs to be addressed in the light of its significant role in maintaining well-being in Europe during the crisis.
Chapter 3

Happiness and health in Europe: a multivariate multilevel model

Summary: This chapter investigates both individual and contextual factors in explaining covariation in happiness and health. We thus use multivariate multilevel model to explain two aspects of well-being – happiness and health – simultaneously. We study 47 countries across Europe during the crisis in 2007 and use data from the 2008 European Values Study. There is a large quantity of missing data, a problem which we deal with by using the recently-developed multilevel multiple imputation. We find that the determinants of both happiness and health are quite similar. Happiness and health are positively correlated at individual, regional and national levels. Being married, being educated, and being affluent are positively associated with being happy and being healthy. Conversely, age, individual unemployment and unemployment rates in regions are negatively associated with happiness and health.

Keywords: Well-being, happiness, health, multivariate multilevel model, multilevel multiple imputation

3.1 Introduction

Happiness and health, as two important indicators of well-being, need to be addressed by academics and policy makers for at least two reasons: first, from an individual perspective, Argyle (2001) argued that happy people seem to

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1 This chapter is based on the following article: Pierewan, A.C., and Tampubolon, G. (forthcoming). Happiness and health in Europe: a multivariate multilevel model, Applied Research in Quality of Life. doi: 10.1007/s11482-014-9309-3.
be more productive and creative than those who are unhappy. Second, from a societal perspective, happiness and health are considered to be successful indicators of a nation’s development. This argument follows Sarkozy commission in 2008 to shift GDP as a successful indicator of a country’s development and to include quality of life indicators (happiness and health) as important measurements of a country’s development (Stiglitz et al., 2008).

In the literature, most studies treat health or happiness as a single outcome (see Graham, 2009; Subramanian et al., 2005). They either explain happiness in terms of health (and other factors) or conversely health in terms of happiness. However, it is important to study happiness and health simultaneously for two reasons. First, both happiness and health are often subjectively elicited. They are neither neurologically measured (happiness) nor clinically measured (health). As a subjective perception, health assessment may involve affect (happiness) and happiness assessment may involve the consideration of health. Second, some have argued that happiness and health can be treated as independent and dependent variables for each other (Blanchflower and Oswald, 2004; Graham, 2008).

The present study has uncovered three papers that constitute an exception in the literature in that they examine the determinants of both happiness and health simultaneously (Subramanian et al., 2005; Oshio and Kobayashi, 2010; Eikemo et al., 2008b). Subramanian et al. (2005) examine the covariation of health and happiness among communities in the United States. Eikemo et al. (2008b) used data from the European Social Survey 2002 and 2004, investigating how happiness and health correlate across countries in Europe. We extend Subramanian’s study by adding one higher level in multivariate multilevel model. Moreover, we expand upon Eikemo’s study by introducing regional factors for explaining happiness and health.

The chapter aims to examine the individual, regional and national covari-
ations in happiness and health. Since this study analyses individual respondents nested in regions and countries, a four-level model is appropriate. In addition, two individual outcomes (happiness and health) are explained simultaneously; for this reason, multivariate multilevel model is most suitable for the analysis. The problem of missing data is an issue at both the regional and individual levels. Because the structure of the data is multilevel, we use a multilevel multiple imputation method.

Our analysis suggests that happiness and health are positively correlated. Happier people tend to be healthier, and vice versa, even after controlling for individual, regional and national covariates. Social capital, marital status, education and household income are among the important covariates that are positively associated with both happiness and health. Individual unemployment, disability, regional unemployment rates and national income inequality are negatively associated with happiness and health.

This chapter is organised as follows: first, the determinants of happiness and health are identified based on previous studies. The data and method used in this study are then described, including the construction of the covariates. In the penultimate section the results are presented and discussed. Lastly, the chapter concludes with theoretical and methodological implications for future researchers and policy makers.

3.2 Happiness and health: the joint outcomes

Previous studies suggest a strong correlation between happiness and health (e.g. Graham, 2008; Argyle, 1997). The relationship between the two may suffer from the problems of endogeneity and self-selection. Instead of dealing with the issues presented by endogeneity problems, this study uses a different approach to examine the association between happiness and health.
The relationship between happiness and health is left open in the framework of the present research: it presumes neither that happiness determines health nor the reverse. When asked about their happiness, respondents may have considered their state of health implicitly and subjectively. Conversely, when asked about their health, respondents may have implicitly and subjectively considered their happiness. The two are therefore correlated. In our analysis, we anticipate that both are mutually constitutive (Subramanian et al., 2005; Argyle, 1997). In modelling terms, we have both as bivariate outcomes to be explained, and both covary.

Subramanian et al. (2005) examine simultaneous explanation of both happiness and health. Their study investigates individual determinants and the community level covariation in health and happiness. Using the 2000 Social Capital Benchmark Survey which involved 21,572 individual respondents living in 36 communities in the United States, they applied a multivariate multilevel model. The findings suggest that both health and happiness are determined by relatively similar factors: income, education and marital status. After controlling for all covariates of health and happiness, the results show that the residual correlation between health and happiness is positive and significant. This indicates that individuals who are healthy are likely to be happy as well. This study gives an understanding of how to treat health and happiness jointly, providing evidence that health and happiness are positively associated. However, this investigation covers communities in the United States. Different areas may have different features in examining the association between health and happiness.

Following Subramanian et al. (2005), Eikemo et al. (2008b) investigate the covariations of health and happiness in European countries using the 2002 and 2004 European Social Survey. Using multivariate multilevel model, this study provides evidence that poor health and unhappiness are related to both
demographic and socio-economic indicators in Europe. Eikemo et al. (2008b) conclude that people who report poor health tend to report unhappiness as well which supports the findings of Subramanian et al. (2005). Although the result gives evidence of the correlation between health and happiness among Europeans, the study uses country as level 2 in multilevel model. Since countries may contain variations in health and happiness, it is important to include areas that are smaller than countries, such as regions or neighbourhoods. An investigation taking more geographical areas into account can more precisely estimate the relationship between health and happiness.

3.3 Determinants of happiness and health

Several studies demonstrate that the determinants of happiness and health are relatively similar (Subramanian et al., 2005; Oshio and Kobayashi, 2010). However, their associations with happiness and health can be different when both are explained simultaneously. Gender, for example, has been identified as an important predictor for happiness and health. At the same time, though, gender appears to predict both positive and negative outcomes. Oswald (1997) noted that women are more likely to be happy, but Subramanian et al. (2002) found that women were less likely to be healthy than men.

Age is an important covariate in the prediction of happiness and health; like gender, different studies have shown it to affect happiness and health in different directions. According to Argyle (2001), the association between age and happiness was slightly positive: older people are likely to be happier than younger people. However, others have shown a u-shaped relationship between age and happiness (Blanchflower and Oswald, 2008; Clark, 2003) – in other words, that people tend to be happier when they are younger and older than when they are middle-aged. The association between age and health is straight-
forward: the younger are healthier. Song and Lin (2009), using a sample from Taiwan, demonstrated that younger people feel healthier. Similarly, Eriksson et al. (2001), using samples from Sweden, found that being young is associated with being healthy.

Education may be one of the most important and consistent determinants of happiness and health. As a human capital indicator, this covariate predicts well-being status; a number of studies have also investigated the relation between education and happiness (Diener et al. 1993; Stutzer and Frey 2008; Diener 2000). The suggestion is that education is positively correlated with well-being. In contrast however, Clark and Oswald (1994) reported a negative relation between the two. Due to changing aspirations and expectations of higher income among more educated people, the resulting unmet expectations may drive the negative correlation between education and well-being. Previous studies found that the association between education and health is mixed. Subramanian et al. (2005) showed that education is strongly correlated with both happiness and health. Kunst et al. (2005) examined the relationship between education and health; they found that in Scandinavian countries, education has no significant correlation with health.

Companionship and social relationships are determinants which are consistently associated with happiness. Empirical studies within and across countries repeat the same result, namely that family solidarity and friendship are strong predictors of well-being (Lane 2000; Argyle 2001). The association between marital status and happiness is reported in some studies (Argyle 2001; Stutzer 2004). Since married people benefit socially and emotionally from the support their spouses bring, being married is positively associated with happiness, while being widowed and being separated is associated with decreased happiness. Moreover, Stutzer (2004) posited that married people tend to encourage commitment which would be beneficial for maintaining their happiness. Diener
and Biswar-Diener (2008) argued that there are other factors involved, and that any benefits accruing from marriage depend on the partners’ personalities and the context of their lives. Using longitudinal data spanning 17 years, Stutzer and Frey (2004) concluded that happier singles are more likely to marry but that married people are no happier than singles. This evidence suggests that, in contrast to the findings reviewed above on the relationship between marriage and happiness, it is happiness that causes marriage rather than vice versa. Marriage can have positive associations with health. Social support provided by a partner in a marriage may benefit individual health. As can be seen from previous research, social support has been identified as a strong predictor of self-rated health (e.g. Song and Lin, 2009). The study finds that marital status has a positive relationship with self-rated health. Subramanian et al. (2005) similarly found that married people are likely to be healthier.

Social capital is an important predictor of health. Studies have found a positive association between them. Mansyur et al. (2008), using data from 45 countries, found that social capital is positively associated with health. Subramanian et al. (2002) also demonstrated that trust, a measure of social capital, has a positive correlation with self-rated health. More recently, Tampubolon et al. (2013), using the 2007 Welsh Health Survey (WHS) and the 2007 Living in Wales (LiW) and applying a multilevel path analytic model, conclude that neighbourhood social capital seems to be associated with self-related health.

The relationship between social class and well-being has been investigated by Haring et al. (1984). By conducting a meta-analysis of American studies, the researchers showed that social class has greater association with life satisfaction than does income. Social position may also explain health, as argued by Marmot and Wilkinson (2006), according to whom health follows a social gradient: higher social positions have a positive association with health.

Unemployment has been recognised as an important predictor for both
unhappiness and ill health. Previous studies pointed out that unemployment is strongly and negatively associated with happiness (Clark and Oswald, 1994; Oswald, 1997). Being unemployed has severe and long-lasting negative impacts on well-being, and these must be interpreted in terms much broader than loss of income; there are significant non-pecuniary effects as well. Being unemployed also has a negative relationship with health, as demonstrated in a study using the Canadian National Population Health Survey (Cott et al., 1999). Similarly, Ahs and Westerling (2005) conducted a study using several cross sectional data from the Swedish Survey of Living Conditions in the periods 1983-89 and 1992-97. They found unemployment to be negatively associated with self-rated health in both periods.

The effect of income has become a major factor in the debate surrounding explanations of happiness. Easterlin (1974) shows that personal income has a positive association with happiness, but that, as GDP grows over time, happiness fails to follow. This has become known as the Easterlin paradox. However, several studies examining this paradox have produced inconsistent and contradictory results. Veenhoven (1991), for example, found that people living in poor, war-torn and isolated countries are likely to be unhappy, whereas Diener et al. (1993) reported that in the US, income generates similar levels of happiness in both poorer and richer areas. As does the Easterlin paradox, this indicates that income in different areas does not produce different levels of happiness.

In relation to health, Subramanian et al. (2005) find that income has a positive impact on health. It shows that poor people are four times more likely to report poor health status than those who are better off financially. Likewise, Oshio and Kobayashi (2010), using data obtained from a nationwide survey in Japan, conclude that people with a higher income are more likely to be healthy than those with a lower income. These data indicate that income
inconsistently predicts happiness but consistently predicts health. Mackenbach et al. (2005) showed that having higher income is associated with better self-assessed health in all countries, especially among individuals in the middle income range.

Some contextual covariates that affect happiness have been identified: regional per capita GDP, income inequality and area unemployment rates. The correlation between GDP and happiness has been investigated in earlier research (Easterlin, 1974; Veenhoven, 1991). More recent studies have found GDP to be positively associated with health (Oshio and Kobayashi, 2010; Huijts et al., 2010; Subramanian et al., 2005). Using individual data from the European Social Survey of 2002, 2004, and 2006, Huijts et al. (2010) concluded that countries’ per capita GDP is positively associated with self-rated health.

With regard to unemployment, findings show that this economic indicator has a negative association with both happiness (Frey and Stutzer, 2002) and health (Dorling, 2009; Jin et al., 1995). Frey and Stutzer (2002) argued that unemployment rates in an area may increase residents’ fear that crime and social unease may rise. Moreover, Di Tella et al. (2001), using data from 12 European countries gathered from 1975 to 1991, showed that being unemployed reduces life satisfaction. Cummins et al. (2005) investigated the relationship between neighborhood material conditions and self-rated health. Using cross sectional data from the Health Survey for England and the Scottish Health Survey, they found that living in a neighbourhood with a high unemployment rate is associated with poor self-rated health. Jin et al. (1995) reviewed 46 studies from the period 1980-1990, finding there to be a negative association between unemployment and health.

In relation to income inequality and happiness, Alesina et al. (2004), using data from the General Social Survey (1972-1997) and the Eurobarometer Survey Series (1975-1992), concluded that in general, individuals have a lower
level of happiness when income inequality is high. This finding held for both Europeans and Americans. Nevertheless, the relationship between inequality and happiness is more marked in Europe than in America. Similarly, Oshio and Kobayashi (2010), using samples from a nationwide survey in Japan, examine the relationship between income inequality, happiness and health. The results suggest that income inequality is negatively associated with both happiness and health.

In predicting health, income inequality presents conflicting results. Some have argued that income inequality negatively affects health (Marmot and Wilkinson, 2006). Wilkinson and Pickett (2009) proposed the income inequality hypothesis: countries with greater income equality tend to enjoy higher levels of well-being. However, others have found there to be no correlation (Lorgelly and Lindley, 2008; Gravelle and Sutton, 2009). The present study adopts the view of Marmot and Wilkinson (2006) to some extent: that certain aspects of area income distribution, particularly income inequality, affect health inequality.

Living in a welfare state can explain happiness and health. Lapinski et al. (1998) examined three welfare states type and found no statistical difference in terms of well-being. Similarly, Veenhoven (2000) concluded that there is no significant difference in well-being among welfare states. However, Di Tella et al. (2003) demonstrated that living in a welfare state is positively associated with well-being. As providers of unemployment benefits, the situation created by welfare states can contribute to the maintenance of individuals’ well-being. Eikemo et al. (2008a) found there to be a slight difference among welfare states in terms of self-reported health. Their results indicated that individuals living in Scandinavian and Anglo-Saxon welfare states tend to have better self-rated health in comparison to those living in southern and eastern European welfare states.
To summarise, a number of consistent findings have arisen from previous research in terms of covariates of happiness and health. Social capital, marital status, income and income inequality have been consistent factors in this regard. By contrast, other covariates such as gender and age have different tendencies to predict happiness and health.

This study seeks to answer three questions: (1) To what extent do happiness and health correlate after controlling some covariates that affect both? (2) To what extent do individual covariates affect happiness and health? (3) To what extent do contextual covariates influence happiness and health?

3.4 Data and method

This chapter uses data from the 2008 European Values Study (EVS) which include 60,232 individual respondents in 47 countries across Europe. The purpose of the EVS is to increase the understanding of the ideas, beliefs, preferences, attitudes, values and opinions of citizens from across Europe. The EVS is a large scale of survey to measure and understand European values. It provides data in a number of categories related to well-being: happiness, health, social participation and trust (European Values Study 2008).

More specifically, the 2008 EVS provides the questions on the main dependent variables used in this chapter: happiness and health. It gives an opportunity to examine these variables. In addition, the 2008 EVS provides the questions regarding the standard covariates of well-being used in previous studies such as gender, age, level of education, employment status and household income. More importantly, this survey gives various geographic codes which indicate where individuals live, including country, NUTS1, NUTS2 and NUTS3 codes. This coding allows us to match the data with the contextual data provided by other institutions and in turns allows us to capture the nes-
ted structure of the data. It also provides an opportunity to draw a map on the aggregate score of well-being based on certain grouping.

### 3.4.1 Dependent variables

To measure happiness and health, we use the questions available in the EVS. Happiness is assessed by the question: ‘Taking all things together, would you say you are: very happy, quite happy, not very happy or not at all happy?’ Health, as measured by self-rated health, is assessed by the question: ‘All in all, how would you describe your state of health these days? Would you say it is: very good, good, fair, poor or very poor?’ The methodological challenge in terms of the use of subjective measures of happiness and health is ensuring these measures’ reliability to measure happiness and health. From previous research on happiness studies, it is clear that subjective measures of happiness have a high correlation with objective measures (e.g. Helliwell and Putnam 2004). These results are also found in studies of self-rated health. Subjective measure of health has high correlation with objective measure of health (Huisman et al. 2007; Idler and Benyamini 1997).

### 3.4.2 Independent variables and the covariates

The covariates of happiness and health The covariates used in this study are gender, age, education, marital status, employment status and household income. We use a dummy variable to measure gender (1 for female, 0 for male). Education is measured by the highest level of education attained by respondents, ranging from pre-primary education to the second stage of tertiary education. Income is measured by median household income.\(^2\)

Marital status is captured using dummy variables for in union, widowed,\(^2\)

\(^2\)One limitation in measuring income is that this study does not control for cost of living. Due to a lack of available regarding cost of living across regions and countries in Europe, this study does not include this variable.
and divorced, with never married as the reference group. Another measure of socio-economic covariation is employment status, differentiated as retired, homemaker, student, unemployed, and disabled. These are used as dummy variables with employed/self-employed as the reference group.

Aslam and Corrado (2012) argue that one of the most suitable groupings in Europe to deal with data available in Europe is the 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 result in individual clustering across countries. In addition, Veenhoven (2009) posited 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 a relatively similar socioeconomic, political and cultural environment. To control regional factors, we use data such as regional per capita GDP and unemployment rates (Eurostat, 2011), while to control national factors, we use the Gini Index and welfare states classification.

Since a large amount of data is missing, for example, 10,740 of 60,232 respondents (17.83%) did not share their income, we need to deal with this missing data problem. Moreover, contextual data contain missing data as well, for example, regional unemployment rates (22.22%) and GDP (33.62%). In dealing with missing data, several imputation methods have been used: listwise deletion, pairwise deletion, mean imputation, regression imputation and stochastic regression imputation. The issue arising from these imputation methods, however, with the exception of pairwise deletion, is that the standard errors they produce are too small (van Buuren, 2012). To solve this problem, Rubin (1987) offered multiple imputation. Another reason to use multiple
imputation is its usefulness in separating the solutions of missing data problems and complete data problems into stages. It solves missing data problems first and complete data problems second. Multiple imputation takes place in three stages. First, it imputes data with plausible values and thus creates m complete data sets. Second, it analyses each imputed dataset using the complete-data method. Lastly, it combines the results from the analysis and adjusts for the additional uncertainty introduced by the process of imputation. To calculate the final result, Rubin’s rule is applied (Little and Rubin 2002; Enders 2010).

3.4.3 Multivariate multilevel model

Snijders and Bosker (2011) argued that a multivariate multilevel model can be used for understanding the covariates; moreover, it can result in residual correlations, leading to an understanding of the fact that the relationships between two dependent variables still hold even after controlling their covariates.

There are several advantages to using a multivariate multilevel model. Firstly, the correlations between dependent variables can be estimated in particular by making use of unexplained correlations at the individual and group level. Secondly, the model will provide a more powerful test as indicated by the presence of smaller standard errors. Lastly, the model can be used to test the effect of explanatory variables on two or more dependent variables, showing for example which one is stronger: the effect of explanatory x on y₁ or on y₂ (Snijders and Bosker 2011).

Because the present research treats subjective happiness and subjective health symmetrically, it enables the interpretation of parallel correlates of happiness and health in the literature. For example, various ways in which aspects of social capital can affect health have been distinguished in the literature. At the same time, the emphasis on companionship and employment status as important correlates of happiness is apparent.
A multivariate multilevel model is appropriate for this study because it
deals with a multilevel setting (that is, individuals nested in regions) and ex-
plains two outcomes simultaneously (Goldstein, 2003). This model corresponds
to a schema in which individual outcomes (such as happiness and health) are
explained by determinants at both the individual, regional and national level
determinants. More specifically, multivariate multilevel model is able to indic-
ate the results whether the effect of covariates on happiness and health can be
compared (Snijders and Bosker, 2011). Although this study follows the ma-
jority of studies on European comparative research in using multilevel model,
unlike most of them it explains two outcomes simultaneously.

We denote this by using $y_{ij}$, the multivariate response for both happiness
and health $i(i=1,\ldots,n_j)$ in individual $j(j=1,\ldots,J)$. The model is described below:

$$
\begin{align*}
    y_{ij} &= \beta_0 z_{1ij} + \beta_1 z_{2ij} + v_{1j} z_{1ij} + v_{2j} z_{2ij} \\
    z_{1ij} &= \begin{cases} 1 & \text{if happiness} \\ 0 & \text{if health} \end{cases} \\
    \text{var}(v_{1j}) &= \sigma_{u1}^2 \\
    \text{var}(v_{2j}) &= \sigma_{u2}^2 \\
    \text{cov}(v_{1j}v_{2j}) &= \sigma_{u12}
\end{align*}
$$

where $z_{1ij}$ is a set of individual covariates of happiness, while $z_{2ij}$ is a set
of individual covariates of health. We estimate these specifications simultane-
ously.\footnote{We use MLwin to estimate this multivariate multivariate model.}

We use MLwin to estimate this multivariate multivariate model.
### 3.5 Results

Table 3.1: Descriptive statistics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Happiness</td>
<td>3.05</td>
<td>0.68</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Health</td>
<td>3.86</td>
<td>0.89</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Membership</td>
<td>0.90</td>
<td>1.51</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td>Trust</td>
<td>0.30</td>
<td>0.47</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Female</td>
<td>0.55</td>
<td>0.49</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Age</td>
<td>43.9</td>
<td>14.9</td>
<td>15</td>
<td>70</td>
</tr>
<tr>
<td>Education</td>
<td>3.13</td>
<td>1.29</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Married</td>
<td>0.56</td>
<td>0.49</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Separated</td>
<td>0.10</td>
<td>0.30</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Widow</td>
<td>0.06</td>
<td>0.23</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Professional</td>
<td>0.26</td>
<td>0.44</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Intermediate</td>
<td>0.09</td>
<td>0.29</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Unemployed</td>
<td>0.06</td>
<td>0.25</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Disabled</td>
<td>0.02</td>
<td>0.13</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Log household income</td>
<td>7.16</td>
<td>0.98</td>
<td>5.0</td>
<td>9.3</td>
</tr>
<tr>
<td>Log GDP</td>
<td>10.24</td>
<td>0.95</td>
<td>7.35</td>
<td>13.19</td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>8.39</td>
<td>3.79</td>
<td>2.1</td>
<td>26.2</td>
</tr>
<tr>
<td>GINI</td>
<td>30.2</td>
<td>4.69</td>
<td>23</td>
<td>50.8</td>
</tr>
<tr>
<td>Traditional</td>
<td>0.45</td>
<td>0.68</td>
<td>-1.53</td>
<td>1.86</td>
</tr>
<tr>
<td>Living in continental countries</td>
<td>0.24</td>
<td>0.42</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Living in liberal countries</td>
<td>0.12</td>
<td>0.33</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Living in Central/Eastern Europe</td>
<td>0.55</td>
<td>0.49</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Regions</td>
<td>350</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respondents</td>
<td>56,899</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3.1 presents the descriptive statistics. The latest version of the European Values Study 2008 consists of 67,786 respondents, but this study restricts the sample to respondents aged 15-70. This restriction decreases the sample to 56,899 respondents. Of the respondents, 55% were female, while 45% were male. Overall, respondents assess their happiness and health as above average or 3.05 and 3.85 respectively. In terms of social capital indicators, respondents were not actively engaged in voluntary association with a mean of 0.9 in which scores ranged from 1 to 15. With regard to generalised trust, 30% of respondents indicated that they were trusting of other people. As an indicator of social companionship, 56% of respondents were married, 10% of them were separated, and only 6% of respondents were widowed. In terms of welfare states, 24% of respondents lived in continental countries, 12% of them lived in liberal countries and 55% of respondents lived in Central/Eastern Europe.
Figure 3.1 shows the spatial distribution of happiness across regions in Europe, and it demonstrates that happiness varies within each country. Sweden, for example, shows different levels of happiness across its regions: happiness levels in southern areas tend to be higher than those in the nation’s north. Similarly, in the UK happiness levels vary from the north to the south: regions of Highlands and Islands, Cumbria and Essex (along with Autonoma de Ceuta in Spain) are among the happiest regions in Europe. Regions of Bolzano in Italy, Rheinhessen-Pfalz in Germany and the Algarve in Portugal are among the least happy regions of Europe.
Figure 3.2: Spatial distribution of self-rated health across regions in Europe in 2008

Figure 3.2 shows the spatial distribution of self-rated health in regions across Europe, which also varies across regions within countries. Spain, for example, has regions with varying levels of self-rated health, as does France. In the UK, regions of Northern and Eastern Scotland and the Highlands and Islands, as well as Southern and Eastern Ireland, are among the healthiest regions in Europe. Meanwhile, the regions of Rheinhessen-Pfalz in Germany, Algarve in Portugal, Zahodna Slovenija in Slovenia and Bolzano in Italy are among the least healthy.

Comparing the results from the two maps, we find that happiness and health appear to correlate in some regions. The Highlands and Islands in the UK is among the happiest regions in Europe and it is also the healthiest; the regions of Rheinhessen-Pfalz in Germany, Algarve in Portugal and Bolzano in Italy are both the least happy and the least healthy regions in Europe.
Table 3.2: Multivariate multilevel model of well-being

<table>
<thead>
<tr>
<th></th>
<th>Happiness</th>
<th>Health</th>
<th>Happiness</th>
<th>Health</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>coeff. (s.e.)</td>
<td>coeff. (s.e.)</td>
<td>coeff. (s.e.)</td>
<td>coeff. (s.e.)</td>
</tr>
<tr>
<td><strong>Fixed Part</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>3.076(0.033) †</td>
<td>3.794(0.042) †</td>
<td>3.352 (0.101)</td>
<td>3.972 (0.144)</td>
</tr>
<tr>
<td><strong>Individual</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Memberships</td>
<td>0.009(0.002) †</td>
<td>0.008(0.002) †</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trust</td>
<td>0.094(0.006) †</td>
<td>0.139(0.008) †</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>0.028(0.005) †</td>
<td>-0.083(0.007) †</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-0.026(0.001) †</td>
<td>-0.024(0.002) †</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age$^2$</td>
<td>0.0003(0.000) †</td>
<td>0.0001(0.000) †</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>0.024(0.003) †</td>
<td>0.051(0.003) †</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In union (ref: Never Married)</td>
<td>0.193(0.008) †</td>
<td>0.030 (0.010) †</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Widow (ref: Never Married)</td>
<td>-0.115(0.013) †</td>
<td>-0.111(0.017) †</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Separated (ref: Never Married)</td>
<td>-0.065(0.011) †</td>
<td>-0.030(0.014) †</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Professional (ref: Manual)</td>
<td>0.022(0.007) †</td>
<td>0.049(0.009) †</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermediate (ref: Manual)</td>
<td>0.024(0.010) †</td>
<td>0.045(0.013) †</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home maker (ref: Self-employed)</td>
<td>0.052(0.000) †</td>
<td>-0.056(0.000) †</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student (ref: Self-employed)</td>
<td>0.212(0.001) †</td>
<td>0.045(0.000) †</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployed (ref: Self-employed)</td>
<td>-0.124 (0.009) †</td>
<td>-0.084(0.011) †</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disabled (ref: Self-employed)</td>
<td>-0.221(0.021) †</td>
<td>-0.888(0.027) †</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log median household income</td>
<td>0.081(0.004) †</td>
<td>0.119(0.005) †</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Region</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>-0.006(0.002) †</td>
<td>-0.006(0.003) †</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log GDP</td>
<td>-0.001(0.004)</td>
<td>0.006(0.012)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Country</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gini Index</td>
<td>-0.005(0.002) †</td>
<td>-0.005(0.003) †</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traditional values</td>
<td>-0.075(0.030) †</td>
<td>-0.049(0.043) †</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continental (ref: Social Democratic)</td>
<td>-0.117(0.062)</td>
<td>0.084(0.092)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liberal (ref: Social Democratic)</td>
<td>0.012 (0.076)</td>
<td>0.110(0.111)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central/Eastern Europe (ref: Social Democratic)</td>
<td>-0.229(0.065) †</td>
<td>-0.138(0.094) †</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Variances at individual levels</strong></td>
<td>0.407</td>
<td>0.760</td>
<td>0.372</td>
<td>0.622</td>
</tr>
<tr>
<td><strong>Variances at region levels</strong></td>
<td>0.009</td>
<td>0.012</td>
<td>0.006</td>
<td>0.008</td>
</tr>
<tr>
<td><strong>Variances at country levels</strong></td>
<td>0.047</td>
<td>0.074</td>
<td>0.010</td>
<td>0.023</td>
</tr>
<tr>
<td>Individual Corr (happiness, health)</td>
<td>0.387</td>
<td>0.334</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regional Corr (happiness, health)</td>
<td>0.614</td>
<td>0.524</td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Corr (happiness, health)</td>
<td>0.825</td>
<td>0.494</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Regional ICC</strong></td>
<td>1.9%</td>
<td>1.5%</td>
<td>1.6%</td>
<td>1.2%</td>
</tr>
<tr>
<td><strong>National ICC</strong></td>
<td>10.2%</td>
<td>9.5%</td>
<td>2.6%</td>
<td>3.5%</td>
</tr>
</tbody>
</table>

Significance: †:5% †1%
Table 3.2 presents the results of multivariate multilevel model of happiness and health for individuals, regions and countries across Europe. The table shows that the residual correlation between happiness and health is positive and significant (0.334). Both happiness and health tend to have similar covariates. The two covariates have a consistent positive association with both happiness and health: trust (0.094 and 0.139) and income (0.081 and 0.119). Other covariates (i.e. age, widowhood, separation, never married status, unemployment and disability) have consistently negative relationships with both happiness and health.

From the indicators of social capital, the results show that trust is positively associated with happiness and health. Joining a voluntary association is positively associated with both happiness and health. Family and social ties are likewise shown to be important determinants for happiness and health. Being in a union has a positive effect on happiness but not on health. However, a widowed individual is likely to be less happy and less healthy than one who is married. A similar result can be seen among those who are separated and those who have never been married; these statuses have significant negative associations with happiness but appear to be insignificant determinants for health.

As two standard demographic covariates, gender and age reveal different patterns in explaining happiness and health. Gender has different patterns in predicting happiness and health. Women tend to be happier than men, but less healthier. Age has a negative association with happiness, but quadratic age has a positive association, indicating that age has a u-shaped relationship with happiness. In terms of health, the results of the present study are consistent with prior research showing a negative association between age and health.

One of the important correlates of happiness and health is education. This correlate has positive associations with both outcomes. This result is similar
to most previous studies on both happiness and health (e.g. Graham 2009; Mackenbach et al. 2005). However, this finding contradicts that of Oswald (1997), who posited a negative association between education and happiness.

In terms of employment status, being a homemaker has a negative association with health but not with happiness. The results suggest that being disabled has a negative association with both happiness and health. Unemployed people seem to be unhappy and unhealthy compared to those who are employed or self-employed.

Household income is a positive and significant predictor for both happiness and health, with the effect of household income on health being slightly greater than its effect on happiness (0.119 compared to 0.081). This result provides evidence that income is important for happiness and health.

In terms of contextual factors, regional unemployment rates and national income inequality are negatively associated with happiness and health. Moving to the values held in particular, traditional values have a negative association with happiness. With regard to living in welfare states, there is a variation in explaining happiness and health. Living in continental states is less happy but healthier than living in welfare states. Meanwhile, living in the Central/Eastern Europe has a negative association with both happiness and health.

We find that the regional intra-class correlation for happiness is 1.6%, while for health it is 1.2%. The national intra-class correlation for happiness is 2.6%, while for health it is 3.5%. These results indicate that both happiness and health are more attributable to individual variations than to regional and national variations. Comparing the two contextual factors, happiness and health are more attributable to national variations than to regional variations. However, regional variations are non-negligible.
3.6 Discussion

This study aims to investigate the individual, regional and national covariations in happiness and health. The main finding of this study is that happiness and health are positively correlated. We find the individual residual correlation to be 0.334, while the regional residual correlation is 0.524 and the national residual correlation is 0.494. These results support the findings of previous studies (Subramanian et al., 2005; Eikemo et al., 2008b). Happier people tend to be healthier, and vice versa. In addition, this result confirms that residual correlation at the contextual level is greater than that at the individual level, indicating that there is a need to explore unobserved factors which affect happiness and health at the regional and national level than the individual level.

Happiness and health tend to be identical, and thus move simultaneously, because they are determined by similar factors. Specifically, most covariates have similar pattern in explaining happiness and health. This finding also confirms the results of Oshio and Kobayashi (2010) showing that the socio-economic factors contributing to both happiness and health are relatively similar in direction. The results suggest that happiness and health are mostly explained by similar covariates: association membership, trust, education, income, unemployed, regional unemployment rate and national income inequality. These results confirm previous studies regarding the relationship among social capital, companionship, happiness and health (Subramanian et al., 2002; Helliwell et al., 2013). The importance of trust on happiness may stem from the fact that trustful people tend to have a positive outlook to other people. Being married or in a partnership is an important factor for predicting happiness. As has been argued by Argyle (2001); Lane (2000), social relationships (including marriage and friendship) are the most significant predictors of happiness. This finding confirms previous studies about social support and its
relationships with happiness and health.

Income is a positive predictor of both happiness and health. The proposition that ‘money does buy happiness’ has been examined in this study and the finding confirms that income is indeed important for happiness and health. These results support Marmot and Wilkinson (2006)’s position that there is a social gradient in health from the top to the bottom of the socioeconomic ladder. The poor tend to have the worst health. Within countries, studies show that the lower an individual’s socioeconomic position, the more likely it is that the individual will have poorer health status. In terms of inequality, we find that both happiness and health are negatively associated with inequality. These findings confirm the spirit level hypothesis (Wilkinson and Pickett, 2009). In looking at social problems and health, they emphasise that stronger social class gradients are more common in societies which have higher degrees of inequality.

Unlike the majority of studies on happiness and health that use the country level as level 2, this study uses region as level 2 and country as level 3. We observe that in each country, happiness and health vary across regions. This finding is deserving of further study, because information about regions can provide a better understanding of both happiness and health. The effects of regional and national factors on happiness and health are apparent. The variation in the measures of happiness and health is attributable to regional and national levels. The findings suggest that the variations between countries are larger than the variations between region, meaning that the country level is more attributable in explaining happiness and health than the regional level. However, regional variations cannot be neglected. This extends previous findings that conclude that the country level contributes about 5% of variations in happiness and health (Eikemo et al., 2008b). This chapter provides a significant contribution in that it accounts for the variations in happiness and health
at the regional level in Europe.

The main limitation of this research is that it uses cross-sectional data and as such cannot capture change over time at either the individual, regional or national level. It is recommended that future research make use of panel data on individuals and regions. This will increase understanding and provide a detailed explanation of changes in happiness and health over time. Moreover, since the relationship between happiness and health may suffer from the endogeneity problem, future research can address this issue.

3.7 Conclusion

This chapter provides evidence that happiness and health are correlated, even after controlling for standard covariates. The residual correlations show that happiness and health are more correlated at regional and national levels than at the individual level. Regional and national determinants of happiness and health tend to be similar. The implication for policy makers is that the maintenance of happiness and health should be conducted jointly both at regional and national levels.
Chapter 4

Virtuous circle association memberships and generalised trust in Europe

Summary: This chapter asks three questions about relationships between association memberships and trust in Europe: What is the pattern of relationships between association membership and trust? Does association memberships lead to trust or is the reverse true? What are the determinants of association memberships and trust? In answering these questions we deal with the multilevel structure in which individuals are nested at the regional and national levels. We use the multilevel simultaneous equations model to test the relationship between association memberships and trust. Using data from the 2008 European Values Study, we find that the two are reciprocally associated. Association memberships are positively associated with generalised trust and vice versa. Education and household income are among the significant variables used to predict association memberships. At regional and national levels, unemployment rate and living in non-social democratic states are negatively associated with both association memberships and trust.

Keywords: Association memberships, generalised trust, social capital, multilevel simultaneous equations model

4.1 Introduction

The term social capital has attracted the attention of both academics and policymakers in a wide range of fields. Woolcock (2010) assesses the literature on social capital that was published in the foregoing two decades. Woolcock found that the role of social capital as the solution to societal problems lies at the heart of many studies where the efficacy of social capital is routinely
He also claims that social capital is an essentially contested concept in social science. Other scholars have demonstrated the relationship between social capital and government performance (Putnam et al., 1993), economic performance (Knack, 1997), development (Dasgupta and Serageldin, 2000) and health outcomes (Kawachi and Berkman, 2003). Since economic conditions may affect social capital (Freitag and Kichner, 2011), the recent economic crisis needs to be considered in explaining it. Zizumbo-Colunga et al. (2010), Growiec et al. (2012) demonstrate that the financial crisis has a detrimental effect on social capital.

One of the liveliest debates in the social capital literature concerns the relationship between two of its components: association memberships and generalized trust. Some argue that these components have a unidirectional relationship, and that either association memberships affect trust or trust affects memberships, but not both. The former perspective relies on the argument that social interactions and social networking may increase trust (Paxton, 2007). The latter posits that trust predominantly determines individuals’ likelihood of joining to association memberships. According to attitudinal perspective, trust creates social relationships (e.g., Uslaner, 2002; Stolle and Hooghe, 2004).

Putnam et al. (1993) suggest that association memberships and trust are interrelated, affecting each other in a virtuous circle. However, little evidence supports this hypothesis. It is important to test this virtuous circle hypothesis for two reasons. First, such an investigation may add to the academic understanding of the mechanism of social capital. Second, with regard to public policy, the results of such an investigation may inform the ways in which governments create the policies by which social capital is fostered. A few studies have already addressed this hypothesis (Brehm and Rahn, 1997; Shah, 1998; Claibourn and Martin, 2000), and the findings have shown mixed results. Brehm and Rahn (1997) conclude that association membership and trust
exist in a tight reciprocal relationship. Claibourn and Martin (2000) on the other hand find the relationship between them to be weak. However, all of these studies are conducted in the United States and none of them explore the relationship in Europe.

In addition to their exclusion of Europe, most studies thus far have focused on analysis at the individual level. Paxton (2007) however is an exception. She uses multilevel analysis to investigate the relationship between certain types of association memberships and generalised trust. The findings suggest that contextual effects (such as political, structural, and cultural characteristics) may influence individual trust. The contextual effects thus need to be included in the model predicting association memberships and trust. Although Paxton’s work uses a new approach in the literature on social capital, it does not take into account the virtuous circle hypothesis.

This study therefore aims to investigate the virtuous circle hypothesis in the relationships between association memberships and trust as well as addressing multilevel structure of the data, where individuals are nested in regions within Europe. We highlight social capital formation by specifying a reciprocal relationship between association memberships and trust.

The main result of this study indicates that association memberships and generalised trust are reciprocally associated. We find that at the individual level, education and social class are the most notable covariates predicting both association memberships and trust. At regional level, high unemployment rates are found to be associated with decreased association membership and trust. Similarly, at the national level, living in non-social democratic states is associated with low levels of association membership and trust.
4.2 Association memberships and generalised trust

One concern often raised in discussions of social capital is that despite overwhelming evidence of its consequences, relatively little is understood about how social capital is created. Given the apparent desirability of social capital, what can be done to create and maintain it? The roles of government and public policy are clearly important in both the US and UK (see Cohen 1999; Hall 1999). Schneider et al. (1997) suggested that the institutional arrangement of public school, particularly school choice, enables the creation of social capital.

Perhaps the most illustrious source of social capital was claimed by de Tocqueville to lie in civic associations. de Tocqueville, as is well known, put vibrant civic associations at the heart of American democracy, this perspective can hence be called the ‘school for democracy’ perspective. In de Tocqueville’s words (de Tocqueville 1863, p.113)

> Feelings and opinions are recruited, the heart is enlarged, and the human mind is developed, only by the reciprocal influence of men [sic] upon each other . . . These influences must therefore be artificially created, and this can only be accomplished by associations.

de Tocqueville refers specifically to ‘those associations only which are formed in civil life, without reference to political object’ (de Tocqueville 1863, p.129). Putnam draws upon this condition and emphasised that generalised reciprocity is a community asset (Putnam 2000, p.129). It is but a small step from such a community asset to a generalised notion of trust or social capital as it is now often understood. Putnam stated that trust in the generalised other ‘rests implicitly on some background of shared expectations of reciprocity’.
This claim is the source of much empirical work which purports to test whether civic associations lead to social capital. Putnam et al. (1993); Putnam (2000) thus identify association memberships and generalised trust as two components of social capital. In Bowling Alone, he puts it this way: ‘The causal arrows among civic involvement, reciprocity, honesty and social trust are as tangled as well-tossed spaghetti. Only careful, even experimental, research will be able to sort them apart definitely. For present purposes, however, we need to recognize that they form a coherent syndrome’ (Putnam, 2000, p.137).

However, Putnam seems to emphasise that civic involvement affects trust, and not the other way round (Putnam, 2000). Such a unidirectional perspective appears more commonly accepted in social capital literature. Meanwhile, another perspective mainly associated with Uslaner (2002) posits that trust is more likely to affect association memberships.

Memberships leads to trust The process by which association memberships can shape trust has been explored and explained by Paxton (2007). She argues that the norms and social sanctions embedded in the fabric of society can spread trust. Social networks are some of the most important means for spreading norms and sanctions in a group (Marsden and Friedkin, 1993), a condition which also applies to voluntary associations. When members of a group engage in distrustful behaviour, they are likely to incur sanctions from the group. People joining an association thus tend to learn and adopt the norms of the group. This process could thus be said to serve as a form of education for democratic citizenship (Skocpol, 2002).

Voluntary associations (and various social interactions associated with them) may be viewed as creators of social capital because they have the effect of teaching members about cooperative values and trust. This also supports the identification of voluntary associations as schools for democracy (Stolle and
Moreover, membership in a voluntary association provides in-depth, face-to-face interaction, thus potentially fostering trust among members in a group. Given the components of in-depth and face-to-face interaction, it becomes clear that generalised trust may be present in an aggregate form within a community as well as in a society of voluntary members.

In her empirical study, Paxton (2007) examines the ways in which certain kinds of voluntary associations promote trust. Using cross-country data from the 1995 World Values Survey, she uses a multilevel model to test whether country-level variables and the variation in trust between countries could be captured. Distinguishing the two types of voluntary associations, connected and isolated associations, is one of the advantages of this investigation. The connectedness of memberships is measured by the degree to which associations’ members have many ties. More ties indicate more connections. This study comes to the conclusion that membership in any voluntary association has a positive and significant effect on trust, with membership in connected associations having a greater effect on the promotion of trust than membership in isolated associations.

Trust leads to memberships As indicated above, the argument that association memberships lead to trust is more widely encountered in the social capital literature. However, Uslaner (2002) argues that certain kinds of individuals are predisposed to be both active volunteers and generally trusting people. Such positive predispositions manifest in a positive effect of voluntary association on trust. This does not mean, however, that voluntary associations necessarily lead to generalised trust. Voluntary associations neither create nor maintain social capital. In fact, Uslaner argues the opposite: trusting people tend to be engaged in more voluntary associations. Trusting people are likely to engage in more voluntary associations. This view has shaped different lines
of research that focus on the effect of trust on association memberships (see Sonderskov, 2011; Holm and Danielson, 2005).

Uslaner claims that trust as a moral resource is primarily a product of nurture. ‘Children develop trust in others by learning from – and emulating – their parents’ (Uslaner, 2004, p.240). He also writes, ‘Your trust depends upon how much your parents trusted others and, more generally, how nurturing your home environment was’ (Uslaner, 2002, p.77). In other words, generalised trust is instilled during childhood, and nurture is the key that starts the engine of the virtuous cycle of voluntary engagement and trust.

Sonderskov (2011) argues that trust may augment the possibility of an individual joining an association when such action enhances public good. Conversely, if membership does not create public good, trust may not influence membership. Following Nannestad (2008), Sonderskov identifies two sorts of memberships: active and passive. Active memberships produce public good and are likely to be affected by generalised trust; passive memberships do not enhance public good and are not likely to be affected by generalised trust. This view is rather different from most perspectives that do not distinguish between membership types.

**Reciprocal mechanism** We argue that association memberships and generalised trust form a reciprocal relationship. We go further than Putnam in actually positing a simultaneous system of equations. A few studies have approached this endogeneity but the results have not yet been conclusive. Some scholars have maintained that memberships have a unidirectional effect on trust (Shah, 1998; Keele, 2005); others have found that trust predominantly influences association memberships as trusting individuals self-select into associations (Stolle and Rochon, 1998). Still others have supported Putnam’s original notion, finding that trust and memberships are interrelated (Brehm

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and Rahn (1997).

Brehm and Rahn (1997) assess individual mechanisms of causes and consequences of social capital. Using the General Social Survey (GSS) cumulative dataset for 1972-94, they examined the reciprocal relationship between civic engagement and interpersonal trust. In addition, they applied a structural equations model and concluded that the connection between association memberships or civic engagement and interpersonal trust is reciprocally tight, whereas the effect of civic engagement on trust is stronger than that of trust on civic engagement.

A study conducted by Shah (1998) used a design relatively similar to that of Brehm and Rahn (1997)'s study. Shah examines the strength and the direction of the relationship between civic engagement and interpersonal trust. Using the 1995 DDB Nedham Life Style Study, Shah’s results suggest that the direction of the relationship between civic engagement and interpersonal trust is stronger from participating to trusting.

Some research questions needing to be addressed in this study are first, what is the pattern of relationship between association memberships and trust? Second, does association memberships lead to trust or is the reverse true? Third, what are determinants of association memberships and trust?

4.3 Data and Methods

We use the 2008 European Values Study (EVS), which included 47 countries and 60,232 individual respondents across Europe. The purpose of the EVS study is to provide understanding regarding the ideas, beliefs, preferences, attitudes, values and opinions of citizens across Europe. This series of studies has been conducted four times thus far: in 1981, 1990, 1999 and 2008 (European Values Study 2008).
The 2008 EVS provides the questions regarding association memberships and generalised trust and their standard covariates including gender, age, level of education, employment status and household income. More importantly, this survey gives various geographic codes that indicate where individuals live, including country, NUTS1, NUTS2 and NUTS3 codes. This coding allows us to match the data with the contextual data provided by other institutions and in turn allows us to capture the nested structure of the data. It also gives an opportunity to draw a map on the aggregate score of well-being based on certain groupings.

To explore the multilevel structure of association memberships and trust data, we follow Aslam and Corrado (2012), who argued that one of the most suitable groupings for dealing with data available in Europe is the NUTS (Nomenclature of Territorial Units for Statistics) system of regional classification or regions. They appear to have similar cultural and geographical characteristics that result in individual clustering across countries. This approach is similar to that taken by Freitag and Kichner (2011), whose study explored regional aggregate analysis of social capital in Europe.

4.3.1 Dependent variables

This study uses the questions on generalised trust and association memberships. Regarding trust, we used the following: ‘Generally speaking, would you say that most people can be trusted or that you can’t be too careful in dealing with people?’ The ordered categories of answer are: ‘most people can be trusted’ to ‘can’t be too careful’. To elicit association memberships, we calculate the sum of any of an individual’s memberships of and activities in voluntary organisations. The respondents were asked: ‘Please look carefully at the following list of voluntary organisations and activities and say: a) which, if any, do you belong to? And b) which, if any, are you currently doing unpaid
voluntary work for?’ The voluntary organisations listed in the questionnaire are: social welfare services for the elderly, disabled, or deprived people; religious or church organisations; educational, arts, music or cultural activities; trade unions; political parties or groups; local communities gathered around issues such as poverty, employment, housing, racial equality; third world development or human rights; conservation, the environment, ecology, animal rights; professional associations; youth work (such as scouts, guides, and youth clubs); sports or recreation; women’s groups; the peace movement; and voluntary organisations concerned with health. In total we define 15 categories of association memberships.

4.3.2 The covariates

In terms of individual factors affecting association memberships and trust, previous studies have identified age, gender, education and income as being among the most important predictive components (Delhey and Newton, 2003; Brehm and Rahn, 1997; Shah, 1998). Education is measured by the highest level of education attained by respondents, ranging from pre-primary education to the second stage of tertiary education. Income is measured by median household income. Higher levels of education and income are identified as contributing particularly positively to both association memberships and trust (Brehm and Rahn, 1997).

In the present study, we consider the social class of respondents as is customary in European societies (Harrison and Rose, 2006) and identify the intermediate and professional classes (with manual worker as a reference). Female is a dummy variable with male as reference. Married and separated are also dummy variables. To explain contextual factors that affect memberships and

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Footnote: One limitation in measuring income is that this study does not control for cost of living. Due to a lack of available regarding cost of living across regions and countries in Europe, this study does not include this variable.
trust, we identify per capita GDP, unemployment rates, welfare states and the countries’ traditional values.

In terms of unemployment rates, Freitag and Kichner (2011), using ecological analyses drawn from across Europe, find a weak negative effect of unemployment rates on social capital but a strong negative effect of social capital on unemployment rates. With regard to welfare states, Larsen (2007) showed that these can both erode and generate social capital. In addition, van Oorschot and Arts (2005) investigate the effect of welfare states on social capital. Using the 1981 and 1990 European Values Survey, the study suggests that the type of welfare states matters for social capital.

We use contextual covariates: regional per capita GDP, unemployment rates, traditional values and dummy for welfare states. We consider GDP to be included in determinants of social capital given that previous papers have used social capital as a predictor for economic development. Regional unemployment rates are taken from Eurostat regional database in between 2007-2008. We follow Esping-Andersen (1990) to distinguish three welfare states which are continental, liberal and social-democratic state, and also include Central/Eastern Europe.

We find a large amount of missing data. For example, 10,740 of 60,232 respondents (17.83%) did not share their income. At contextual level, there are missing data as well. For example, regional unemployment rates (22.22%) and GDP (33.62%). To deal with this missing data problem. We use a recently developed technique: multilevel multiple imputation which is explained in Section 1.6.5.

Exclusion restrictions for association memberships and trust The exclusion restrictions for trust are intended to account for nurture, optimism, and control (Uslaner 1999 p.146) or (Uslaner 2002 p.194). Nurture is meas-
ured by the questions: ‘When you think about your parents when you were about 14 years old, could you say whether these statements correctly describe your parents?: my mother liked to read books, I discussed politics at home with my mother, my mother liked to follow the news, my father liked to read books, I discussed politics at home with my father, my father liked to follow the news’. Optimism is identified by: ‘Here is a list of qualities which children can be encouraged to learn at home. Which, if any, do you consider to be especially important? Please choose up to five: independence, hard work, feeling of responsibility, tolerance and respect for other people, and unselfishness’. The control is elicited with: ‘Some people feel they have completely free choice and control over their live, and other people feel that what they do has no real effect on what happens to them. Please use the scale to indicate how much freedom of choice and control you feel you have over the way your life turns out?’

The exclusion restrictions for association memberships, following Shah (1998); Brehm and Rahn (1997), are interest in politics and length of time living in the country. According to Chaffee and Frank (1996), following political news is a factor contributing to political participation. Hence, respondents’ interest in politics is measured by whether they follow political news which is elicited with the question: ‘How often do you follow politics in the news on television or on the radio or in the daily papers?’. The reason behind the use of this exclusion restriction is based on the findings of Clabourn and Martin (2000), which suggest that media consumption and political participation have no association with interpersonal trust. The second exclusion restriction is number of years living in a country. We use the question: ‘Can you tell me in which year you first came to live in (country)?’ Brehm and Rahn (1997) argue that people who live longer in a country may be inclined to join voluntary associations because they are likely to have friends and social work-related activities.
4.3.3 Multilevel simultaneous equations model

A theoretical debate on the relationship between association memberships and generalised trust needs to be examined by means of a suitable method. Previous research, for example that of [Brehm and Rahn (1997)], has used a structural equations model limited to investigating at the individual level of analysis without taking into account the nested structure of the data. Following [Paxton et al. (2011)], we test the virtuous circle hypothesis between association membership and generalised trust; at the same time we address the nested structure of the data.

In the multilevel simultaneous equations model, two equations are estimated simultaneously. These two equations consist of sets of explanatory variables which are similar except for exclusion restrictions. Exclusion restrictions are a set of variables which are excluded from one equation but which appear in another equation. The exclusion restrictions assume no direct relationship from $x_1$ to $y_2$ ([Wooldridge, 2009]). These are also untestable. Compared to instrumental variables, exclusion restrictions have more relaxed assumption. In addition, exclusion restrictions are required assumptions for instrumental variables ([Wooldridge, 2009]).

Figure 4.1: Virtuous circle between memberships and trust
Figure 4.1 describes the virtuous circle between association memberships and trust. To estimate the multilevel simultaneous equations model, it is necessary to identify exclusion restrictions for each dependent variable. Exclusion restrictions refer to the explanatory variables in the selection equation that is not in the equation of interest [Sartori, 2003]. This model sets these variables as outcomes and covariates. We denote membership in voluntary associations as $M$, and the level of trust of the individual $i$ in region $j$ as $T$. The model is described below:

$$M = \beta_m T + \beta_{m2}X_{m1ij} + \beta_{m3}X_{2ij} + \beta_{m4}X_{3j} + \nu_m + \epsilon_m$$

(4.1)

$$T^* = \beta_t M + \beta_{t2}X_{t1ij} + \beta_{t3}X_{2ij} + \beta_{t4}X_{3j} + \nu_t + \epsilon_t$$

(4.2)

where $m1T^*$ is trust as covariate of memberships and $t1M$ is memberships as covariate of trust. $m2X_{m1ij}$ represents exclusion restrictions for memberships, while $t2X_{t1ij}$ represents exclusion restrictions for trust. $m3X_{2ij}$ is a set of individual covariates of memberships, while $t3X_{2ij}$ is a set of individual covariates of trust. $m4X_{3j}$ is a set of contextual covariates of memberships, while $t4X_{3j}$ is a set of contextual covariates for trust. In equation (4.1) we treat memberships as outcome and trust as covariate, while in equation (4.2) we treat trust as outcome and memberships as covariate.

### 4.4 Results

Table 4.1 reports descriptive statistics for all variables. The 2008 European Values Study consists of responses from 67,786 individuals, but we restrict the sample to respondents aged 15-70, with the average age being 43.9 years old. This restriction decreases the sample to 56,899 respondents. Of the respondents, 55% were female, while 45% were male. Respondents were not actively
Table 4.1: Descriptive statistics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memberships</td>
<td>0.90</td>
<td>1.51</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td>Trust</td>
<td>0.30</td>
<td>0.47</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Female</td>
<td>0.55</td>
<td>0.49</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Age</td>
<td>43.9</td>
<td>14.9</td>
<td>15</td>
<td>70</td>
</tr>
<tr>
<td>Education</td>
<td>3.13</td>
<td>1.29</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Married</td>
<td>0.56</td>
<td>0.49</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Separated</td>
<td>0.10</td>
<td>0.30</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Widow</td>
<td>0.06</td>
<td>0.23</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Professional</td>
<td>0.26</td>
<td>0.44</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Intermediate</td>
<td>0.09</td>
<td>0.29</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Unemployed</td>
<td>0.06</td>
<td>0.25</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Disabled</td>
<td>0.02</td>
<td>0.13</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Log household income</td>
<td>7.16</td>
<td>0.98</td>
<td>5.0</td>
<td>9.3</td>
</tr>
<tr>
<td>Log GDP</td>
<td>10.24</td>
<td>0.95</td>
<td>7.35</td>
<td>13.19</td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>8.39</td>
<td>3.79</td>
<td>2.1</td>
<td>26.2</td>
</tr>
<tr>
<td>Traditional</td>
<td>0.45</td>
<td>0.68</td>
<td>-1.53</td>
<td>1.86</td>
</tr>
<tr>
<td>Living in continental countries</td>
<td>0.24</td>
<td>0.42</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Living in liberal countries</td>
<td>0.12</td>
<td>0.33</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Living in Central/Eastern Europe</td>
<td>0.55</td>
<td>0.49</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Regions</td>
<td>350</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respondents</td>
<td>56,899</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

engaged in association memberships with a mean of 0.9 in which the score ranges from 1 to 15. With regard to generalised trust, 30% of respondents trusted other people. Table 4.2 presents the distribution of respondents with memberships in voluntary associations. Of 62.94% respondents were not members of any voluntary associations. The largest proportion of respondents who were members of voluntary associations belonged to only one association which is 18.78% of the total respondents. Only 0.29% of respondents were members of fifteen voluntary associations.
Table 4.2: Sum of memberships among respondents

<table>
<thead>
<tr>
<th>Memberships</th>
<th>Freq.</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>37,865</td>
<td>62.94</td>
</tr>
<tr>
<td>1</td>
<td>11,298</td>
<td>18.78</td>
</tr>
<tr>
<td>2</td>
<td>5,044</td>
<td>8.38</td>
</tr>
<tr>
<td>3</td>
<td>2,666</td>
<td>4.43</td>
</tr>
<tr>
<td>4 – 7</td>
<td>199</td>
<td></td>
</tr>
<tr>
<td></td>
<td>132</td>
<td>0.22</td>
</tr>
<tr>
<td></td>
<td>78</td>
<td>0.13</td>
</tr>
<tr>
<td></td>
<td>44</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>0.04</td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>0.02</td>
</tr>
<tr>
<td>10</td>
<td>177</td>
<td>0.29</td>
</tr>
<tr>
<td>Total</td>
<td>60,164</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Figure 4.2: Spatial distribution of memberships across regions in Europe

Figure 4.2 shows the spatial distribution of association memberships held by respondents across regions in Europe. The figure demonstrates that association memberships vary within each country. We find that the regions of Zeeland, Drenthe and Friesland in the Netherlands, and Nordjlland and Hovedstaden in Denmark have the highest involvement in voluntary associations.
across Europe. Pomorski, Podlaskie and Wielkopolskie in Poland have the lowest involvement in voluntary association. If we look more detail within country, the number of people involved in association memberships varies differently, indicating a need to go into more detail at region level.

Figure 4.3: Spatial distribution of trust across regions in Europe

Figure 4.3 describes the spatial distribution of generalised trust in regions across Europe. Similar to association memberships, generalised trust also varies across countries. The regions of Zahodna Slovenija in Slovenia, Northern and Eastern Scotland in UK, and Bolzano in Italy have the highest rate of generalised trust, whereas the regions of Algarve in Portugal, Mittelpanken in Germany, and Centru in Romania have the lowest.
Table 4.3: Multilevel SEM for memberships and trust

<table>
<thead>
<tr>
<th></th>
<th>Memberships</th>
<th>Trust</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-0.198(0.084)‡</td>
<td>-2.449(0.099)‡</td>
</tr>
<tr>
<td>Memberships</td>
<td>0.010(0.004)‡</td>
<td></td>
</tr>
<tr>
<td>Trust</td>
<td>0.153(0.010)‡</td>
<td></td>
</tr>
<tr>
<td>Following news</td>
<td>0.086(0.004)‡</td>
<td></td>
</tr>
<tr>
<td>Live in country</td>
<td>0.153(0.019)‡</td>
<td></td>
</tr>
<tr>
<td>Nurture</td>
<td>0.039(0.003)‡</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>0.042(0.003)‡</td>
<td></td>
</tr>
<tr>
<td>Optimism</td>
<td>0.022(0.006)‡</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>-0.029(0.009)</td>
<td>0.003(0.012)</td>
</tr>
<tr>
<td>Age</td>
<td>0.000(0.000)</td>
<td>0.003(0.000)</td>
</tr>
<tr>
<td>Education</td>
<td>0.126(0.004)‡</td>
<td>0.109(0.006)‡</td>
</tr>
<tr>
<td>Marriage</td>
<td>-0.076(0.013)</td>
<td>-0.069(0.016)‡</td>
</tr>
<tr>
<td>Widow</td>
<td>-0.120(0.027)‡</td>
<td>-0.019(0.030)</td>
</tr>
<tr>
<td>Divorce</td>
<td>-0.146(0.020)‡</td>
<td>-0.089(0.024)‡</td>
</tr>
<tr>
<td>Professional</td>
<td>0.227(0.012)‡</td>
<td>0.086(0.016)‡</td>
</tr>
<tr>
<td>Intermed class</td>
<td>0.079(0.017)</td>
<td>0.067(0.022)‡</td>
</tr>
<tr>
<td>Unemployed</td>
<td>-0.080(0.019)‡</td>
<td>-0.141(0.020)‡</td>
</tr>
<tr>
<td>Household income</td>
<td>0.083(0.007)‡</td>
<td>0.027(0.008)‡</td>
</tr>
<tr>
<td>Regional GDP</td>
<td>-0.064(0.007)‡</td>
<td>0.144(0.007)‡</td>
</tr>
<tr>
<td>Unemployment rates</td>
<td>-0.042(0.002)‡</td>
<td>-0.003(0.002)</td>
</tr>
<tr>
<td>Traditional values</td>
<td>0.193(0.011)‡</td>
<td>0.148(0.013)‡</td>
</tr>
<tr>
<td>Continent</td>
<td>-0.699(0.019)‡</td>
<td>-0.807(0.027)‡</td>
</tr>
<tr>
<td>Liberal</td>
<td>-0.161(0.019)‡</td>
<td>-0.392(0.030)‡</td>
</tr>
<tr>
<td>Central/Eastern Europe</td>
<td>-0.473(0.022)‡</td>
<td>-0.434(0.083)‡</td>
</tr>
</tbody>
</table>

Variance/covariance  0.318(0.006)‡

Significance: ‡:5% †:1%

Table 4.3 describes the results obtained from a multilevel simultaneous equations model. Estimation results for association memberships are presented in the left-hand column, while the right-hand column contains the results for generalised trust. Our central finding is that association memberships and generalised trust have a significant relationship: association membership is positively associated with generalised trust and vice versa.

**Memberships** We discuss the results separately, beginning with the equation for association memberships. Trust is positively associated with association membership, even after including exclusion restrictions and controlling for socio-demographic and contextual covariates. In short, people who trust
others are more likely to join an association. Professional and intermediate class, income and education have a positive association with memberships. Conversely, being female and being older are negatively associated with joining voluntary associations. At the regional level, we find that people who live in a region with higher GDP are less likely to join voluntary associations, while living in a region with higher unemployment rates makes one less likely to join voluntary associations. Similarly, living in continental countries, liberal countries, or the Central/Eastern Europe (that is, outside of a social democratic state) is negatively associated with membership in voluntary associations. Living in countries with a high level of traditional values is associated with an increased probability of joining association memberships.

**Trust** Our findings indicate that members of voluntary associations are more likely to trust others. We find that education, social class and household income are among the most important covariates of trust. Being educated and being in either the professional or intermediate class are positively associated with trust for others. Household income is positively associated with trust. With regard to contextual variables at the regional level, we find that people living in regions with higher per capita GDP tend to be more trusting of others. Meanwhile, living in regions with high levels of unemployment is associated with decreased trust. In terms of welfare states, those living in continental and liberal countries and the Central/Eastern Europe tend to have lower levels of trust than those living in social democratic states. In terms of traditional/secular values, living in countries with higher levels of traditional values is associated with higher levels of generalised trust.
4.5 Discussion

In this chapter we have investigated the virtuous circle hypothesis as it applies to association memberships and generalised trust. The main finding of this study is that association memberships and generalised trust are reciprocally related: association membership affects trust and trust affects association membership, even after controlling for individual and contextual covariates and exclusion restrictions. This indicates that the relationship between them needs to be treated as bidirectional. This finding is contrary to major studies stating that association membership only affects trust (Paxton, 2007); it also fails to support (Uslaner, 2002), who demonstrated that association membership does not affect trust when the aforementioned exclusion restrictions are included in a model. Our study also indicates that simultaneity bias is responsible for the finding reported in numerous single-equation studies, namely, that association membership solely affects generalised trust. In the context of a financial crisis, these two components of social capital may be maintained by each other.

By addressing the multilevel structure of the data, we find that association memberships and trust can be attributed to differences between regions, meaning that they vary significantly among European regions. Although most of the variation in the measures of both memberships and generalised trust can be explained on the individual level, to some extent the variations are also attributable to the regional level. Previous studies using a single-level design may not cover results in as comprehensive a manner as does a multilevel study. This result supports the argument suggested by Curtis et al. (2001); Schofer and Fourcade-Gourinchas (2001), who found that association memberships as a form of pro-social behaviour may be affected by contextual factors.

Education is an important predictor of memberships and trust. This result confirms Uslaner (2002); Brehm and Rahn (1997) in their position that education is an important covariate predicting trust. More educated people tend
to trust other people. It is assumed that when people attain better in school, they learn better how to relate to other people and how to deal with diversity. People with a higher level of education are thus more likely to grasp such matters than others. In terms of association memberships, education provides the chance to meet other people, which affects individuals’ levels of learning with regards to civic participation.

Social class is positively associated with association memberships. This result confirms Brehm and Rahn (1997); Wollebaek and Selle (2002) in that social class is an important component in predicting association memberships. Those with a higher occupational level are likely to have more social networks, which in turn are linked with a greater probability of joining associations. In addition, length of residence in a country is associated with joining voluntary associations. Since people who live longer in a country tend to have more friends, they are more likely to join voluntary associations.

At the regional level, it is interesting to compare the result from memberships and trust equations. Economic conditions, measured by regional per capita GDP have a negative effect on memberships but a positive effect on trust. This condition may foster generalised trust. It is also related to the optimism that is one important dimensions of trust; optimism, therefore, may also increase trust in other people. The explanation for this is that living in richer regions may provide more a comfortable environment, which has a positive impact on maintaining trust.

Another significant regional covariate affecting association memberships and trust is unemployment, which has a negative effect on both. A study conducted by Freitag and Kichner (2011) found that social capital at the regional level affects unemployment rates but that the relationship is unidirectional. We find, however, that unemployment rates do matter for social capital, affecting both memberships and trust. The likelihood of engaging in an association may
be influenced by regional unemployment rates. For example, living in a region with a high level of unemployment could decrease one’s possibility of joining a professional or trade union. High unemployment levels may also decrease trust.

This study finds that living in continental and liberal countries and in the Central/Eastern Europe tends to result in lower levels of both association membership and generalised trust. We believe this to be because those countries may not provide as positive a social system as do social democratic countries, which give people a greater opportunity to join associations and grow up trustful of others. This supports van Oorschot and Arts (2005) that find the welfare states matter for maintaining social capital.

Another important finding of the present study is that living in countries with high traditional values is positively associated with both association membership and generalised trust. A society holding to its traditional values tends to maintain social norms that encourage individuals to participate in social activities. For example, a traditional society would expect its citizens to attend religious activities, which cause people across an area to come together. Similarly, living in a traditional society is associated with generalised trust because such a society tends to encourage strong bonds between people. The existence of such bonds may lead to higher levels of trust among people in certain areas or in certain countries.

Although we have provided insight as to the nature of social capital, this study has some limitations. We have performed a cross-sectional study; therefore, we are unable to capture the dynamic of social capital over time. Longitudinal data would allow us to test contemporaneous and lagged effects of social capital as done by Claibourn and Martin (2000). In terms of the categories of association memberships, we do not distinguish between types of memberships as in the study conducted by Sonderskov (2011). Differentiating
between types of memberships may better explain the relationship between association memberships and generalised trust.

4.6 Conclusion

This chapter seeks to examine the virtuous circle hypothesis between association membership and generalised trust. The results confirm that association membership and generalised trust are reciprocally associated. The results also suggest that there are regional disparities in terms of association memberships and generalised trust. In other words, the disparities occur not only between countries in Europe but also within countries. Multilevel simultaneous equations model used in this study provides an estimated coefficient that takes into account the standard errors raised from the nested structured data.
Chapter 5

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

Summary: 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 a 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 important to understanding individual well-being.

Keywords: well-being, spatial dependence, multilevel model

5.1 Introduction

Well-being here refers to subjective evaluations on human optimal experience and functioning (Ryan and 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 study 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

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been examined by a number of studies (Ballas and Tranmer 2012; Stanca 2010; Oswald and Wu 2011; Okulicz-Kozaryn 2011; Aslam and Corrado 2012; Brereton et al. 2008). 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.

The recent economic crisis may have different geographic patterns in explaining well-being. Bernal et al. (2013), using Spanish national data between 2005 and 2010, investigate the association between financial crisis and suicide rates in certain areas in Spain. Results suggest that Mediterranean and Northern areas have greater increase in suicide rates compared to Central Spain. These results confirm that financial crisis and geography matter for suicide rates.

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 and 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 et al. 2010). For example, people who live in rich regions tend to have higher level of well-being. In addition, Di Tella et al. (2003) suggest that well-being among Europeans is affected by macroeconomic variables (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 of economic indicators on well-being. In addition, Ertur et al. (2006); Niebuhr (2002) conclude that macroeconomic indicators among regions
in Europe have spatial dependence structure.

Besides these important considerations, one 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 result 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 lead to a 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 argument, we focus on NUTS level 2 as spatial scale and thereafter we use the 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); 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 models 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 models ignore 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 chapter aims to examine how the nested and spatial structures explain variations in individual well-being across regions in Europe during the crisis. 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
5.2 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 et al., 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 that explain 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 and Putnam 2004).

On companionship, a number of studies discuss the impact of marital status on well-being: individuals derive social and emotional benefit 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 and 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 and 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 et al. (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 and 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 (Clark, 2003; Blanchflower and Oswald, 2008): 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 et al., 1993; Stutzer and Frey, 2008; Diener, 2000), 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 creation of an expectation among the more educated of a higher income. The resulting unmet expectation may drive the negative correlation between education and well-being.

Previous studies have identified a number of contextual covariates affecting well-being. These include regional GDP growth, regional unemployment rate, income inequality and traditional values. Graham (2009), for example, identifies a paradox in which GDP growth may give rise to social and economic problems (such as an increased crime rate) which are detrimental to happiness. Unemployment also has a negative effect on happiness (Frey and Stutzer, 2002), possibly due to fears that it will lead to a rise in the incidence of crime and social unrest. Di Tella et al. (2001), referring to data from 12 European countries over the period 1975-1991, also find that unemployment reduces life satisfaction. Alesina et al. (2004) find that income inequality has
detrimental effect on well-being. People who live in a country with high level of inequality are likely to have lower level of well-being compared to those who live in a more equal country.

In a cross-sectional settings such as Europe, we include traditional/secularism values as a measure of cultural variations. These provide a contrast between societies with high and low level in terms of: awareness of a religious life, the important of parent-child relationship, and the level of national pride that individuals have \cite{Inglehart2000}. Previous research has found that more traditional values are associated with lower levels of well-being \cite{Li2010, Sagiv2000}.

### 5.3 Spatial dependence multilevel model of well-being: from mechanism to model

Much of the research on well-being reviewed above is based on multiple regression, and despite their contribution to our understanding of well-being, they neglect the spatial and multilevel structure of the data. Few studies are the exception, exploiting the spatial or geographical dimension of well-being \cite{Oswald2011, Stanca2010, Okulicz-Kozaryn2011}; some explore multilevel structure of happiness data \cite{Rampichini1997, Ballas2012, Aslam2012, Pittau2010}.

\cite{Oswald2011} use the Behavioral Risk Factor Surveillance System to examine the geographical dimension of life satisfaction and mental health in the United States. Using the individual as the unit of analysis, they find that the state of Lousiana and the district of Columbia exhibit high levels of psychological well-being, while those levels in the states of California and West Virginia are low. Although this study sheds some light on the geographical dimension of well-being, it is limited by its use of an aggregate level of happi-
ness and linear regression. It does not explore multilevel structure (i.e. that individuals reside in states) and the spatial structure (i.e. that the state of Massachusetts shares a border with New Hampshire and Connecticut) of the data.

To better understand spatial mechanism, we refer to the so-called first law of geography: ‘Everything is related to everything else, but near things are more related than distant things’ (Tobler 1970). To test this law, spatial econometrics is a suitable approach (Anselin 1988), as it addresses the spatial dependence structure. Anselin (1988) states that ‘spatial dependence can be understood as the lack of independence among observations’.

Spatial dependence can be elaborated in two mechanisms: as a diffusion and a spatial externalities (Morenoff 2003). Diffusion illustrates a spatial process intrinsic to a given outcome, while spatial externalities describe spatial processes generated by explanatory variables which spread into neighbouring geographic areas. From diffusion mechanism, well-being may be viewed as spatially dependent among region in Europe because well-being in one region is contagious with that in neighbouring regions. Meanwhile, spatial externalities mechanism views that well-being may be spatially dependent because the covariates or error terms affecting well-being are spatially dependent.

Among the first to apply spatial dependence approach to the study of well-being, Stanca (2010) examines the spatial structure of the effect of a country’s economic conditions on subjective well-being. Using aggregate happiness data taken from the World Values Survey, the study uses a two-step methodology. First, it estimates the effect of economic conditions on the life satisfaction of individuals. Second, it examines the relationship between the effects of individual economic conditions on subjective well-being and macroeconomic conditions. These effects are used as dependent variables in cross-country regressions, while the macroeconomic conditions are used as independent vari-
ables. The study finds that before controlling for country covariates, the effect of individual income on subjective well-being is spatially dependent, but that after controlling for covariates, the estimate for spatial dependence becomes insignificant. Stanca’s study thus contributes to the understanding of how spatial structure may explain the effect of income on subjective well-being. Conversely, ignoring this structure may result in bias in estimating well-being.

Okulicz-Kozaryn (2011) uses Eurobarometer data from 1996 to explore the geography of life satisfaction across regions (NUTS 2) in Europe, exploiting geographical areas in more detail. Using Local Indicators of Spatial Association (LISA) proposed by Anselin (1995), this study concludes that life satisfaction is spatially positively correlated - that is, regions are surrounded by other regions with relatively similar levels of life satisfaction. Although this study provides important understanding into how spatial structure explains life satisfaction, it uses aggregated levels of life satisfaction without including any covariates.

A further limitation of these spatial econometrics studies of well-being is that they focus on spatial dependence, while neglecting nested structure in which individuals live in certain areas (such as household, neighbourhood, district, region and country). To deal with this structure, multilevel model is most suitable. Pittau et al. (2010) use the 1992-2002 Eurobarometer surveys to carry out multilevel analysis to examine the effect of economic disparity on life satisfaction in European regions. They conclude that the regional dimension is relevant to any estimation of life satisfaction, even after controlling for individual characteristics and the differing effects of income.

Aslam and Corrado (2012) apply multilevel model and use Wave 4 of the European Social Survey to examine regional variations to explain well-being. Their study not only uses the random effect but also the country fixed effect. Their findings are those who live in Denmark, Spain, Sweden and Ireland have higher level of well-being than those who live in the rest of EU countries. The
study concludes that not only individual but also regional economic and non-economic factors (such as social capital) have a significant effect on well-being.

More recently, Ballas and Tranmer (2012) examine multilevel structure and the geographical dimension of happiness and well-being. Using combined data from the 1991 Census Samples of Anonymised Records (SARs) and the 1991 British Household Panel Survey, they provide an important insight into how best to approach the study of happiness. However, they leave some questions unanswered; they do not, for example, explain the spatial dynamics of well-being, such as the spatial dependence of the outcome.

To sum up, the two methods used for analysing well-being: spatial dependence model and multilevel are no without criticism. Given the spatial contiguity of regions, the independence assumption regarding the neighborhood random effects is implausible and in turn regions may be dependent each other (Savitz and Raudenbush, 2009). If errors at region level are correlated, the assumption of multilevel model is violated. Meanwhile, spatial dependence model does not take into account the nested structure of data. To overcome the limitation of these two models, spatial dependence multilevel model seems suitable.

We thus aim to answer three research questions. First, is well-being spatially dependent across regions in Europe? Second, what is the mechanism through that explains the process? Third, does spatial dependence multilevel improve estimates and inference of well-being?

5.4 Data and Methods

To examine how the spatial and nested structure explain well-being across regions in Europe, we use data from the 2008 European Values Study (European Values Study, 2008). This covers 47 countries, 200 regions and 23,483 individual
respondents, and its purpose is to enhance understanding of the ideas, beliefs, preferences, attitudes, values and opinions of citizens across Europe. It also contains information on happiness and region code (NUTS2). This region code allows us to match the data with those from the Eurostat regional database to examine the effect of contextual factors on happiness. More importantly, the data is also matched with digital boundary data from EuroBoundaryMaps 5.0, allowing us to examine the spatial dependence structure of regions in Europe.

5.4.1 Dependent variable

In this study we use well-being as the dependent variable, measured by happiness and life satisfaction questions. Happiness question: ‘Taking all things together, would you say you are ‘very happy’, ‘quite happy’, ‘not very happy’ or ‘not at all happy’?’. Meanwhile, life satisfaction question: ‘All things considered, how satisfied are you with your life as a whole these days? The answers include 10-scale ranging from dissatisfied to satisfied. In terms of the scale of the variable, some studies (Praag and Ferrer-i-Carbonell, 2007) treat well-being as an ordinal scale, thus needs to be estimated by ordinal logistic multilevel regression. However, Frey and Stutzer (2002) suggest that ordinality or cardinality scale of subjective well-being does not make big difference in results. Thus, the use of linear model is expected to be similar as the use of ordinal scale in findings. Since the software used in estimating the model at the moment only provides linear model, we treat well-being as continuous.

5.4.2 Individual covariates

Individual covariates used in this study include health, association membership, gender, age, education, marital status, employment status and household income. Health is measured by individual self-rating on a five-point ordinal scale, ranging from ‘very poor’ (1) to ‘very good’ (5). To measure association
membership, we ask: ‘Please look carefully at the following list of voluntary organisations and activities and say: (a) Which, if any, do you belong to? and (b) Which, if any, are you currently doing unpaid voluntary work for?’ Possible answers consist of 15 voluntary organisations, and to calculate membership, we use the total of number voluntary associations followed by a respondent.

We create a dummy variable to measure gender (1 for female, 0 for male). Education is measured by the highest level of education attained by respondents, ranging from pre-primary to the second stage of tertiary education. Marital status is measured using dummy variables for ‘in union’, ‘widowed’, and ‘divorced’, with ‘never married’ as the reference group. Another measure of socio-economic covariates is employment status, differentiated as ‘retired’, ‘homemaker’, ‘student’, ‘unemployed’, and ‘disabled’. These are used as dummy variables with ‘employed/self-employed’ as the reference group. Lastly, income is measured by median household income.

5.4.3 Contextual covariates

To measure regional economic conditions, we use regional per capita GDP, GDP growth and the unemployment rate, obtained from Eurostat regional data (Eurostat 2011). Di Tella et al. (2001), referring to data from 12 European countries over the period 1975-1991, also find that unemployment reduces life satisfaction. Alesina et al. (2004) find that income inequality has detrimental effect on well-being.

Moving to country level covariates, we include income inequality, traditional/secularism values and welfare state regimes. People who live in a country with high level of inequality are likely to have lower level of well-being compared to those who live in a more equal country. We use the Gini index

\[ \text{One limitation in measuring income is that this study does not control for cost of living. Due to a lack of available regarding cost of living across regions and countries in Europe, this study does not include this variable.} \]
at country level obtained from UNU-WIDER to measure income inequality. Since well-being may be affected by economic systems established in a country where individuals live, we follow Esping-Andersen (1990) to differentiate welfare state regimes and create dummy variables for living in continent, liberal and Central/Eastern Europe countries, while social democratic countries as a reference.

5.4.4 Spatial dependence multilevel model

The aim of this study is to examine how nested and spatial structures of the data explains well-being across regions in Europe. We first examine the nested structure of data using multilevel model, by then including spatial structure among the group or level-2 data. To estimate this data, spatial dependence multilevel model is used as one of the most suitable methods. Since it is a combination of multilevel model and spatial dependence model, we begin to briefly describe both methods.

Multilevel model is used to account for the nested structure of data. Specifically, it can be used to address spatial heterogeneity, assuming that the association between the dependent variable and its covariates can vary between levels (Ballas and Tranmer, 2012). However, this model only captures nested structure where individuals reside in regions. This nested structure gives the model below:

\[ Y_{ij} = X_{ij} \beta_{ij} + \mu_j + \epsilon_{ij} \]  
\[ \epsilon_{ij} \sim N(0, \sigma^2_{\epsilon}) \]  
\[ \mu_j \sim N(0, \sigma^2_{\mu}) \]  
\[ \mu \perp \epsilon \]
Note that each regions’ error term, \( \mu_j \), are independently distributed. To express this more visually, we display regions in Germany to show how standard multilevel model treats the level 2 structure of the data. In Figure 5.1 each region has one \( \mu \) unconnected with other \( \mu \) (compare with Figure 5.2). Since level 2 is assumed to be independently distributed, this model cannot address spatial dependence among level 2 units.

Figure 5.1: Spatial patterns of NUTS2 regions in Germany in standard multilevel model

To improve on this, we consider spatial dependence model. Spatial dependence can be examined through spatial lag and spatial error model \cite{Anselin1988, Ward2008}. Using spatial lag we can interpret that spatial dependence occurs directly through dependent variable. Meanwhile using spatial error model, we can interpret that spatial dependence comes only through error terms. \cite{Ward2008} argue that these models may seem superficially similar, as each model suggests spatial dependence between observations. Elaborated by \cite{Anselin1988}, these models capture spatial dependence among geographical areas or neighbouring areas. The re-
duced specification is below.

\[ y_i = X\beta + \rho Wy + \epsilon \] (5.5)

\[ y_i = X\beta + \epsilon \] (5.6)

\[ \epsilon = \rho W\epsilon + \eta \] (5.7)

Equation 5 represents spatial lag model, while equation 6 and 7 represent spatial error model, where \( y \): dependent variable, \( \epsilon \): error term, \( \rho \): degree of spatial dependence, \( W \): spatial contiguity weight matrix. Savitz and Raudenbush (2009) combine these two models by correcting error terms in standard multilevel model using spatial error model (see Anselin, 2003). By doing this, the underestimation of standard error may be avoided. They propose a spatial dependence multilevel model, where the spatial structure of level 2 units (e.g. regions) is taken into account. At the same time, nested structure of the data is also addressed. In spatial dependence multilevel model we have:

\[ y_{ij} = X_{ij}\beta_{ij} + \mu_j + \epsilon_{ij} \] (5.8)

\[ \mu_j = \rho W\mu_j + \eta_j \] (5.9)

\[ \epsilon_{ij} \sim N(0, \sigma^2_\epsilon) \] (5.10)

\[ \eta_j \sim N(0, \sigma^2_\eta) \] (5.11)

\[ \eta \perp \epsilon \] (5.12)

where \( \rho \): degree of spatial dependence, \( W \): spatial contiguity weight matrix. Note that each region’s error term, \( \mu_j \), is now spatially correlated. As opposed to the linear multilevel model, the new parameters to be estimated are \( \rho \) and \( \eta \).
The result of $\rho$, which is included in error term ($\mu$), shows the degree to which spatial dependence of outcome through error term is introduced. In other words, spatial dependence of well-being is due to spatial dependence of unobserved factors. Savitz and Raudenbush (2009, p.160) interpret that ‘when $\rho \neq 0$, the spatial dependence of the sites is introduced. For example, $\rho > 0$ indicates that a site typically surrounded by other sites with similar values on the outcome. On the other hand, $\rho < 0$ indicates that high-value cites are typically surrounded by low-value sites, and vice versa. Finally, $\rho = 0$ indicates no spatial dependence’.

Using Germany as an example, Figure 5.2 shows the level 2 structure of the spatial dependence multilevel model in which regions are spatially dependent. Clearly, this model can capture both spatial dependence and multilevel which we have identified as essential to estimate well-being.

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The same interpretation is also used in previous studies (Baller et al., 2001; Beck et al., 2006). Spatial dependence of outcome is due to spatial dependence of error terms. For example, Baller et al. (2001, p. 583) wrote ‘In the non-South, in contrast, the spatial patterning of homicide rates is more consistent with a spatial error model (at least in the last three decades). This implies that homicide rates cluster because of the clustering of unmeasured variables’.
5.5 Results

We begin with the descriptive statistics, including spatial distribution of happiness in regions across Europe, then present the results from multilevel model and spatial dependence multilevel model. Table 5.1 reports descriptive statistics for all variables. The latest version of the European Values Study 2008 consists of 67,786 respondents, but we restrict the sample to respondents aged 15-70, with average of 43.9 years old. Due to data from both individual and contextual covariates being missing, the full data consists of 23,483 respondents in 200 regions. In terms of welfare states, 24% of respondents lived in continental countries, 12% lived in liberal countries and 55% of respondents live in Central/Eastern Europe.
Table 5.1: Descriptive statistics

<table>
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<th>Mean</th>
<th>SD</th>
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<th>Max</th>
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<td>4</td>
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<td>0.49</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Age</td>
<td>43.9</td>
<td>14.9</td>
<td>15</td>
<td>70</td>
</tr>
<tr>
<td>Education</td>
<td>3.13</td>
<td>1.29</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Married</td>
<td>0.56</td>
<td>0.49</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Separated</td>
<td>0.10</td>
<td>0.30</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Widow</td>
<td>0.06</td>
<td>0.23</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Professional</td>
<td>0.26</td>
<td>0.44</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Intermediate</td>
<td>0.09</td>
<td>0.29</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Pensioner</td>
<td>0.22</td>
<td>0.23</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Homemaker</td>
<td>0.08</td>
<td>0.27</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Student</td>
<td>0.07</td>
<td>0.25</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Unemployed</td>
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<td>0.25</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Disabled</td>
<td>0.02</td>
<td>0.13</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Log household income</td>
<td>7.16</td>
<td>0.98</td>
<td>5.0</td>
<td>9.3</td>
</tr>
<tr>
<td>Log GDP</td>
<td>10.24</td>
<td>0.95</td>
<td>7.35</td>
<td>13.19</td>
</tr>
<tr>
<td>GDP growth</td>
<td>3.30</td>
<td>2.35</td>
<td>-2.7</td>
<td>12.7</td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>8.39</td>
<td>3.79</td>
<td>2.1</td>
<td>26.2</td>
</tr>
<tr>
<td>GINI</td>
<td>30.2</td>
<td>4.69</td>
<td>23</td>
<td>50.8</td>
</tr>
<tr>
<td>Traditional</td>
<td>0.45</td>
<td>0.68</td>
<td>-1.53</td>
<td>1.86</td>
</tr>
<tr>
<td>Living in continental countries</td>
<td>0.24</td>
<td>0.42</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Living in liberal countries</td>
<td>0.12</td>
<td>0.33</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Living in Central/Eastern Europe</td>
<td>0.55</td>
<td>0.49</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Regions</td>
<td>200</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respondents</td>
<td>23,483</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 5.3: Spatial distribution of well-being across regions in Europe
Figure 5.3 shows the spatial distribution of happiness across regions in Europe, and demonstrates that happiness varies within each country. In Sweden for example, happiness levels in the south tend to be higher than those in the north. Regional differences can also be seen in the UK, with parts of Scotland, Cumbria and Essex being among the most happy regions of Europe. Meanwhile, inhabitants of the regions of Bolzano in Italy, Rheinhessen-Pfalz in Germany, Autonoma de Ceuta in Spain, and the Algarve in Portugal are among the least happy regions of Europe.
<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
<th>Model 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>coeff(s.e)</td>
<td>3.115(0.017)†</td>
<td>3.063(0.035)‡</td>
<td>1.713(0.148)‡</td>
<td>2.061(0.137)‡</td>
<td>2.704(0.188)‡</td>
<td>2.787(0.190)‡</td>
</tr>
<tr>
<td>Individual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ρ</td>
<td>0.834</td>
<td>0.790</td>
<td>0.733</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health</td>
<td>0.252(0.010)‡</td>
<td>0.252(0.005)‡</td>
<td>0.252(0.010)‡</td>
<td>0.252(0.005)‡</td>
<td>0.252(0.004)‡</td>
<td>0.252(0.004)‡</td>
</tr>
<tr>
<td>Memberships</td>
<td>0.011(0.003)‡</td>
<td>0.011(0.003)‡</td>
<td>0.010(0.003)‡</td>
<td>0.010(0.003)‡</td>
<td>0.010(0.002)‡</td>
<td>0.010(0.002)‡</td>
</tr>
<tr>
<td>Trust</td>
<td>0.056(0.011)‡</td>
<td>0.056(0.008)‡</td>
<td>0.053(0.010)‡</td>
<td>0.055(0.009)‡</td>
<td>0.055(0.009)‡</td>
<td>0.055(0.009)‡</td>
</tr>
<tr>
<td>Female</td>
<td>0.030(0.009)‡</td>
<td>0.031(0.008)‡</td>
<td>0.030(0.009)‡</td>
<td>0.031(0.008)‡</td>
<td>0.031(0.008)‡</td>
<td>0.031(0.008)‡</td>
</tr>
<tr>
<td>Age</td>
<td>-0.020(0.002)‡</td>
<td>-0.020(0.002)‡</td>
<td>-0.020(0.002)‡</td>
<td>-0.020(0.002)‡</td>
<td>-0.020(0.002)‡</td>
<td>-0.020(0.002)‡</td>
</tr>
<tr>
<td>Age²</td>
<td>0.000(0.000)‡</td>
<td>0.000(0.000)‡</td>
<td>0.000(0.000)‡</td>
<td>0.000(0.000)‡</td>
<td>0.000(0.000)‡</td>
<td>0.000(0.000)‡</td>
</tr>
<tr>
<td>Education</td>
<td>0.004(0.004)</td>
<td>0.005(0.004)</td>
<td>0.005(0.004)</td>
<td>0.006(0.004)</td>
<td>0.006(0.004)</td>
<td></td>
</tr>
<tr>
<td>Union</td>
<td>0.182(0.012)‡</td>
<td>0.184(0.011)‡</td>
<td>0.184(0.012)‡</td>
<td>0.184(0.011)‡</td>
<td>0.184(0.011)‡</td>
<td>0.184(0.011)‡</td>
</tr>
<tr>
<td>Widow</td>
<td>-0.081(0.022)‡</td>
<td>-0.081(0.019)‡</td>
<td>-0.080(0.022)‡</td>
<td>-0.081(0.019)‡</td>
<td>-0.081(0.019)‡</td>
<td></td>
</tr>
<tr>
<td>Separated</td>
<td>-0.033(0.016)‡</td>
<td>-0.035(0.015)‡</td>
<td>-0.037(0.016)‡</td>
<td>-0.034(0.015)‡</td>
<td></td>
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</tr>
<tr>
<td>Professional</td>
<td>0.014(0.009)</td>
<td>0.013(0.010)</td>
<td>0.014(0.009)</td>
<td>0.012(0.010)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermediate</td>
<td>0.032(0.011)‡</td>
<td>0.031(0.014)†</td>
<td>0.032(0.012)‡</td>
<td>0.031(0.014)†</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pensioner</td>
<td>0.021(0.012)</td>
<td>0.019(0.012)</td>
<td>0.019(0.012)</td>
<td>0.018(0.012)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housekeeper</td>
<td>0.025(0.018)</td>
<td>0.022(0.016)</td>
<td>0.023(0.019)</td>
<td>0.020(0.016)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>0.017(0.020)</td>
<td>0.019(0.019)</td>
<td>0.018(0.020)</td>
<td>0.018(0.019)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>-0.149(0.021)‡</td>
<td>-0.151(0.016)‡</td>
<td>-0.154(0.021)‡</td>
<td>-0.154(0.017)‡</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disabled</td>
<td>-0.046(0.030)</td>
<td>0.040(0.028)</td>
<td>0.044(0.030)</td>
<td>0.039(0.028)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log household income</td>
<td>0.063(0.007)‡</td>
<td>0.059(0.006)‡</td>
<td>0.058(0.007)‡</td>
<td>0.057(0.006)‡</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contextual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regional GDP growth</td>
<td>-0.004(0.004)</td>
<td>-0.001(0.003)</td>
<td>-0.007(0.003)</td>
<td>-0.002(0.003)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regional GDP</td>
<td>0.034(0.012)‡</td>
<td>-0.004(0.011)</td>
<td>0.010(0.012)</td>
<td>-0.005(0.010)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regional unemployment rate</td>
<td>-0.008(0.003)</td>
<td>-0.003(0.003)</td>
<td>-0.002(0.003)</td>
<td>0.001(0.002)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emission</td>
<td>-0.010(0.017)</td>
<td>-0.004(0.013)</td>
<td>-0.005(0.015)</td>
<td>-0.011(0.012)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Country Gini index</td>
<td>-0.020(0.003)</td>
<td>-0.017(0.004)‡</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traditional value</td>
<td>-0.144(0.020)‡</td>
<td>-0.148(0.023)‡</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continent</td>
<td>-0.125(0.042)‡</td>
<td>-0.181(0.052)‡</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liberal</td>
<td>0.009(0.015)</td>
<td>-0.061(0.068)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central/Eastern Europe</td>
<td>-0.115(0.053)</td>
<td>-0.183(0.064)‡</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variances at level 1</td>
<td>0.395</td>
<td>0.395</td>
<td>0.319</td>
<td>0.320</td>
<td>0.319</td>
<td>0.319</td>
</tr>
<tr>
<td>Variances at level 2</td>
<td>0.050</td>
<td>0.047</td>
<td>0.019</td>
<td>0.021</td>
<td>0.012</td>
<td>0.012</td>
</tr>
<tr>
<td>ICC</td>
<td>11.2%</td>
<td>10.6%</td>
<td>5.6%</td>
<td>6.1%</td>
<td>3.62%</td>
<td>3.62%</td>
</tr>
<tr>
<td>DIC</td>
<td>45343.91</td>
<td>45194.09</td>
<td>40044.95</td>
<td>39971.02</td>
<td>39968.36</td>
<td>39916.35</td>
</tr>
</tbody>
</table>

Significance: †:5% ‡:1%
Our task is to examine how nested and spatial structure among regions in Europe explain well-being. Table 5.2 presents results from two kinds of multilevel models: standard multilevel model and spatial dependence multilevel model. Model 1 represents a null model of standard multilevel model, while Model 2 shows a null model of spatial dependence multilevel model. From both models we find a quite similar value of regional intra-class correlation (11.2% and 10.6%), which indicates that the variation in individual well-being at regional level is non-negligible. When we include the spatial dependence structure (Model 2), we find that $\rho=0.834$, meaning that unobserved factors of well-being in one region have positive correlation with unobserved factors of well-being in surrounding regions.

Comparing the constant coefficients and standard errors from standard multilevel and spatial dependence multilevel model, we find that the intercept of multilevel spatial dependence model is smaller than that of standard multilevel model. Moreover, we also find that the standard errors of the two models are different (0.035 compared to 0.017), indicating an underestimation of the standard errors when spatial dependence is ignored. To determine the best fit model, we find $\text{DIC difference}=149.82$ ($p<0.001$), in which Model 2 has lower level of DIC. This indicates that Model 2 is better than Model 1, thus concluding that addressing spatial dependence in the model yields better estimates of well-being.

The remainder of Table 5.2 explores the individual and contextual factors affecting well-being. Model 3 presents the result of standard multilevel model and adds individual and regional covariates of well-being. Consistent with earlier studies’ findings, being healthy, being a member of an association, being trustful and being in a marriage are positively associated with well-being.

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4This chapter uses HLM 7.0 to fit the model. It is possible to fit a three-level or four-level model using this particular software when fitting a standard multilevel model. However, it is impossible to fit a model with more than two levels in a spatial dependence multilevel model.
Meanwhile, being unemployed, being widowed, and being separated are negatively associated with well-being. In terms of contextual covariates, unemployment rate has a negative effect on well-being, while living in regions with high level GDP tends to enhance well-being.

Model 4 illustrates spatial dependence multilevel model and adds individual and regional covariates. The results suggest that well-being is spatially-dependent through unobserved factors with $\rho=0.790$, even after controlling for standard individual and contextual covariates. Most coefficients in this model are relatively similar to the those of Model 3. However, the unemployment rate and regional GDP coefficient become smaller and insignificant which indicate that spatial dependence among regions in Europe matters.

Model 5 shows how country level covariates affect well-being. Living in inequal countries and living in high level traditional values country are negatively associated with well-being. Moreover, looking at welfare states, the results indicate that living in continental countries and living in Central/Eastern Europe countries is negatively associated with well-being.

A comparison of these six models finds that spatial dependence multilevel model with regional and country covariates has the best fit, with the lowest DIC=39916.35. Moreover, comparing Model 5 and 6 we find the DIC difference=47.99 ($p<0.001$). This significant difference between standard multilevel and spatial dependence multilevel models indicates that the latter fit the data better.

In terms of individual covariates, the three models show quite similar results. We find that health, marital status and employment status are among the most important covariates of well-being. Health is positively and significantly associated with well-being with coefficient: 0.252. Marital status is also significant; being in a union has a positive effect on well-being. Conversely, being widowed (compared to being single) is more likely to be associated with
a lower level of well-being. A similar result can be seen when comparing those who are separated and who have never married with those in a union, with both having a significant negative effect on well-being. Being unemployed and being a homemaker tend to make one less happy than being employed or self-employed.

5.6 Discussion

This study presents spatial dependence multilevel model and its usefulness in explaining variations in individual well-being across regions in Europe. One of its major findings is that well-being is spatially dependent through unobserved factors, even after controlling for standard individual, regions’ and country’s covariates of well-being. This spatial dependence occurs because unobserved factors of well-being in one regions have positive correlation with unobserved factors of well-being in surrounding regions.

Since spatial dependence multilevel model improves multilevel model through spatial error model, the results may only be explained by spatial externalities, not diffusion. This means that well-being cannot spread directly through the contiguity among regions, but it can be explained by unobserved factors in neighbouring regions. Although we have included these contextual covariates of well-being, there are unobserved factors which spread from one to neighbouring regions. The unobserved factors may be identified by the factors during the crisis that can explain well-being but are not included in the model.

Consistent with the findings of Bernal et al. (2013) which show that well-being is different across geography during the recent crisis in Spain, the present study gives evidence that well-being clusters across regions in Europe. Although the study do not focus on certain countries, further research may investigate spatial dependence of well-being or mental health in a single country.
The present study also shows that regional factors do indeed have an effect on well-being, with some of the variation in the measures of well-being being attributable to region level variations. We find the association between a region’s contextual factors and its well-being to be non-negligible, a result which supports Aslam and Corrado (2012), who conclude that regional economic factors matter for individual well-being. However, the use of multilevel model without incorporating spatial dependence structure among region can result in biased estimates.

The finding on the unemployment rate supports earlier research (Di Tella et al., 2003) and indicates that both the unemployed and the employed suffer when this rate goes up. The unemployed have less chance of getting a job; those in employment fear the possibility of losing theirs. Both groups may be impacted by attendant negative effects of a high or growing unemployment rate, such as increased crime, social tension and violent protest (Frey, 2008). However, when spatial dependence multilevel model is introduced, the unemployment rate becomes statistically insignificant in explaining well-being. This may be caused that unobserved factors at neighbouring regions are more associated with well-being and in turn decrease unemployment rate coefficient.

Living in countries with high level of inequality, and in countries which score highly on traditional values, all have a negative effect on well-being. These results support the findings of previous studies (Hayo and Seifert, 2003; Alesina et al., 2004; Li and Bond, 2010). The result indicates that traditional values have a negative effect on well-being which supports previous research (Sagiv and Schwarz, 2000). This may be because in individualistic culture like in Europe, many people place high value on individual freedom. Those who live in a traditional culture (which contradicts individualistic values) have a lower level of well-being.

Results from individual covariates reveal that strong covariates of well-
being include health, marital status and individual unemployment. Healthy people tend to be happy people, a result which supports previous studies (Graham, 2009; Frey, 2008; Argyle, 2001). The reason for this high correlation is that the variables of health and well-being are subjective measures which supplement each other. Well-being measure may involve subjective health assessment and vice versa.

Being married (or in a committed partnership) is an important factor for predicting well-being, providing, among others, companionship. As has been argued by Argyle (2001); Lane (2000), social relations (including marriage and friendships) are the factors with the most significant impact on well-being. Argyle (2001) also states that marriage can enhance self-esteem by providing an escape from stress in other parts of one’s life. In addition, married people benefit from an intimate relationship and suffer less from loneliness.

Turning to individual unemployment, this research supports previous results (Di Tella et al., 2003; Clark and Oswald, 1994), namely that unemployed people appear to have a lower level of well-being than those in employment. Unemployment almost always leads to loss of income, often with an attendant increase in depression and anxiety. Understandably therefore, being unemployed exhibits lower levels of well-being compared to any other single characteristic (including significant negative ones such as being divorce and being separated).

Our research has several limitations. Further studies are needed to include unobserved factors to the specification for examining whether spatial dependence of well-being through unobserved factors remains high. In addition, we have missing data problem especially on income and contextual covariates: regional per capita GDP and unemployment rates. The analytical depth of future research would be improved by referring to recent developments of multiple imputation especially in a multilevel structure (Carpenter and Kenward).
5.7 Conclusion

In this chapter we provide new insight on how nested and spatial structures explain variations in well-being. Well-being can be explained not only by nested structure in which individual nested in regions, but also by spatial structure of regions in Europe. Well-being across region in Europe is not randomly distributed, but spatially dependent: regions with a higher level of well-being are surrounded by a higher level of well-being through unobserved factors at neighbouring regions. Moreover, spatial dependence of well-being persists even after controlling individual and contextual covariates. Other than that, we conclude that the variations of well-being are attributable to the regional level. We have also shown that spatial dependence multilevel model is suitable for understanding well-being across regions in Europe. This study proves evidence that ignoring multilevel and spatial structure at the same time would be misleading. Future studies on well-being or health related outcomes which exploit the nested and spatial structures may use spatial dependence multilevel model in improving estimates of outcomes.

One major implication for public policy is that treating regions as isolated islands may be misguided. Moreover, European governments should address both development within a region and its surrounding regions. Finally, the fact that well-being is spatially dependent through unobserved factors across regions suggests that well-being needs to be addressed not only within countries but also across countries, especially around the borders.
Chapter 6

Conclusion

Well-being is an important issue for both individuals and societies. The search for the determinants of well-being is therefore crucial, from both academic and policy-making perspectives. At present, there are three research gaps in the existing literature. First, there is a limited number of studies on the determinants of well-being during times of economic crisis. Second, only a few studies examine the regional factors influencing well-being. Third, there is insufficient analysis accounting for the multilevel structure of well-being data. To fill these gaps, this study investigates the individual and contextual determinants of well-being across regions during the recent economic crisis in Europe using variants of multilevel models.

The remainder of this chapter discusses the key findings of the present study before suggesting directions for further research in order to overcome the limitations. Finally, the chapter provides a summary of this study’s main contributions and a discussion of the implications for both researchers and policy makers in Europe.
6.1 Key findings

This study sets out to answer the following research questions: (1) To what extent do the individual and contextual determinants affect well-being during the 2007-2008 economic crisis in Europe? (2) To what extent are the regional and national explanations able to capture variations in well-being? (3) How do multilevel models explain variations of well-being across regions and countries in Europe?

While the economic crisis must be taken into account, well-being can generally be explained by individual demographic and socioeconomic characteristics. Gender, marriage, household income and social capital are among the important covariates that are positively associated with well-being, while individual unemployment is negatively associated with well-being. This study confirms the findings of previous studies concluding that individual factors are important determinants of well-being (Dolan et al., 2008; Graham, 2009). The results suggest that there is a difference in the level of well-being between female and male; being female is associated with increased well-being. With respect to companionship, marital status has been found to be a significant factor in well-being. Being married or in a partnership is positively associated with well-being, while being widowed or divorced is negatively associated with well-being. These results support the findings of previous studies (Soons and Kalmijn, 2009; Argyle, 2001).

All empirical chapters suggest that household income is positively associated with well-being. Confirming Graham (2009), this study finds that having enough money is important for maintaining individuals’ well-being during a crisis. Echoing previous findings (Clark and Oswald, 1994; Di Tella et al., 2001), this study reveals evidence that there is a negative association between individual unemployment and well-being.

Since health is an important predictor of happiness, this study examines
the relationships between happiness and health. The findings show that happiness and health are positively correlated even after controlling for their standard covariates. Happier people tend to be healthier people and vice versa. Moreover, happy regions are likely to be healthy regions and happy nations are likely to be healthy nations. More specifically, the correlation between happiness and health is stronger at the regional and national levels than that at the individual level, a finding which supports earlier studies (Subramanian et al., 2005; Eikemo et al., 2008b). This result indicates that the factors associated with well-being seem to be more similar at the regional and national level than at the individual level. This finding also confirms the work of Oshio and Kobayashi (2010) who found that socio-economic factors contributing to both happiness and health are relatively similar in direction.

The findings of this study indicate that social capital is positively and consistently correlated with well-being. Social capital can serve as a buffer that ameliorates the deleterious effect of an economic crisis. Consistent with the findings of Economou et al. (2014) and Helliwell et al. (2013), this study finds that social capital has been capable of helping to maintain individual well-being during the crisis in Europe. Given the fact that social capital is an important factor contributing to well-being, exploring the relationship among various aspects of social capital is necessary. This study confirms the virtuous circle hypothesis between association membership and generalised trust which means that association membership affects trust and vice versa, even after controlling for individual and contextual covariates. The results that support previous studies (Brehm and Rahn, 1997; Shah, 1998). At the individual level, education and social class are positively associated with both association membership and trust. Looking at the regional level, living in regions with higher unemployment rates is associated with lower levels of social capital, while at the national level, living outside social democratic states may suggest
lower levels of social capital.

Where digital use patterns are concerned, this study focuses on the relationships between Internet use and well-being before and during the crisis. The results suggest that Internet use explains well-being with different patterns. Internet use appears to have had no significant association with well-being at the time before crisis. Meanwhile, during the crisis, it has been revealed to have had a positive association with well-being. This finding supports some studies (Kavetsos and Koutrompís 2011; Cotten et al. 2012) while contradicting others (Kraut et al. 1998; 2002). Due to financial constraints at the time of a crisis, people may change their way of interacting with others. Some might shift, for example, from offline to online social interaction. In such a case, online companionship becomes increasingly important for maintaining subjective well-being. It thus follows that those with Internet access would find it easier to maintain their social relationships hence improving their well-being.

In addition, the ubiquitous nature of the Internet may explain the positive association between Internet use and well-being. Many daily activities that in which people previously engaged offline can now be performed on the Internet. There is no doubt that by providing applications such as online job searching, online banking and online shopping, the Internet can simplify life and in turn increase well-being. Internet users can perform routine tasks more easily and more efficiently than those who do not have access to the Internet. Interestingly, although being unemployed is negatively associated with well-being, this study finds that using Internet among unemployed people can be beneficial for their well-being.

To investigate how individual and contextual determinants explain well-being, multilevel models are fitted. Although individual determinants have more power in explaining well-being, contextual determinants also contribute to well-being. With regard to the distribution of well-being, there are dispar-
ities in terms of well-being across regions in Europe. The regional intra-class correlations of all models in the results show that the contributions of regional factors are non-negligible, a finding that supports Aslam and Corrado (2012) as well as Pittau et al. (2010).

The results of this study show that well-being in Europe varies across regions and is related to local politics and socioeconomic conditions. At the regional level, higher unemployment rates are negatively associated with well-being. Meanwhile, at the national level, living in countries with high income inequality is negatively associated with well-being. This result supports the spirit level hypothesis, according to which more countries with greater societal equality enjoy greater health and social well-being (Wilkinson and Pickett, 2009). These findings support Frank’s (2013, 2010) argument that others’ preferences in many important consumer goods, such as housing, strongly affect our own choices. Most people are unlikely to live in a house that is smaller than other houses in their area. This indicates that people living in areas or neighbourhoods with higher levels of inequality are more likely to be unhappy. A possible explanation may be a tendency to compare what one has to what others have, and this tendency may lead to envy. Another explanation is that social rank in a community leads people to keep up their standards of living.

The present study also suggests that the circumstances of welfare states are relevant in explaining well-being. The findings show that living in a liberal, continental or Central/Eastern Europe countries has relatively lower levels of well-being compared to those living in a social democratic country such as Denmark, Finland and Sweden. This indicates that social democratic regimes can create a buffer for individual well-being during an economic crisis, confirming the findings of Bambra and Eikemo (2009) that social democratic regimes can protect individuals in hard times.

One major finding of this study is that well-being can be explained by the
spatial structure of regions in Europe. In other words, results show that well-being is spatially dependent, even after controlling for standard individual, regional and national level covariates of well-being. Well-being in one region appears similar to that in the surrounding regions. This might be because unobserved factors of well-being in one region have a positive correlation with unobserved factors of well-being in surrounding regions. In terms of the European regional context, some macroeconomic indicators have been found to be spatially dependent. For example, GDP growth across regions in Europe is positively associated with the average of those in neighbouring regions (Ertur et al., 2006). Moreover, unemployment rates across regions in Europe tend to be spatially dependent (Niebuhr, 2002). Although these contextual covariates of well-being have been included, there are unobserved factors which spread from one region to neighbouring regions. There is a need to explore unobserved factors of well-being, especially regional aspects that is affected by economic crisis.

6.2 Limitations and directions for further research

In this study, almost every determinant in the model could be considered endogenous, given that well-being may affect almost all aspects of social, political, and economic life. Moreover, this is true both at the individual and institutional levels (Graham, 2009). The causal relationship between these determinants is beyond the scope of this study, but it constitutes an important area for future research. As suggested by Diener and Seligman (2004), well-being can be both a cause and a consequence of individual behaviour. Consequently, the possible endogeneity problems arise from these circumstances. For example, well-being may be the result of having positive social relationships, but on the
other hand, social relationships can be a consequence of well-being.

Some studies have attempted to tackle the endogeneity problems inherent in this field of study. Graham et al. (2004) found that people with high levels of happiness tend to have higher levels of income. Stutzer (2004) showed that happier singles tend to marry rather than that married people tend to be happier than singles. In practice, the limitation implied by these results leads to an impossibility of making causality claims in the true sense, and it also means that causality can run in direction opposite to those stated. To solve this problem, adequate data and precise methods are required in future studies.

Another limitation is that this study rests on cross-sectional data and does not consider the time dimension of well-being. The study of well-being in the time before and during the economic crisis can be better executed using longitudinal data. Longitudinal data is needed in order to properly investigate changes in well-being over time; it may provide an opportunity to tackle endogeneity problems as well. In addition, future studies may benefit from the use of longitudinal data in order to investigate spatio-temporal patterns of well-being.

This study uses measures of subjective well-being (life satisfaction and happiness). Although previous studies have found a high correlation between subjective and objective measures of well-being, future researchers may wish to examine supplementary objective and subjective measures of well-being in order to check robustness of the findings.

This study takes the regional level as one of its units of analysis. However, exploiting an even smaller area (such as the NUTS3 or neighbourhood level) may yield more refined findings. In addition, this study uses number of contextual factors provided by the European statistics office (Eurostat) and other organisations. However, some specific contextual factors are needed to
enable a precise estimation at lower levels (for example, income inequality in regions or neighbourhoods). Researchers investigating such contextual factors might choose to emulate the work of Ballas and Tranmer (2012) examining the individual, households, neighbourhood and district factors contributing to well-being in Britain.

6.3 Main contributions

This study makes several contributions to the existing literature on well-being. First, it enhances the understanding of the individual and contextual determinants of well-being across regions in Europe during the recent economic crisis. More specifically, this study presents a new understanding of the determinants of happiness during the crisis. Although previous research has succeeded in showing how a state of economic crisis affects well-being, this study goes further by exploring the individual, regional and national determinants that explain well-being. The results support Frey and Stutzer (2002) who demonstrated subjective well-being to be much more than just a personal issue: it is also associated with contextual issues such as regional and national socioeconomic factors.

Second, this study adds to the understanding of how regional dimensions explain well-being by explicitly modelling the clustered structure of well-being data across regions in Europe. The results suggest that regional variations in well-being are non-negligible and that well-being varies among regions across European countries. This study promotes the use of multilevel model and its extensions. Multilevel models offer the opportunity to investigate whether or not places matter for well-being. Standard multilevel model is used to examine how Internet use has affected well-being in the time before and during the crisis. This extends previous studies that have focused on single level analysis.
et al., 1998; Stepanikova et al., 2010). Using multivariate multilevel model, this study shows that there are non-negligible residual correlations between happiness and health. The results reached using multilevel simultaneous equations model have supported the virtuous circle of the two aspects of social capital that are under examination: association membership and trust. In short, multilevel models allow researchers to partition the variations of well-being into individual, regional and national components.

Third, although previous studies have examined the nested structure of well-being (e.g. Pittau et al., 2010; Aslam and Corrado, 2012) and the spatial correlation of well-being (Okulicz-Kozaryn, 2011), this study provides a new insight showing that well-being across regions in Europe can be explained through both nested and spatial structure. The results gathered from the use of spatial dependence multilevel model show that the spatial structure of regions across Europe are important in determining well-being. One of the important contributions of this study is that neighbouring regions’ characteristics should be considered explaining well-being.

6.4 Implications for research and policy making

The present research has valuable implications for future study of individual and contextual determinants of well-being during the crisis in Europe. With regard to the research line on individual variations in well-being the findings suggest that studies investigating cross-regional variations in well-being can be extended to the examination of contextual explanations for these variations. The findings on the individual and contextual determinants infer that such a study can be performed by analysing data from large numbers of regions with multilevel perspective. Since such data and methods can also be applied to the
examination of individual and contextual determinants of well-being, future studies should address contextual explanations in this strand of research.

The findings presented in this study have some notable implications for European societies as a whole. During the crisis, well-being has been affected not only by individual attributes, but also contextual characteristics. This finding is in line with Karanikolos et al. (2013) who argue that in the resilience of well-being during economic crisis, multilevel framework covering individuals, communities, and entire societies should be addressed.

Given the importance of the issue of well-being during times of economic crisis, policy-makers should take note of the findings of this study. Well-being during the crisis in Europe beginning in 2007-2008 can be determined by individual and contextual factors. Given the contextual determinants confirmed by this research, policy-makers should give increased attention to ways of addressing regional factors (such as unemployment rate and regional GDP) and country level factors (such as income inequality). In particular, the importance of Internet access in maintaining well-being needs to be considered by policy-makers. Providing Internet access can be beneficial for individuals’ well-being, especially in the case of those who are unemployed. Internet use among the unemployed may provide some opportunities that would otherwise be unavailable, for example, online assistance in finding employment.

Finally, one major implication for public policy is the importance of the spatially structured nature of regions in Europe. Attempts to treat regions as isolated islands may be misguided, improving well-being in a region can best be accomplished when taking into account the factors in neighbouring regions.
Bibliography


Mitchell, R. (2005). Commentary: The decline of death—how do we meas-
ure and interpret changes in self-reported health across cultures and time?


Appendix A

Appendix: Sensitivity analyses

A.1 Chapter 2: Internet use and well-being

Table A.1: Linear multilevel model

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Significance: †:5% ‡:1%
### Table A.2: Ordinal logit multilevel model

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<td>1.534(0.141)</td>
</tr>
<tr>
<td>cutpoint4</td>
<td>0.951(0.118)</td>
<td>2.265(0.140)</td>
</tr>
<tr>
<td>cutpoint5</td>
<td>1.513(0.117)</td>
<td>2.807(0.140)</td>
</tr>
<tr>
<td>cutpoint6</td>
<td>2.663(0.117)</td>
<td>3.937(0.140)</td>
</tr>
<tr>
<td>cutpoint7</td>
<td>3.307(0.117)</td>
<td>4.558(0.140)</td>
</tr>
<tr>
<td>cutpoint8</td>
<td>4.273(0.119)</td>
<td>5.561(0.141)</td>
</tr>
<tr>
<td>cutpoint9</td>
<td>5.708(0.120)</td>
<td>6.963(0.142)</td>
</tr>
<tr>
<td>cutpoint10</td>
<td>6.970(0.122)</td>
<td>8.186(0.144)</td>
</tr>
<tr>
<td><strong>Variances at level 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respondents</td>
<td>33,566</td>
<td>41,346</td>
</tr>
</tbody>
</table>

Significance: †5% ‡1%
## A.2 Chapter 3: Happiness and health

Table A.4: Multivariate multilevel model (without imputation)

<table>
<thead>
<tr>
<th></th>
<th>Happiness</th>
<th>Health</th>
<th>Happiness</th>
<th>Health</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>coeff.(s.e.)</td>
<td>coeff.(s.e.)</td>
<td>coeff.(s.e.)</td>
<td>coeff.(s.e.)</td>
</tr>
<tr>
<td><strong>Fixed Part</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>3.076(0.033)</td>
<td>3.794(0.042)‡</td>
<td>3.882(0.101)‡</td>
<td>4.329(0.144)‡</td>
</tr>
<tr>
<td><strong>Individual</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Memberships</td>
<td>0.013(0.003)†</td>
<td>0.008(0.004)†</td>
<td>0.140(0.111)†</td>
<td>0.008(0.004)†</td>
</tr>
<tr>
<td>Trust</td>
<td>0.093(0.009)†</td>
<td>0.140(0.011)†</td>
<td>0.026(0.008)†</td>
<td>-0.055(0.010)†</td>
</tr>
<tr>
<td>Female</td>
<td>-0.029(0.002)†</td>
<td>-0.027(0.002)†</td>
<td>0.000(0.000)†</td>
<td>0.000(0.000)†</td>
</tr>
<tr>
<td>Age</td>
<td>0.000(0.000)†</td>
<td>0.000(0.000)†</td>
<td>0.000(0.000)†</td>
<td>0.000(0.000)†</td>
</tr>
<tr>
<td>Age²</td>
<td>0.013(0.004)†</td>
<td>0.000(0.000)†</td>
<td>0.039(0.005)†</td>
<td>0.039(0.005)†</td>
</tr>
<tr>
<td>Education</td>
<td>0.192(0.011)†</td>
<td>0.057(0.014)†</td>
<td>-0.079(0.025)†</td>
<td>-0.079(0.025)†</td>
</tr>
<tr>
<td>In union</td>
<td>-0.098(0.020)†</td>
<td>-0.021(0.020)†</td>
<td>-0.052(0.013)†</td>
<td>-0.052(0.013)†</td>
</tr>
<tr>
<td>Widow</td>
<td>0.037(0.014)†</td>
<td>0.048(0.018)†</td>
<td>-0.056(0.000)†</td>
<td>-0.056(0.000)†</td>
</tr>
<tr>
<td>Professional</td>
<td>0.052(0.000)†</td>
<td>0.149(0.008)†</td>
<td>0.212(0.001)†</td>
<td>0.212(0.001)†</td>
</tr>
<tr>
<td>Intermediate</td>
<td>-0.021(0.009)†</td>
<td>-0.008(0.003)†</td>
<td>0.039(0.012)†</td>
<td>0.039(0.012)†</td>
</tr>
<tr>
<td>Home maker</td>
<td>0.076(0.044)†</td>
<td>0.049(0.043)†</td>
<td>-0.018(0.105)†</td>
<td>-0.018(0.105)†</td>
</tr>
<tr>
<td><strong>Region</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>-0.006(0.003)†</td>
<td>-0.008(0.003)†</td>
<td>0.045(0.000)†</td>
<td>0.045(0.000)†</td>
</tr>
<tr>
<td>Log GDP</td>
<td>-0.006(0.003)†</td>
<td>-0.008(0.003)†</td>
<td>0.039(0.012)†</td>
<td>0.039(0.012)†</td>
</tr>
<tr>
<td>Gini Index</td>
<td>-0.096(0.044)†</td>
<td>-0.049(0.043)†</td>
<td>-0.006(0.008)†</td>
<td>-0.006(0.008)†</td>
</tr>
<tr>
<td>Traditional values</td>
<td>-0.018(0.082)†</td>
<td>-0.091(0.103)†</td>
<td>-0.018(0.008)†</td>
<td>-0.018(0.008)†</td>
</tr>
<tr>
<td>Continental</td>
<td>0.108 (0.105)</td>
<td>0.206 (0.135)</td>
<td>0.052 (0.094)</td>
<td>0.052 (0.094)</td>
</tr>
<tr>
<td>Liberal</td>
<td>0.387</td>
<td>0.334</td>
<td>0.047</td>
<td>0.047</td>
</tr>
<tr>
<td>Central/Eastern Europe</td>
<td>0.614</td>
<td>0.524</td>
<td>0.047</td>
<td>0.047</td>
</tr>
<tr>
<td>National Corr (happiness, health)</td>
<td>0.825</td>
<td>0.494</td>
<td>0.825</td>
<td>0.494</td>
</tr>
<tr>
<td>Individual Corr (happiness, health)</td>
<td>0.374</td>
<td>0.594</td>
<td>0.374</td>
<td>0.594</td>
</tr>
<tr>
<td>Regional ICC</td>
<td>1.9%</td>
<td>1.5%</td>
<td>1.6%</td>
<td>1.2%</td>
</tr>
<tr>
<td>National ICC</td>
<td>10.2%</td>
<td>9.5%</td>
<td>2.6%</td>
<td>3.5%</td>
</tr>
</tbody>
</table>

Significance: †:5% ‡:1%
### A.3 Chapter 4: Association memberships and trust

Table A.5: Multilevel Simultaneous Equations model (without imputation)

<table>
<thead>
<tr>
<th></th>
<th>Memberships</th>
<th>Trust</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>coeff (s.e.)</td>
<td>coeff (s.e.)</td>
</tr>
<tr>
<td>Constant</td>
<td>-1.296(0.152)‡</td>
<td>-2.462(0.188)‡</td>
</tr>
<tr>
<td>Memberships</td>
<td>0.022(0.006)‡</td>
<td></td>
</tr>
<tr>
<td>Trust</td>
<td>0.160(0.014)‡</td>
<td></td>
</tr>
<tr>
<td>Following news</td>
<td>0.089(0.006)‡</td>
<td></td>
</tr>
<tr>
<td>Length of residence</td>
<td>0.177(0.026)‡</td>
<td></td>
</tr>
<tr>
<td>Nurture</td>
<td></td>
<td>0.053(0.005)†</td>
</tr>
<tr>
<td>Control</td>
<td></td>
<td>0.068(0.004)‡</td>
</tr>
<tr>
<td>Optimism</td>
<td></td>
<td>0.023(0.009)‡</td>
</tr>
<tr>
<td>Female</td>
<td>0.023(0.013)</td>
<td>0.018(0.006)</td>
</tr>
<tr>
<td>Age</td>
<td>-0.002(0.000)†</td>
<td>0.004(0.000)‡</td>
</tr>
<tr>
<td>Education</td>
<td>0.128(0.006)‡</td>
<td>0.120(0.008)‡</td>
</tr>
<tr>
<td>Marriage</td>
<td>-0.054(0.018)‡</td>
<td>-0.086(0.024)‡</td>
</tr>
<tr>
<td>Widow</td>
<td>-0.043(0.036)</td>
<td>-0.086(0.045)‡</td>
</tr>
<tr>
<td>Divorce</td>
<td>-0.133(0.026)‡</td>
<td>-0.148(0.034)†</td>
</tr>
<tr>
<td>Professional</td>
<td>0.238(0.017)‡</td>
<td>0.116(0.023)‡</td>
</tr>
<tr>
<td>Intermed class</td>
<td>0.079(0.023)‡</td>
<td>0.062(0.031)‡</td>
</tr>
<tr>
<td>Unemployed</td>
<td>-0.211(0.036)‡</td>
<td>-0.187(0.039)‡</td>
</tr>
<tr>
<td>Income</td>
<td>0.083(0.010)‡</td>
<td>0.049(0.013)‡</td>
</tr>
<tr>
<td>Regional GDP</td>
<td>-0.010(0.012)‡</td>
<td>0.081(0.015)‡</td>
</tr>
<tr>
<td>Unemployment rates</td>
<td>-0.036(0.002)‡</td>
<td>-0.001(0.002)</td>
</tr>
<tr>
<td>Traditional values</td>
<td>0.179(0.016)‡</td>
<td>0.065(0.018)‡</td>
</tr>
<tr>
<td>Continent</td>
<td>-0.355(0.020)‡</td>
<td>-0.411(0.275)‡</td>
</tr>
<tr>
<td>Liberal</td>
<td>-0.107(0.030)‡</td>
<td>-0.499(0.040)‡</td>
</tr>
<tr>
<td>Central/Eastern Europe</td>
<td>-0.462(0.028)‡</td>
<td>-0.451(0.035)‡</td>
</tr>
</tbody>
</table>

Variances 0.325(0.007)‡
Variances/covariances 0.106(0.005)‡

Significance: †:5% ‡:1%
Appendix B

Appendix: Stata and MPlus code

B.1 Codes for chapter two

*Internet use and well-being
*10 January 2012
*prepare ESS 2004-2010 for well-being following my other papers

*Internet use and well-being, 27 June 2012
*source: the 2004-2010 European Social Survey
*inspired from the works of
*1. Kraut, R., Patterson, M., Lundmark, V., Kiesler, S.,
*paradox: A social technology that reduces social
*involvement and psychological well-being?
*2. Franzen, A. (2000). Does the Internet makes us lonely?
*3. Deaton, A. (2012). The financial crisis and the
*well-being of Americans. Oxford Economic Papers,
*pages 1-26.
*I improve these works in several ways:
*1. I use individual and regional as unit of analysis
*2. I use multilevel to account regional conditions
*on individual happiness
*3. I use the case of Europe during the crisis
*main findings:Internet use
*explains well-being differently at different times.
*Before the crisis, Internet use
*has no significant association with well-being,
*while during the crisis, it has a
*positive association.
set mem 700m

use g:/Internethappiness/datatreedy/ess2ready0.dta

recode gndr(2=1)(1=0), gen(female)
gen age=agea
recode maritala (1/2=1 union) (3/5=2 separated) ///
(6=3 widowed) (9=4 nvrmar), gen(mar)
tab mar, gen(m) //this and next 3 lines: dummies marital status
ren m2 sepdiv
ren m3 widow
ren m4 nvrmar //ref: never married

gen educ = eduyrs

recode iscoco (1000/3999=1 mgrprof) (4000/5999=2 intermed) ///
(6000/9999=3 manual), gen(class)
tab class, gen(cl)
ren cl1 prof
ren cl2 intermed // ref: manual
ren cl3 manual
gen income = hinctnta

**revised social class

recode iscoco (1000/3999=1 high) (4000/9999=2 low), gen(high)
tab high, gen(h)
ren h1 high

***recode the main covariates

recode health (1=5) (2=4) (3=3) (4=2) (5=1), gen(shealth)

***recode internet use

recode netuse (0=0/1 nonet) (1=2/3 lessnet(4/5=2 mednet) ///
(6/7=3 highnet), gen(net)
tab net, gen(n) //this and next 3 lines: dummies net use
ren n1 lessnet //ref: never use
ren n2 mednet
ren n3 highnet

keep stflife lessnet mednet highnet shealth ppltrst sclact ///
sclmeet female age sepdiv widow nvrmar educ prof intermed //
uempla dsbld rtrd hswrk income unem2004 int2004

cd F:ESS_internet use ess2ready0.dta, clear
gllamm happy highnet mednet lessnet unet sclmeet ppltrst //
shealth female age sepdiv widow nvrmar //
educ prof intermed uempla dsbld rtrd hswrk incomex //
unem2004 int2004cntry, i(id) link(ologit)
clear
use ess3ready1.dta, clear
gllamm happy highnet mednet lessnet unet sclmeet ppltrst //
shealth female age sepdiv widow nvrmar //
educ prof intermed uempla dsbld rtrd hswrk incomex //
unem2006 int2006imp, i(keyess) link(ologit)
clear
use ess4ready2.dta, clear
gllamm happy highnet mednet lessnet unet sclmeet ppltrst //
shealth female age sepdiv widow nvrmar //
educ prof intermed uempla dsbld rtrd hswrk incomex //
unem2008 int2008imp, i(id) link(ologit)
clear
use ess2ready0.dta, clear
gllamm happy highnet mednet lessnet unet sclmeet ppltrst //
shealth female age sepdiv widow nvrmar //
educ prof intermed uempla dsbld rtrd hswrk incomex //
unem2010 int2010imp, i(code) link(ologit)
clear

B.1.1 Stata code for drawing map

***Creating Euro Maps
***22 Januari 2011 - 21:19

clear
set mem 700m
set more off

***changing dbf into stata file

cd g:_regions
shp2dta using nuts_1, database(eudb1) coordinates(eucoord1) genid(id)
shp2dta using nuts_2, database(eudb2) coordinates(eucoord2) genid(id)
shp2dta using nuts_2, database(eudb3) coordinates(eucoord3) genid(id)

***creating data from ESS

208
clear
cd g:
by cdnuts1, sort : egen satis1=mean(satis)
by cdnuts2, sort : egen satis2=mean(satis)
by cdnuts3, sort : egen satis3=mean(satis)

by cdnuts1, sort : egen happy1=mean(happy)
by cdnuts2, sort : egen happy2=mean(happy)
by cdnuts3, sort : egen happy3=mean(happy)

save g:, replace

***creating evs nuts 2

use g:, clear
by cdnuts2, sort : keep if _n==1
save g:, replace

use nuts2
mmerge id using eudb2
drop _merge
save g:2, replace

***merging master map and data (nuts 1, nuts 2 nuts 3)
clear
cd g:
use masternuts2
mmerge cdnuts2 using essnuts2, ukeep (internet2 happy2 satis2)
drop _merge
save g:2, replace

***creating final maps
clear
cd g:

use mergenuts2, clear
drop if id==8 | id==55 | id==221 | id==21 ///
| id==217 | id==169 | id==102 | id==186
spmap happy2 using "eucoord2.dta", ///
id(id) ndf(yellow)

drop if id==8 | id==55 | id==221 | id==21 ///
| id==217 | id==169 | id==102 | id==186
spmap internet2 using "eucoord2.dta", ///
id(id) fcolor(Blues2) ndfcolor(gray) ocolor(none ..)
drop if id==8 | id==55 | id==221 | id==21 ///
| id==217 | id==169 | id==102 | id==186
spmap int2010 using "eurocoord2.dta", ///
id(id) fcolor(Blues2) ndfcolor(gray) ocolor( none ..)
B.2 Codes for chapter three

B.2.1 Stata code for preparing dataset

* multivariate multilevel well-being in Europe 2008
* 13 Aug 2010
* prepare EVS 2008 for well-being following my other papers

* happiness and health, 27 June 2011
* source: the 2008 European Values Study
* inspired from the works of
* Covariation in the socioeco-nomic determinant of self
* rated health and happiness: multivariate multilevel
* analysis of individuals and communities in the USA.
* Health and happiness.
* In Ervasti, H., Fridberg, T., Hjerm, M., and Ringdal, K.,
* editors, Nordic social attitudes in a European perspective.
* Edward Elgar Publishing Limited.
* I improve these works in several ways:
* 1. I use individual and regional as unit of analysis
* 2. I use multilevel to account regional conditions on
* individual happiness
* 3. I use the case of Europe during the crisis
* main findings: Happiness and health are positively correlated.
* Happier people tend to be healthier, and vice versa.
* Most covariates have similar pattern in determining
* health and happiness.

set mem 800m
cd g:
use c_abrv v8 v66 v9 v10-v24 v28-v42 v62 v65 v89 v170-v179 ///
v263 v302 v303 v308 v313 v324b v330a v331a v332a v336 v344 ///
v339ISEI v346ISEI v339ESeC v346ESeC v353MM v353M_cs v355 ///
v357ISEI v357ESeC v360-v362 v364-v366 v354 v363 v367 ///
v371b_N3 v371b_N2 weight_c using ZA4800_F1.dta, clear
ren c_abrv country
***taking all things together how happy are you
recode v8 (1=4 vhappy) (2=3 qhappy) (3=2 notvery) ///
(4=1 notatall), gen(happy) ///
ren v66 satis // life satisfaction
recode v9 (1=5 vgood) (2=4 good) (4=2 poor) (5=1 vpoor), ///
gen(health)
egen memall = anycount(v10-v24), v(1)
label var memall Membership
egen memnp = anycount(v10 v11 v12 v15-v24), v(1)
label var memnp "Membership non-polit"
egen volall = anycount(v28-v42), v(1)
label var volall Volunteering
egen volnp = anycount(v28 v29 v30 v33-v42), v(1)
label var volnp "Volunteering non-polit"
gen memvol = memall + volall
gen memvolnp = memnp + volnp
recode v62 (1=1 "most can be trusted") (2=0), gen(trust)
ren v65 control
recode v89 (1=1) (else=0), gen(empd) //or not
egen posval = anycount(v171-v173 v175 v179), v(1)
//independence, hardwork,
//responsibility, tolerance+respect, unselfishness
label var posval "children taught: indep, hdwk, resp, toler+resp, unself"
//would vote in election tomorrow
recode v263 (1=1) (else=0), gen(vote)
recode v302 (1=0) (2=1), gen(female)
gen age=2008-v303
gen age2=age*age
gen ctry5yr= v308>2003 // yr come to the country
label var ctry5yr "Lived in country 5 yr or less"
recode v313 (1/2=1 union) (3=2 widow) (4/5=3 separated) ///
(6=4 nvrmarr), gen(mar)
tab mar, gen(m) //this and next 3 lines: dummies marital status
ren m1 union
ren m2 widow
ren m3 sepdiv //ref: never married
ren v324b nchildren
recode v330a (1=1) (else=0), gen(divchild)
recode v331a (1=1) (else=0), gen(divparen)
recode v332a (1=1) (else=0), gen(divrelat)
ren v336 educ
ren v344 educp //partner
ren v355 educfm //parent
ren v339ISEI isei
ren v346ISEI iseip //occ status of partner
ren v357ISEI iseifm //occ status parent
recode v339ESeC (1/2=1 mgrprof) (3=2 intermed) ///
(else=3 manual), gen(class3)
label var class3 "ESeC 3 class"
tab class3, gen(cl)
//this and next 2 lines: dummies social class
ren cl1 mgrpro
ren cl2 intermed //ref: manual
recode v346ESeC (1/2=1 mgrprof) (3=2 intermed) ///
(else=3 manual), gen(class3p)
label var class3p "ESeC 3 class, partner"
tab class3p, gen(cp)
//this and next 2 lines: dummies social class
ren cp1 mgrprop
ren cp2 interp //ref: manual
recode v357ESeC (1/2=1 mgrprof) (3=2 intermed) ///
(else=3 manual), gen(class3fm)
label var class3fm "ESeC 3 class, parents"
tab class3fm, gen(cf) //this and next 2 lines: dummies social class
ren cf1 mgrprof
ren cf2 interp //ref: manual
recode v353MM (1=149) (2=225) (3=400) (4=750) ///
(5=1250) (6=1750) (7=2250) ///
(8=2750) (9=4000) (10=6250) (11=8750) (12=11000) ///
, gen(moninc)
gen lmoninc=log(moninc)
egen nurture=anycount(v360-v362 v364-v366), v(1 2 3)
*v360,361,362 mother read books, ///
discussed politics, followed news, v364,365,366 father
label var nurture "F/M read books, disc politics, foll news"
recode v354 (1=0) (else=1), gen(sfoster)
label var sfoster "Grew up in single parent or foster fam"
//v363 had difficulty making ends meet
recode v363 (1=3) (2=2) (3=1) (else=0)
//v367 had problems replacing broken things
recode v367 (1=3) (2=2) (3=1) (else=0)
gen chardship = v363+v367
//note miss is taken as no childhd fin hardship
label var chardship "growing up: diff ends meet, ///
replace things"
ren v371b_N3 nuts3
ren v371b_N2 nuts2
ren weight_c wt
keep if age<71
* for LG
gen mallcov = memall
gen vallcov = volall
gen mvcov = memvol
gen mmnpcov = memnp
gen vnpcov = volnp
gen mvnpcov = memvolnp
order happy satis health trust memall memnp volall ///
volnp memvol memvolnp empd female age age2 ///
B.2.2 Mplus code for imputing dataset

TITLE: This is imputing data for EVS;
DATA: FILE = evs-mplus-2013.dat;
VARIABLE: NAMES are idid happy satis health mem
         memput memall trust religs length female
         age age2 educ union widow sepdiv mgrpro intermed
         retired hskpr student unemp dis moninc lmoninc cdnuts2
         cdnuts3 ctry5yr control posval nurture news codec
cdnuts2new id_spec unempn2 growthn2 gdpnuts2
         emmission2 lgpdct lgdpn2 internet id code freedom
civil political trad survive gini libdem95 welfare eastern
continent liberal w3 rest nuts2 country
         nuts_alt countryx;
usevariables are happy satis health memall trust religs
         length female age age2 educ union widow sepdiv mgrpro
         intermed retired hskpr student unemp dis lmoninc ctry5yr
         control posval nurture news cdnuts2new unempn2
         growthn2 gdpnuts2 emmission2
         lgpdct lgdpn2 internet freedom civil political trad survive
gini libdem95 eastern continent liberal rest;
CLUSTER = cdnuts2new;
!CATEGORICAL = trust ;
       MISSING = ALL(-9999);
ANALYSIS: TYPE = TWOLEVEL RANDOM;
ESTIMATOR = BAYES;
PROCESSORS = 2;
BSEED=17965;
CHAiNS=1;
ALGORITHM=GIBBS(RW);

MODEL:
%WITHIN%
happy ON satis health memall trust religs length female
   age age2 educ union widow sepdiv mgrpro intermed
retired hskpr student
   unemp dis lmoninc ctry5yr control posval nurture news*1;
satis@1; satis health memall trust religs length female
   age age2 educ union widow sepdiv mgrpro intermed
retired hskpr student
   unemp dis lmoninc ctry5yr control posval nurture news*1;

%BETWEEN%
satis ON unempn2 growthn2 gdpnuts2 emmision2
   lgdpct lgdpn2 internet freedom civil political trad survive
gini libdem95 eastern continent liberal rest*1;
satis@1; unempn2 growthn2 gdpnuts2 emmision2
   lgdpct lgdpn2 internet freedom civil political trad survive
gini libdem95 eastern continent liberal rest*1;

DATA IMPUTATION:
IMPUTE= happy satis health memall trust religs length female
   age age2 educ union widow sepdiv mgrpro intermed retired hskpr student unemp dis lmoninc
   ctry5yr control posval nurture news unempn2 growthn2 gdpnuts2 emmision2
   lgdpct lgdpn2 internet freedom civil political trad survive
gini libdem95 eastern continent liberal rest;
NDATASETS=10;
SAVE=evs-2013.imp*.dat;

OUTPUT: TECH1 TECH8;

B.2.3 Stata code for drawing map
***Creating Euro Maps
***22 Januari 2011 - 21:19
clear
set mem 700m
set more off

***changing dbf into stata file

cd g:_regions
sph2dta using nuts_1, database(eudb1) coordinates(eucoord1) genid(id)
sph2dta using nuts_2, database(eudb2) coordinates(eucoord2) genid(id)
sph2dta using nuts_3, database(eudb3) coordinates(eucoord3) genid(id)

***creating data from EVS
+++++++=
clear
cd g:
use ZA4800_F1
use id_cocas country c_abrv v8 v9 v62 v66 v10-v24 v28-v42
v62 v65 v89 v170-v179 v263 v302 v303 v308 ///
v313 v324b v330a v331a v332a v336 v344 v339ISEI v346ISEI
v339ESeC v346ESeC v353MM v353M_cs v355 v357ISEI ///
v357ESeC v360-v362 v364-v366 v354 v363 v367 ///
v368b_CC v368b_N3 v368b_N2 v368b_N1
using ZA4800_F1.dta, clear
ren v368b_CC councode
ren v368b_N3 cdnuts3
ren v368b_N2 cdnuts2
ren v368b_N1 cdnuts1
recode v8 (1=4 vhappy) (2=3 qhappy) (3=2 notvery) ///
(4=1 notatall), gen(happy)
recode v9 (1=5 vgood) (2=4 good) (4=2 poor) ///
(5=1 vpoor), gen(health)
recode v62(1=1 trust) (2=0 not), gen(trust)
ren v66 satis
egen memall = anycount(v10-v24), v(1)
label var memall Membership
egen volall = anycount(v28-v42), v(1)
label var volall Volunteering
gen memvol = memall + volall
gen age=2008-v303

***generating mean of variables

by cdnuts1, sort : egen happy1=mean(happy)
by cdnuts2, sort : egen happy2=mean(happy)
by cdnuts3, sort : egen happy3=mean(happy)

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by cdnuts1, sort : egen health1=mean(health)
by cdnuts2, sort : egen health2=mean(health)
by cdnuts3, sort : egen health3=mean(health)

save g:_evs, replace

***creating evs nuts 2

use g:_evs, clear
by cdnuts2, sort : keep if _n==1
save g:2, replace

***merging nuts master file (nuts 1, nuts 2 and nuts 3)

cd g:

use nuts2
mmerge id using eudb2
drop _merge
save g:3, replace

***merging master map and data (nuts 1, nuts 2 nuts 3)

clear
cd g:
use masternuts2
mmerge cdnuts2 using evsnuts2, ukeep ///
(happy2 satis2 health2 trust2 memvol2 memall2)
drop _merge
save g:2, replace

***creating final maps

use mergenuts2, clear
drop if id==8 | id==55 | id==221 | id==21 | id==217 | ///
id==169 | id==102 | id==186
spmap health2 using "eucoord2.dta", id(id) ///
fcolor(Blues2) ndfcolor(gray) ocolor(none ..)

gen happy=happy2
spmap happy2 using "eucoord2.dta", id(id) ///
fcolor(Blues2) ndfcolor(gray) ocolor(none ..)
B.2.4 runmlwin syntax for analysis

Random-intercept bivariate response model
runmlwin ///

use evs-mplus-2013.dat, clear
(happy cons memall,trust, female, age, age2, ///
educ, union, widow, sepdiv, mgrpro, intermed, ///
hskpr, unemp, dis, lmoninc, lgdpn2, unempn2, ///
gini, trad, continent, liberal, rest, eq(1)) ///
(health cons memall, trust, female, age, age2, ///
educ, union, widow, sepdiv, mgrpro, intermed, ///
hskpr, unemp, dis, lmoninc, lgdpn2, unempn2, ///
gini, trad, continent, liberal, rest, eq(2)), ///
level3(happy: (cons, eq(1)) (cons, eq(2))) ///
level2(happy: (cons, eq(1)) (cons, eq(2))) ///
level1(health: (cons, eq(1)) (cons, eq(2))) nopausevariables
B.3 Codes for chapter four

B.3.1 Stata code for preparing dataset

*social capital in Europe 2008
*13 Aug 2010
*prepare EVS 2008 for well-being following my other papers

* virtuos circle of social capita, 12 November 2010
* source: the 2008 European Values Study
* inspired from the works of
*   for the causes and consequences of social capital. American Journal
*   of Political Science, 41(3):999-1023.
*   individual-level assessment of social capital. Political Psychology, 19:469-496.

* I improve these works in several ways:
* 1. I use individual and regional as unit of analysis
* 2. I use multilevel to account regional conditions on individual happiness
* 3. I use the case of Europe during the crisis

main findings: association membership and general-ised trust are reciprocally related: association membership affects trust and trust affects association membership, even after controlling for individual and contextual covariates and exclusion restrictions.

set mem 800m
cd g:
use c_abrv v8 v66 v9 v10-v24 v28-v42 v62 v65 v89 v170-v179 ///
v263 v302 v303 v308 v313 v324b v330a v331a v332a v336 v344 ///
v339ISEI v346ISEI v339ESeC v346ESeC v353MM v353M_cs v355 ///
v357ISEI v357ESeC v360-v362 v364-v366 v354 v363 v367 ///
v371b_N3 v371b_N2 weight_c using ZA4800_F1.dta, clear
ren c_abrv country
***taking all things together how happy are you
recode v8 (1=4 vhappy) (2=3 qhappy) (3=2 notvery) ///
(4=1 notatall), gen(happy) ///
ren v66 satis //life satisfaction
recode v9 (1=5 vgood) (2=4 good) (4=2 poor) (5=1 vpoor), ///
gen(health)
egen memall = anycount(v10-v24), v(1)
label var memall Membership
egen memnp = anycount(v10 v11 v12 v15-v24), v(1)
label var memnp "Membership non-polit"
egen volall = anycount(v28-v42), v(1)
label var volall Volunteering
egen volnp = anycount(v28 v29 v30 v33-v42), v(1)
label var volnp "Volunteering non-polit"
gen memvol  = memall + volall
gen memvolnp = memnp + volnp
recode v62 (1=1 "most can be trusted") (2=0), gen(trust)
ren v65 control
recode v89 (1=1) (else=0), gen(empd) //or not
egen posval = anycount(v171-v173 v175 v179), v(1)
//independence, hardwork,
//responsibility, tolerance+respect, unselfishness
label var posval "children taught: indep, hdwk, resp, toler+resp, unself"
//would vote in election tomorrow
recode v263 (1=1) (else=0), gen(vote)
recode v302 (1=0) (2=1), gen(female)
gen age=2008-v303
gen age2=age*age
egen ctry5yr= v308>2003 // yr come to the country
label var ctry5yr "Lived in country 5 yr or less"
recode v313 (1/2=1 union) (3=2 widow) (4/5=3 separated) ///
(6=4 nvrmarr), gen(mar)
tab mar, gen(m) //this and next 3 lines: dummies marital status
ren m1 union
ren m2 widow
ren m3 sepdiv //ref: never married
ren v324b nchildren
recode v330a (1=1) (else=0), gen(divchild)
recode v331a (1=1) (else=0), gen(divparen)
recode v332a (1=1) (else=0), gen(divrelat)
ren v336 educ
ren v344 edup //partner
ren v355 educfm //parent
ren v339ISEI isei
ren v346ISEI iseip //occ status of partner
ren v357ISEI iseifm //occ status parent
recode v339ESeC (1/2=1 mgrprof) (3=2 intermed) ///
(else=3 manual), gen(class3)
label var class3 "ESeC 3 class"
tab class3, gen(cl)
//this and next 2 lines: dummies social class
ren cl1 mgrpro
ren cl2 intermed //ref: manual
recode v346ESeC (1/2=1 mgrprof) (3=2 intermed) ///
(else=3 manual), gen(class3p)
label var class3p "ESeC 3 class, partner"
tab class3p, gen(cp)
//this and next 2 lines: dummies social class
ren cp1 mgrprop
ren cp2 interp //ref: manual
recode v357ESeC (1/2=1 mgrprof) (3=2 intermed) ///
(else=3 manual), gen(class3fm)
label var class3fm "ESeC 3 class, parents"
tab class3fm, gen(cf) //this and next 2 lines: dummies social class
ren cf1 mgrprofm
ren cf2 interfm //ref: manual
recode v353MM (1=149) (2=225) (3=400) (4=750) ///
(5=1250) (6=1750) (7=2250) ///
(8=2750) (9=4000) (10=6250) (11=8750) (12=11000) ///
, gen(moninc)
gen lmoninc=log(moninc)
egen nurture=anycount(v360-v362 v364-v366), v(1 2 3)
*v360,361,362 mother read books, ///
*discussed politics, followed news, v364,365,366 father
label var nurture "F/M read books, disc politics, foll news"
recode v354 (1=0) (else=1), gen(sfoster)
label var sfoster "Grew up in single parent or foster fam"
//v363 had difficulty making ends meet
recode v363 (1=3) (2=2) (3=1) (else=0)
//v367 had problems replacing broken things
recode v367 (1=3) (2=2) (3=1) (else=0)
gen chardship = v363+v367
//note miss is taken as no childhd fin hardship
label var chardship "growing up: diff ends meet, ///
replace things"
ren v371b_N3 nuts3
ren v371b_N2 nuts2
ren weight_c wt
keep if age<71
* for LG
gen mallcov = memall
gen vallcov = volall
gen mvcov = memvol
gen mnpcov = memnp
gen vnpcov = volnp
gen mvnpcov = memvolnp
order happy satis health trust memall memnp volall ///
volnp memvol memvolnp empd female age age2 ///
B.3.2 Mplus code for imputing dataset

TITLE: This is imputing data for EVS;
DATA: FILE = evs-mplus-2013.dat;
VARIABLE: NAMES are idid happy satis health mem
    memput memall trust religs length female
    age age2 educ union widow sepdiv mgrpro intermed retired hskpr student unemp dis moninc lmoninc cdnuts2 cdnuts3 ctry5yr control posval nurture news codec cdnuts2new id_spec unempn2 growthn2 gdpnuts2 emmision2 lgdpct lgdpn2 internet id code freedom civil political trad survive gini libdem95 welfare eastern continent liberal w3 rest nuts2 country
    nuts_alt countryx;
usevariables are happy satis health memall trust religs
    length female age age2 educ union widow sepdiv mgrpro
    intermed retired hskpr student unemp dis moninc ctry5yr control posval nurture news cdnuts2new unempn2 growthn2 gdpnuts2 emmision2
    lgdpct lgdpn2 internet freedom civil political trad survive gini libdem95 eastern continent liberal rest;
CLUSTER = cdnuts2new;
!CATEGORICAL = trust ;
MISSING = ALL(-9999);
ANALYSIS: TYPE = TWOLEVEL RANDOM;
ESTIMATOR = BAYES;
PROCESSORS = 2;
   BSEED=17965;
   CHAINS=1;
   ALGORITHM=GIBBS(RW);
MODEL:
   %WITHIN%
   happy ON satis health memall trust religs length female
   age age2 educ union widow sepdiv mgrpro intermed
   retired hskpr student
   unemp dis lmoninc ctry5yr control posval nurture
   news*1;
   satis@1; satis health memall trust religs length female
   age age2 educ union widow sepdiv mgrpro intermed
   retired hskpr student
   unemp dis lmoninc ctry5yr control posval nurture
   news*1;
   %BETWEEN%
   satis ON unempn2 growthn2 gdpnuts2 emmision2
   lgdpc2 lgdpn2 internet freedom civil political trad survive
   gini libdem95 eastern continent liberal rest*1;
   satis@1; unempn2 growthn2 gdpnuts2 emmision2
   lgdpc2 lgdpn2 internet freedom civil political trad survive
   gini libdem95 eastern continent liberal rest*1;
DATA IMPUTATION:
IMPUTE= happy satis health memall trust religs length
   female age age2 educ union widow sepdiv mgrpro
   intermed retired hskpr student unemp dis lmoninc
   ctry5yr control posval nurture
   news unempn2 growthn2 gdpnuts2 emmision2
   lgdpc2 lgdpn2 internet freedom civil political trad survive
   gini libdem95 eastern continent liberal rest;
NDATASETS=10;
   SAVE=evs-2013.imp*.dat;
OUTPUT: TECH1 TECH8;

B.3.3 Stata code for drawing map

***Creating Euro Maps
***22 January 2011 - 21:19
clear  *  
set mem 700m  
set more off  

***changing dbf into stata file  

cd g:_regions  
shp2dta using nuts_1, database(eudb1) coordinates(eucoord1) genid(id)  
shp2dta using nuts_2, database(eudb2) coordinates(eucoord2) genid(id)  
shp2dta using nuts_3, database(eudb3) coordinates(eucoord3) genid(id)  

***creating data from EVS  

+++++++=  

clear  
cd g:  
use ZA4800_F1  
use id_cocas country c_abrv v8 v9 v62 v66 v10-v24 v28-v42 v62 v65 v89 v170-v179 v263 v302 v303 v308  
v313 v324b v330a v331a v332a v336 v344 v339ISEI v346ISEI v339ESeC v346ESeC v353MM v353M_cs v355 v357ISEI  
v357ESeC v360-v362 v364-v366 v354 v363 v367  
v368b_CC v368b_N3 v368b_N2 v368b_N1  
using ZA4800_F1.dta, clear  

ren v368b_CC councode  
ren v368b_N3 cdnuts3  
ren v368b_N2 cdnuts2  
ren v368b_N1 cdnuts1  

recode v8 (1=4 vhappy) (2=3 qhappy) (3=2 notvery)  
(4=1 notatall), gen(happy)  
recode v9 (1=5 vgood) (2=4 good) (4=2 poor)  
(5=1 vpoor), gen(health)  
recode v62(1=1 trust) (2=0 not), gen(trust)  
ren v66 satis  
egen memall = anycount(v10-v24), v(1)  
label var memall Membership  
egen volall = anycount(v28-v42), v(1)  
label var volall Volunteering  
gen memvol = memall + volall  
gen age=2008-v303  

***generating mean of variables  

by cdnuts1, sort : egen memvol1=mean(memvol)  
by cdnuts2, sort : egen memvol2=mean(memvol)
by cdnuts3, sort : egen memvol3=mean(memvol)
by cdnuts1, sort : egen trust1=mean(trust)
by cdnuts2, sort : egen trust2=mean(trust)
by cdnuts3, sort : egen trust3=mean(trust)

save g:_evs, replace

***creating evs nuts 2

use g:_evs, clear
by cdnuts2, sort : keep if _n==1
save g:2, replace

***merging nuts master file (nuts 1, nuts 2 and nuts 3)

cd g:

use nuts2
mmerge id using eudb2
drop _merge
save g:3, replace

***merging master map and data (nuts 1, nuts 2 nuts 3)

clear
cd g:
use masternuts2
mmerge cdnuts2 using evsnuts2, ukeep ///
(happy2 satis2 health2 trust2 memvol2 memall2)
drop _merge
save g:2, replace

***creating final maps

use mergenuts2, clear
drop if id==8 | id==55 | id==221 | id==21 | id==217 | ///
   id==169 | id==102 | id==186
spmap memvol2 using "eucoord2.dta", id(id) ///
fcolor(Blues2) ndfcolor(gray) ocolor(none ..)

spmap trust2 using "eucoord2.dta", id(id) ///
fcolor(Blues2) ndfcolor(gray) ocolor(none ..)
B.3.4 Latent Gold syntax for analysis

options
  algorithm
tolerance=1e-008 emtolerance=0.01
emiterations=250 nriterations=50;
  startvalues
    seed=0 sets=10 tolerance=1e-005 iterations=50;
bayes
  categorical=1 variances=1 latent=1 poisson=1;
montecarlo
    seed=0 replicates=500 tolerance=1e-008;
quadrature nodes=10;
missing excludeall;
output
  parameters=first standarderrors estimatedvalues
bivariateresiduals
  iterationdetails;
variables
  caseid idid;
groupid cdnuts2new;
dependent trust Probit, memall Poisson;
independent trustcov, memallcov, female, age, age2,
educ, mgrpro, intermed, unemp, lmoninc, news, ctry5yr,
posval, nurture, control, lgdpn2, unempn2,
  trad, continent, liberal, rest;
latent
  cdnuts2new group continuous;
equations
  cdnuts2new;
  trust <- 1 + (1) cdnuts2new + memallcov + female +
  age + educ + union + widow + sepdv + mgrpro + intermed +
  unemp + lmoninc + posval + nurture +
  control+ lgdpn2+unempn2+trad+continent+liberal+rest;
  memall <-1 + (1) cdnuts2new + trustcov + female + age +
educ + union + widow + sepdv + mgrpro + intermed + unemp+
  lmoninc + news + ctry5yr + lgdpn2+unempn2+trad+continent+
  liberal+rest;
B.4 Codes for chapter five

B.4.1 Stata code for preparing dataset

*spatial dependence well-being in Europe 2008
*13 Aug 2010
*prepare EVS 2008 for well-being following my other papers

* spatial well-being, 12 November 2011
* source: the 2008 European Values Study
* inspired from the works of
* 1. Morenoff, J. D. (2003). Neighborhood mechanisms and the
   spatial dynamics of birth weight. American Journal of
   Economic disparities and life satisfaction in European
* I improve these works in several ways:
  * 1. I use individual and regional as unit of analysis
  * 2. I use multilevel to account regional conditions on
     individual happiness
  * 3. I use the case of Europe during the crisis
* main findings: well-being is spatially dependent,
* even after controlling for standard
* individual and regional covariates of well-being.

set mem 800m
cd g:
use c_abrv v8 v66 v9 v10-v24 v28-v42 v62 v65 v89 v170-v179 ///
v263 v302 v303 v308 v313 v324b v330a v331a v332a v336 v344 ///
v339ISEI v346ISEI v339ESeC v346ESeC v353MM v353M_cs v355 ///
v357ISEI v357ESeC v360-v362 v364-v366 v354 v363 v367 ///
v371b_N3 v371b_N2 weight_c using ZA4800_F1.dta, clear
ren c_abrv country
***taking all things together how happy are you
recode v8 (1=4 vhappy) (2=3 qhappy) (3=2 notvery) ///
(4=1 notatall), gen(happy) ///
ren v66 satis /life satisfaction
recode v9 (1=5 vgood) (2=4 good) (4=2 poor) (5=1 vpoor), ///
gen(health)
eggen memall = anycount(v10-v24), v(1)
label var memall Membership
egen memnp = anycount(v10 v11 v12 v15-v24), v(1)
label var memnp "Membership non-polit"
egen volall = anycount(v28-v42), v(1)
label var volall Volunteering
egen volnp = anycount(v28 v29 v30 v33-v42), v(1)
label var volnp "Volunteering non-polit"
gen memvol = memall + volall
gen memvolnp = memnp + volnp
recode v62 (1=1 "most can be trusted") (2=0), gen(trust)
ren v65 control
recode v89 (1=1) (else=0), gen(empd) //or not
egen posval = anycount(v171-v173 v175 v179), v(1)
//independence, hardwork,
//responsibility, tolerance+respect, unselfishness
label var posval "children taught: indep, hdwk, resp, toler+resp, unself"
//would vote in election tomorrow
recode v263 (1=1) (else=0), gen(vote)
recode v302 (1=0) (2=1), gen(female)
gen age=2008-v303
gen age2=age*age
gen ctry5yr= v308>2003 // yr come to the country
label var ctry5yr "Lived in country 5 yr or less"
recode v313 (1/2=1 union) (3=2 widow) (4/5=3 separated) ///
(6=4 nvrarr), gen(mar)
tab mar, gen(m) //this and next 3 lines: dummies marital status
ren m1 union
ren m2 widow
ren m3 sepdunv //ref: never married
ren v324b nchildren
recode v330a (1=1) (else=0), gen(divchild)
recode v331a (1=1) (else=0), gen(divparen)
recode v332a (1=1) (else=0), gen(divrelat)
ren v336 educ
ren v344 educp //partner
ren v355 educfm //parent
ren v339ISEI isei
ren v346ISEI iseip //occ status of partner
ren v357ISEI iseifm //occ status parent
recode v339ESeC (1/2=1 mgrprof) (3=2 intermed) ///
(else=3 manual), gen(class3)
label var class3 "ESeC 3 class"
tab class3, gen(cl)
//this and next 2 lines: dummies social class
ren c11 mgrpro
ren c12 intermed //ref: manual
recode v346ESeC (1/2=1 mgrprof) (3=2 intermed) ///
(else=3 manual), gen(class3p)
label var class3p "ESeC 3 class, partner"
tab class3p, gen(cp)
//this and next 2 lines: dummies social class
ren cp1 mgrprop
ren cp2 interp   //ref: manual
recode v357ESeC (1/2=1 mgrprof) (3=2 intermed) ///
   (else=3 manual), gen(class3fm)
label var class3fm "ESeC 3 class, parents"
tab class3fm, gen(cf) //this and next 2 lines: dummies social class
ren cf1 mgrpropf
ren cf2 interfm   //ref: manual
recode v353MM (1=149) (2=225) (3=400) (4=750) ///
   (5=1250) (6=1750) (7=2250) ///
   (8=2750) (9=4000) (10=6250) (11=8750) (12=11000) ///
   , gen(moninc)
gen lmoninc=log(moninc)
egen nurture=anycount(v360-v362 v364-v366), v(1 2 3)
*v360,361,362 mother read books, ///
*discussed politics, followed news, v364,365,366 father
label var nurture "F/M read books, disc politics, foll news"
recode v354 (1=0) (else=1), gen(sfoster)
label var sfoster "Grew up in single parent or foster fam"
//v363 had difficulty making ends meet
recode v363 (1=3) (2=2) (3=1) (else=0)
//v367 had problems replacing broken things
recode v367 (1=3) (2=2) (3=1) (else=0)
gen charship = v363+v367
//note miss is taken as no childhd fin hardship
label var charship "growing up: diff ends meet, ///
replace things"
ren v371b_N3 nuts3
ren v371b_N2 nuts2
ren weight_c wt
keep if age<71
* for LG
gen mallcov = memall
gen vallcov = volall
gen mvcov = memvol
gen mnpcov = memnp
gen vnpcov = volnp
gen mvnpcov = memvolnp
order happy satis health trust memall memnp volall ///
   volnp memvol memvolnp empd female age age2 ///
educ educp educfm ///
mar union widow sepdiv nchildren isei iseip iseifm ///
class3 mgrpro intermed class3p mgrprop interp ///
class3fm mgrprofm interfm moninc lmoninc
control posval nurture sfoster chardship
divchild divparen divrelat vote nuts2 nuts3 ctry5yr
country mallcov vallcov mvcov mnpcov vnpcov
mvnpcov wt

keep happy satis health trust memall memnp volall
volnp memvol memvolnp empd female age age2 educ
educp educfm mar union widow
sepdiv nchildren isei iseip iseifm class3 mgrpro intermed
class3p mgrprop interp class3fm mgrprofm interfm
moninc lmoninc control posval nurture sfoster chardship
divchild divparen divrelat vote nuts2 nuts3 ctry5yr country
mallcov vallcov mvcov mnpcov
vnpcov mvnpcov wt
compress
saveold mihappy, replace

B.4.2 Stata code for drawing map

***Creating Euro Maps
***22 Januari 2011 - 21:19
clear
set mem 700m
set more off

***changing dbf into stata file

cd g:_regions
shp2dta using nuts_1, database(eudb1) coordinates(eucoord1) genid(id)
shp2dta using nuts_2, database(eudb2) coordinates(eucoord2) genid(id)
shp2dta using nuts_3, database(eudb3) coordinates(eucoord3) genid(id)

***creating data from EVS
+++++++=
clear
cd g:
use ZA4800_F1
use id_cocas country c_abrv v8 v9 v62 v66 v10-v24 v28-v42
v62 v65 v89 v170-v179 v263 v302 v303 v308
v313 v324b v330a v331a v332a v336 v344 v339ISEI v346ISEI
v339ESeC v346ESeC v353MM v353M_cs v355 v357ISEI
v357ESeC v360-v362 v364-v366 v354 v363 v367
v368b_CC v368b_N3 v368b_N2 v368b_N1

230
using ZA4800_F1.dta, clear

ren v368b_CC councode
ren v368b_N3 cdnuts3
ren v368b_N2 cdnuts2
ren v368b_N1 cdnuts1

recode v8 (1=4 vhappy) (2=3 qhappy) (3=2 notvery) ///
(4=1 notatall), gen(happy)
recode v9 (1=5 vgood) (2=4 good) (4=2 poor) ///
(5=1 vpoor), gen(health)
recode v62(i=1 trust) (2=0 not), gen(trust)
ren v66 satis
egen memall = anycount(v10-v24), v(1)
label var memall Membership
egen volall = anycount(v28-v42), v(1)
label var volall Volunteering
gen memvol = memall + volall
gen age=2008-v303

***generating mean of variables

by cdnuts1, sort : egen happy1=mean(happy)
by cdnuts2, sort : egen happy2=mean(happy)
by cdnuts3, sort : egen happy3=mean(happy)

by cdnuts1, sort : egen health1=mean(health)
by cdnuts2, sort : egen health2=mean(health)
by cdnuts3, sort : egen health3=mean(health)

save g:_evs, replace

***creating evs nuts 2

use g:_evs, clear
by cdnuts2, sort : keep if _n==1
save g:2, replace

***merging nuts master file (nuts 1, nuts 2 and nuts 3)

cd g:

use nuts2
mmerge id using eudb2
drop _merge
save g:3, replace
***merging master map and data (nuts 1, nuts 2 nuts 3)

clear
cd g:
use masternuts2
mmerge cdnuts2 using evsnuts2, ukeep ///
(happy2 satis2 health2 trust2 memvol2 memall2)
drop _merge
save g:2, replace

***creating final maps

use mergenuts2, clear
gen happy=happy2
spmap happy2 using "eucoord2.dta", id(id) ///
fcolor(Blues2) ndfcolor(gray) ocolor(none ..)

B.4.3 HLM code for analysis

Level-1 Model
HAPPYij = j + j*(HEALTHij) + j*(MEMALLij) + //
j*(FEMALEij) + j*(AGEij) + j*(EDUCij) + //
j*(UNIONij) + j*(WIDOWij) + j*(SEPDIVij) + //
j*(MGRPROij) + 0j*(INTERMEDij) + 1j*(RETIREDij) + //
2j*(HSKPRIij) + 3j*(STUDENTij) + 4j*(UNEMPij) + //
5j*(DISij) + 6j*(LMONINCij) + rij

Level-2 Model
j = ?00 + ?01*(GINIj) + ?02*(LIBERALj) +?03*(CONTINENTj) //
+?04*(RESTj)+?05*(TRADj) +?06*(UNEMPN2j) + ?07*(LGDPN2j) //
+?08*(EMISSIONj)+ b0
j = ?10
j = ?20
j = ?30
j = ?40
j = ?50
j = ?60
j = ?70
j = ?80
j = ?90
0j = ?100

232
$1j = ?110$
$2j = ?120$
$3j = ?130$
$4j = ?140$
$5j = ?150$
$6j = ?160$

Spatial Dependence
$b0 = ?*W*b0 + u0$

Mixed Model
$HAPPY_{ij} = ?00 + 01*GINI_j + ?02*(LIBERAL_j) + ?03*(CONTINENT_j) + ?04*(REST_j) + ?05*(TRAD_j) + ?06*(UNEMP_j) + ?07*(LGDP_j) + ?08*(EMISSION_j) + ?10*HEALTH_{ij} + ?20*MEMALL_{ij} + ?30*FEMALE_{ij} + ?40*AGE_{ij} + ?50*EDUC_{ij} + ?60*UNION_{ij} + ?70*WIDOW_{ij} + ?80*SEPDIV_{ij} + ?90*MGRPR0_{ij} + ?100*INTERMED_{ij} + ?110*RETIRED_{ij} + ?120*HSKPR_{ij} + ?130*STUDENT_{ij} + ?140*UNEMP_{ij} + ?150*DIS_{ij} + ?160*LMONINC_{ij} + b0 + r_j$