

Internet Use and Well-Being Before and During the Crisis in Europe

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Abstract 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. Using the four waves of the European Social Survey 2004–2010, this study examines the association between Internet use and well-being before and during the financial crisis in Europe which started in 2007. To understand how contextual factors explain individual well-being, we use multilevel model. We find 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. We also find that the density of Internet users in regions across Europe has positive and significant association with well-being. The results suggest 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

1 Introduction

The debate in literature on whether Internet use increases or decreases well-being began in the 1990s, and continues to grow. 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) find a positive contribution of Internet use in reducing depression among older people. Kavetsos and Koutroumpis (2011) conclude

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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 a detrimental effect on well-being. Its use may reduce face-to-face social interaction and trigger loneliness. For people who have few friends, Internet use tends to emphasise their sense of social isolation and in turn decrease well-being (Kraut et al. 1998; Kraut et al. 2002). The 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, a study has yet to examine the effect of Internet use on well-being before and during the current global financial crisis. Although recent works discuss levels of well-being during times of general 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 only a limited understanding of how contextual factors affect individual well-being. The distribution of economic resources and Internet connections across regions may appear to influence subjective well-being; regions with more dense Internet connections may simply offer better access. In addition, individuals surveyed in these studies are nested within regions, and it is essential that this nested or multilevel structure of the data be taken into consideration. Thirdly, the majority of 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) use a Luxembourg representative sample. Few studies however have investigated the relationship across several countries. This is despite the significance of country variations—for instance in terms of overall level of economic development—and their potential role in conditioning this relationship.

This paper aims to fill these gaps by using a multilevel model to examine whether Internet use is associated with well-being before and during the current European financial crisis. It uses data from the European Social Survey (ESS), a cross-national survey which collects data across Europe every two years. We refer to ESS data collected from 2004 to 2010 which presents information on Internet use, social companionship and happiness, and thus provides an opportunity to explore the relationships between Internet use and well-being. The data also identifies regions within countries according to region codes (NUTS 2), 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 has a positive and significant association with well-being. We also find that the density of Internet users in a region has a positive association with well-being.

This paper 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 Internet Use, Well-Being and Crisis: A General Framework

2.1 Well-Being and Its Correlates

The literature on well-being is vast and still growing, hence our review is necessarily selective (Blanchflower and Oswald 2008; Clark and Oswald 1994; Frey 2008; Frey and Stutzer 2002; Graham, 2009; Lane 2000). 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 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 and older than when they are middle-aged.

The effect of income has spawned a major debate in the literature on well-being. Easterlin (1974) shows that personal income has a 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 data obtained between 1981 and 2007, find that as GDP per capita grows, well-being increases by as much as 77 % among 52 countries across the world.

Unlike education and income, unemployment has been recognised as a consistent predictor for unhappiness; Clark and Oswald (1994) and Oswald (1997) point out a strong and negative association between unemployment and 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 also significant non-pecuniary effects, such as the detrimental effect of unemployment on an individual's self-esteem.

Among 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 wellbeing (Lane 2000; Argyle 2001). Some studies report on the impact of marital status on happiness. The consensus is that the state of marriage brings social and emotional benefits, and thus has a positive correlation with well-being. 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.

A number of contextual covariates that affect happiness have also been identified; these include the percentage of households where any member of the household has the possibility to access the Internet and unemployment rate in regions. Kavetsos and Koutroumpis (2011) find that broadband penetration in a country may have a beneficial effect on well-being, providing increased access to the Internet and thus ease of online transactions including shopping and banking, and contacting family and friends. In addition, we are also told that the high unemployment rate may be harmful for well-being. Frey (2008) points out that the unemployment rate is likely to raise concerns of individuals about the future, which in turn is likely to decrease their sense of well-being.

2.2 Does Internet Use Increase or Decrease Well-Being?

There are two strands of the literature aimed at explaining 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 its use may increase well-being. Kavetsos and Koutroumpis (2011), examining whether technology affluence affects well-being across Europe refer to the Eurobarometer survey from 2005 to 2008 and conclude that having Internet connection is associated with a higher level of well-being.

In a recent study, Cotten et al. (2012) examine the association between Internet use and depression among older adults. They use the 2006 Health Retirement Study (HRS), which questions a nationally-representative sample of Americans over the age of 50 years. On the subject of Internet use, it asks: ‘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 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 %. Despite its focus being limited to a single country, it presents strong evidence that Internet use may benefit well-being.

There is however evidence to support the opposing view. This states that Internet use decreases subjective well-being, since the time consumed in using the Internet may decrease people’s time available to maintain face-to-face social contact 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 their study, 169 respondents were given a computer and Internet connection at home. The respondents’ Internet use was also tracked for two periods in 1995 and 1996. The results show that although most respondents used the Internet as a communication medium (in other words, to interact with others), its use is associated with decreased social involvement, increased loneliness and increased depression. Since the Internet users tend to spend their time online, they devote less time to 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 web-browsing and with other communication tools such as instant messenger, chat rooms and newsgroups is related to increased loneliness and decreased life satisfaction. Stepanikova et al. (2010) explain that since the Internet does not provide nonverbal cues when compared with traditional social relations, it may lead to uncomfortable emotions, such as feelings of anonymity and loneliness.

Given these conflicting findings, we ask whether, in Europe, Internet use does increase or decrease well-being.

2.3 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) argues that there are three reasons why the Internet may benefit an individual’s social network. First, it can reduce the time used in many transactions in daily life. Online shopping, for example, facilitates flexibility of time, and the time saved by that transaction can be spent with family members, friends and colleagues. Second, some professions (e.g. journalism, research, computer programming, online marketing) use the Internet as a vital

tool for their jobs and can assist the individual to establish a flexible, home-based office. This also increases the time available to spend with social networks. Third, 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 individual's 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, shows 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.

Graham and Sukhtankar (2004) find that the financial crisis of 2001/2002 in Latin America had a detrimental effect on individual well-being. They find that in crisis countries, mean happiness levels decreased in 2002 compared to those in 2001. Shapiro (2010), using survey data from the Cognitive Economics Study beginning in autumn 2008, concludes that financial crisis reduces median household income by about 15 %, with a subsequent decrease in household consumption. More recently, Christelis et al. (2011), using the 2009 Internet Survey of the Health and Retirement Study, find that during the crisis many households sustained the decrease in household expenditure.

The decrease in household consumption as consequence of financial crisis is likely to affect household expenditure available for social companionship, such as for visiting family or meeting friends. To overcome this constraint and to maintain the same level of companionship, people may explore alternatives such as the Internet. Since the Internet is now an integral part of everyday life, people can quite easily keep in touch through this medium. The Internet thus 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. Migrating to the Internet to maintain companionship may have beneficial effect on individual well-being. Therefore we ask whether Internet use increases well-being at the time of crisis?

3 Data and Methods

To examine the effect of Internet use on well-being before and during the crisis, we use four waves of the ESS conducted in 2004, 2006, 2008 and 2010. The ESS is a long-term project that aims to understand modern Europe and changes within it. This survey provides cross-country data, allowing us to explore the effect of the Internet on well-being across Europe. Crucially, the survey provides regional or NUTS codes to identify where individuals reside. To obtain regional or contextual data, we match the ESS with data from the Eurostat regional database. Maps of the regions in Europe use digital boundary data obtained from EuroBoundaryMaps 5.0 (Eurogeographic, 2011).

Subjective well-being is usually measured by posing subjective questions on happiness (which tends to reflect short-term emotion) and life satisfaction, (which reflects long-term and stable evaluations of quality of life) (Frey and Stutzer 2002). Although 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 paper, we use the happiness question: 'Taking all things together, how happy would

you say you are?'. The answer provides a 10-point scale, ranging from extremely unhappy to extremely happy, and is taken as ordinal.

3.1 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) to ask 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 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'.

3.2 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 addressing degree of trust, social support 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) 'Do you have a friend or relative with whom you can discuss intimate and personal matters?' and (3) '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 are rated according to a 5-point scale, ranging from very good to good, fair, bad and very bad. Income is measured referring to household income and using a variable that reflects twelve income categories ranging from EUR1,800 to EUR120,000.

We create a dummy variable for gender (1 for female, 0 for male). Education is measured against the highest level of education attained by respondents, ranging from pre-primary education to the second stage of tertiary education. Marital status is measured using 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 significant effect of unemployment on well-being, we examine whether the Internet can help in dealing with such a condition. We interact unemployment and Internet use to understand whether doing something about unemployment through the Internet, to use it to look for work, for example, can have a net association with well-being.

At contextual level we include Internet density in every 100 households which indicate percentage of households where any member of the household has the possibility to access the Internet from home in a region. In addition, we also include regional unemployment rate. These contextual data are obtained from Eurostat regional statistics (Eurostat 2011).

3.3 Analytic Strategy

The analysis proceeds in two steps. 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 current 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 present data from the period before the crisis, while the 2008 and 2010 ESS represent the time during the crisis itself.

We examine how individual and contextual levels affect well-being by using a multi-level model to estimate a well-being function. Multilevel model applications in the social sciences first emerged in the field of education, and enable the hierarchical nature of data to be explicitly viewed. For example, students are nested within classes, classes are nested within schools. One of the advantages of this model is that the resulting coefficients (or more importantly, their standard errors) are addressed in terms of clustering at various levels (Snijders and Bosker 2011). This means that the estimated coefficients and standard errors are less likely to be biased because of the nested structure of the data have been addressed.

To do estimate using multilevel model, there are several choices to treat the dependent variable scale such as linear and ordinal scale. Since the scale of well-being used in this paper is ordinal, we use a model that is suitable with this scale. Among the models, GLLMM (Generalised Linear Latent and Mixed Models) seems to be suitable. GLLMM is a class of multilevel latent variable model, where 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). 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”.

4 Results

Our task is to examine whether Internet use increases or decreases subjective well-being before and during the current European financial crisis. Firstly, we present descriptive statistics, including those pertaining to changes in Internet use and well-being over four waves of ESS. This is followed by the results of the multilevel analyses of Internet use and well-being.

Figure 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 to 10 for ease of comparison. From 2004 to 2006, well-being remains stable, changing only slightly from 7.19 to 7.14. Then from 2006 to 2008 it decreases slightly (from 7.14 to 6.94), indicating that the deepening crisis is accompanied by a discernible negative change in well-being. Social relationships or individual involvement in social meeting meanwhile remain stable. Remarkably, over the whole period Internet use by individuals monotonically increases, a trend which seems not to be affected by the crisis at all.

Figure 2 presents the mean of individual Internet use across selected regions in Europe, and this 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

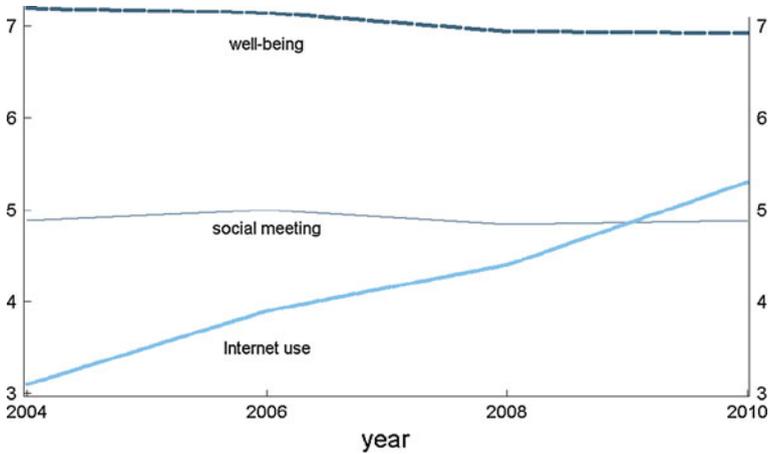


Fig. 1 Internet use, social meeting and well-being

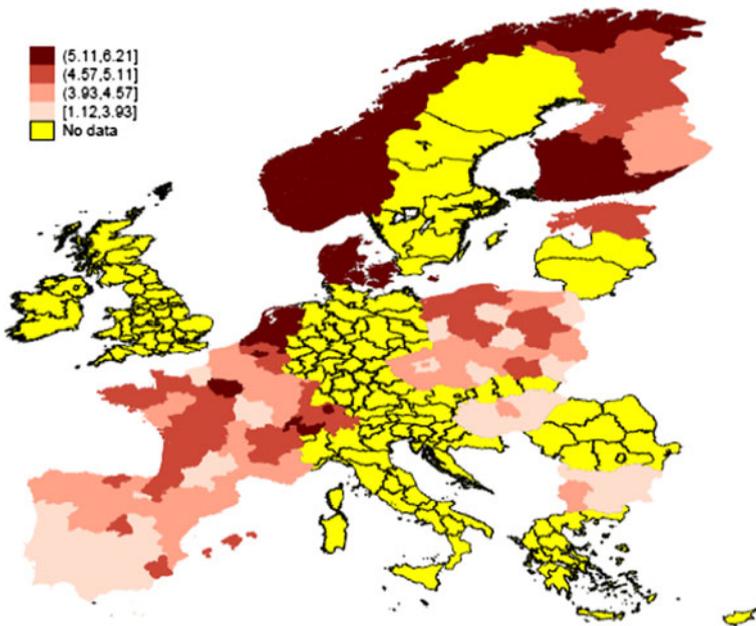


Fig. 2 Individuals' Internet use across regions (NUTS2) in Europe 2010

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 3 shows the mean of well-being across European regions, and also presents variations within countries. Syddanmark and Midtjylland (in Denmark) and West Finland (Finland) have the highest levels of well-being across Europe, whereas Algarve (Portugal),

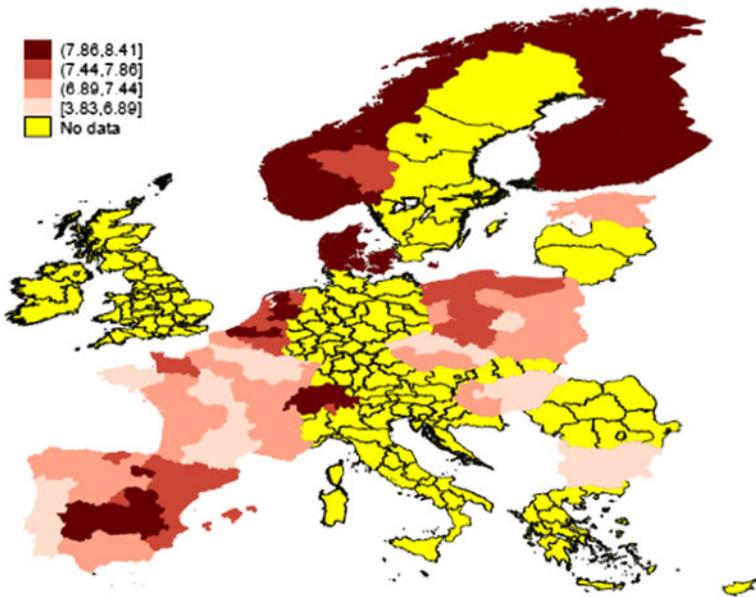


Fig. 3 Individuals' well-being across regions (NUTS2) in Europe 2010

Severozapedan (Bulgaria) and Northern Hungary (Hungary) have the lowest. Taken with the variation in the Internet use shown in Fig. 2, a contextual or multilevel examination of the relationship between Internet use and well-being is clearly needed.

Table 1 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 2002 and 2004—the time before the crisis—while columns 3 and 4 describe the model for 2008 and 2010 (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 experience a similar level of well-being to those without access to the Internet. Of the individual covariates of well-being, having social support, meeting others socially, being trustful and being healthy are positively and significantly associated with well-being. In contrast, being unemployed, being single, being separated and being widowed have negative and significant associations with well-being. Among the contextual covariates, Internet density and unemployment rate are positively related to well-being.

The results from 2006 are similar to those from 2004, namely that Internet use has no significant effect on subjective well-being. People who frequently use the Internet tend to have a similar level of well-being to those who have no access at all. In terms of individual covariates, being healthy is positively associated with well-being. Similarly, having social support, friends, and being trustful are all likely to be associated with a higher level of well-being, with the coefficient of having social support being largest (0.608). Not surprisingly, being unemployed is detrimental to 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

Table 1 Multilevel Logistic Regression Internet Use and Well-being across Europe

	2004 Coef. (SE)	2006 Coef. (SE)	2008 Coef. (SE)	2010 Coef. (SE)
Intercept	2.346 (0.134)	1.749 (0.147)	1.979 (0.150)	-0.037 (0.179)
<i>Individual level</i>				
Frequent users	-0.030 (0.035)	-0.068 (0.039)	0.091 (0.090)*	0.103 (0.041)*
Medium users	-0.007 (0.044)	-0.069 (0.054)	0.122 (0.056)*	0.080 (0.063)
Rarely users	-0.097 (0.057)	-0.135 (0.071)	0.183 (0.078)*	0.215 (0.100)*
Unemployed * Net	0.144 (0.020)	-0.004 (0.023)	0.011 (0.011)	0.045 (0.018)*
Social meeting	0.153 (0.008)**	0.157 (0.009)**	0.156 (0.009)*	0.147 (0.009)**
Social support	0.662 (0.040)**	0.608 (0.047)**	0.488 (0.041)**	0.496 (0.043)**
Trust	0.098 (0.005)**	0.100 (0.006)**	0.100 (0.006)**	0.105 (0.006)**
Health	0.553 (0.014)**	0.569 (0.017)**	0.545 (0.016)**	0.557 (0.017)**
Female	0.148 (0.028)**	0.138 (0.028)**	0.154 (0.026)**	0.153 (0.028)**
Age	-0.000 (0.001)	-0.003 (0.001)**	-0.001 (0.001)	0.004 (0.001)**
Separated	-0.669 (0.043)**	-0.462 (0.048)**	-0.608 (0.045)**	-0.602 (0.045)**
Widow	-0.561 (0.045)**	-0.532 (0.052)**	-0.485 (0.049)**	-0.571 (0.051)**
Single	-0.349 (0.033)**	-0.397 (0.037)**	-0.421 (0.035)**	-0.281 (0.038)**
Education	0.002 (0.004)	-0.010 (0.004)**	-0.004 (0.004)	-0.002 (0.002)
Professional	0.049 (0.033)	0.034 (0.037)	-0.055 (0.035)	-0.068 (0.034)*
Intermediate	0.079 (0.032)**	-0.013 (0.035)	0.065 (0.035)	-0.025 (0.036)
Unemployed	-0.622 (0.082)**	-0.314 (0.104)**	-0.621 (0.087)**	-0.691 (0.103)**
Disabled	-0.163 (0.070)**	-0.202 (0.079)**	-0.173 (0.087)**	-0.202 (0.070)**
Retired	0.318 (0.040)**	0.317 (0.046)**	0.270 (0.042)**	0.216 (0.045)**
Homemakers	0.081 (0.030)**	0.054 (0.034)	0.061 (0.035)	-0.020 (0.035)
Household income	0.063 (0.067)**	0.052 (0.007)**	0.060 (0.006)**	0.071 (0.006)**
<i>Region level</i>				
Internet density	0.013 (0.004)**	0.025 (0.001)**	0.019 (0.001)**	0.035 (0.002)**
Unemployment rate	0.014 (0.004)**	0.028 (0.005)**	0.023 (0.001)**	0.051 (0.004)**
Variance region level (SE)	0.065 (0.007)**	0.277 (0.022)**	0.181 (0.022)**	0.161 (0.018)**
ICC (%)	2.2	9.4	7.2	5.5

* $p < 0.05$; ** $p < 0.01$

density and unemployment rate have positive association with well-being. Moreover, the variance at region level is significant. This result vindicates our thesis that ignoring unobserved heterogeneities at regional level may not be as robust as previously thought.

Column 3 presents the results from 2008; these reflect the onset of the crisis and show that at such a critical time, Internet users are likely to have a higher level of well-being. This is regardless of length of time spent online: even those who 'rarely', 'somewhat frequently' and 'frequently' connect to the Internet are happier than those with no access at all. The results even indicate a higher coefficient of 'rare Internet use' than that the somewhat frequent and frequent users (0.183, compared to 0.122 and 0.091). In terms of individual covariates, having social support and social contact, being trustful and staying healthy are positively related to well-being, while being unemployed, being divorced,

separated or single have a negative association. Contextual factors show that Internet density and unemployment rate have a positive and significant association with well-being. Similar to the result from the previous wave, the variance at region is significant.

The last column presents the results from 2010 which suggest that Internet use, both at lower and high level, has a positive and significant association with subjective well-being. Similar to the findings from the 2008 wave, we find that the coefficient of low-level Internet use is larger than that of high-level Internet use (0.215 compared to 0.103). Having social support, meeting socially, being trustful and being healthy continue to be positively associated with well-being. Meanwhile, being unemployed, being widowed, single or separated are negatively and significantly associated with subjective well-being. Of these, being unemployed has the largest negative coefficient (-0.691). However, the interaction term between unemployment and Internet use has positive association with well-being. Similar to the findings from all three previous waves, both Internet density and unemployment rate have positive and significant correlations with well-being.

5 Discussion

In this paper we examine whether Internet use increases or decreases subjective well-being at time before and during crisis in Europe. Using four waves of the 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; Kraut et al. 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. It thus supports some studies (Kavetsos and Koutroumpis 2011; Cotten et al. 2012) and contradicts others (Kraut et al. 1998; Kraut et al. 2002).

Why does Internet use have different effects at different times? If we visit the 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 at a time of crisis, many people tend to substitute offline companionship with online social interaction. The results show that 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; this confirms 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 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, substituting face-to-face meetings with friends with online meetings). In this way, online companionship becomes increasingly important for maintaining subjective 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 of the Internet access in Europe. In 2006 which reflects the period before the economic crisis, only 49 % of households had an Internet connection,

while in 2008 had increased to more than 60 %. This percentage increases in 2010 becoming 70 % (European Commission 2012). The increase of the Internet access may lead people to engage in online activities that were previously done offline. It is almost indisputable that by providing applications that facilitate job searches, banking and shopping online, the Internet can simplify life, one conclusion being 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 crisis Internet density in European regions have positive associations with well-being. Living in regions 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 are more suffered 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 crisis. Internet users in more suffered countries may get benefit by using online social networks.¹ Meanwhile, Internet users who live in emerging countries would gain the benefit of purchasing goods.² Overall, the Internet users can get much benefit from the Internet.

Beyond documenting associations between Internet use and well-being, the findings suggest a mechanism 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 support, social meeting and trust, has a positive association with well-being, regardless of the times. These results support previous studies (Graham 2009; Helliwell and Putnam 2004). Social interaction as a form of companionship provides social support which enhances quality of life and acts as a buffer to stress. Moreover, as Lane (2000) 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 ones spouse and children (Diener and Biswar-Diener 2008).

Not surprisingly, being unemployed tends to have a negative effect on well-being: this is consistent with several earlier studies (Clark and Oswald 1994; Di Tella et al. 2001). Aside from the strain of making ends meet on a low or no income, this can be explained in terms of two mechanisms: the psychological cost of unemployment and the compromising of social norms. With regard to the former, unemployment frequently leads to depression and anxiety; in terms of social norms, the internal pressure to comply with the work ethic

¹ Data from Eurostat shows that Spain and Greece have higher level of the use of social network activities than that of EU rate (European Commission 2012).

² 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.

(rather than depending on the state or on others) may be implicated in the link between unemployment and a 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 the 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 (Oesch and Lipps 2012). Blanchard (2006) concludes that unemployment rate in Europe started to increase in the 1970s and increase further in the 1980s. It reached 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 conclude that the regional unemployment rate has a positive association with well-being among poor-prospect unemployed men.

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 include 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 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 of further research.

6 Conclusion

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

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Appendix

See Tables 2 and 3.

Table 2 Descriptive results

	2004		2006		2008		2010	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Well-being	7.19	2.03	7.14	2.06	6.94	2.13	6.92	2.14
Frequent users	0.31	0.46	0.39	0.48	0.44	0.49	0.53	0.49
Medium users	0.09	0.29	0.08	0.27	0.06	0.24	0.06	0.24
Rarely users	0.04	0.21	0.04	0.19	0.03	0.16	0.02	0.13
Unemployed ^a Net	0.11	0.78	0.09	0.76	0.15	1.21	0.18	1.08
Social meeting	4.88	1.60	5.00	1.59	4.84	1.63	4.88	1.64
Social support	0.89	0.31	0.90	0.29	0.87	0.33	0.88	0.32
Trust	4.91	2.49	4.99	2.52	4.70	2.57	5.09	2.43
Health	3.76	0.93	3.71	0.93	3.72	0.95	3.62	0.93
Female	0.54	0.49	0.54	0.49	0.55	0.53	0.53	0.49
Age	46.4	18.4	47.7	18.5	47.5	18.5	45.5	16.7
Separated	0.08	0.28	0.09	0.29	0.09	0.29	0.11	0.31
Widow	0.09	0.29	0.10	0.30	0.11	0.31	0.12	0.33
Single	0.28	0.45	0.26	0.44	0.25	0.43	0.29	0.45
Education	11.5	4.05	12.1	4.11	11.9	4.17	12.2	3.98
Professional	0.31	0.46	0.33	0.47	0.32	0.46	0.31	0.46
Intermediate	0.22	0.41	0.23	0.42	0.21	0.41	0.22	0.42
Unemployed	0.04	0.20	0.03	0.18	0.04	0.20	0.05	0.21
Disabled	0.02	0.16	0.03	0.17	0.03	0.17	0.03	0.17
Retired	0.24	0.43	0.25	0.44	0.25	0.43	0.28	0.45
Homemakers	0.21	0.41	0.20	0.40	0.17	0.38	0.18	0.38
Household income	6.07	2.62	6.15	2.75	5.26	2.77	5.00	2.77
Internet density	40.0	18.6	51.0	19.1	56.9	19.7	66.9	17.0
Unemployment rate	8.08	4.69	7.12	3.60	6.18	2.98	9.59	4.89
Respondents	45,731		43,000		56,752		39,160	

Table 3 Multilevel linear regression Internet use and well-being across Europe

	2004 Coef. (SE)	2006 Coef. (SE)	2008 Coef. (SE)	2010 Coef. (SE)
Intercept	2.546 (0.153)	1.469 (0.211)	2.112 (0.182)	-0.043 (0.228)
<i>Individual level</i>				
Frequent users	-0.039 (0.035)	-0.059 (0.040)	0.084 (0.038)*	0.107 (0.041)**
Medium users	-0.013 (0.049)	-0.058 (0.055)	0.114 (0.056)*	0.080 (0.064)
Rarely users	-0.104 (0.021)	-0.125 (0.072)	0.177 (0.078)*	0.211 (0.100)*
Unemployed*Net	0.014 (0.021)	-0.003 (0.023)	0.012 (0.011)	0.045 (0.019)*
Social meeting	0.152 (0.008)**	0.157 (0.009)**	0.157 (0.009)**	0.146 (0.009)**
Social support	0.662 (0.041)**	0.613 (0.047)**	0.484 (0.041)**	0.495 (0.043)**
Trust	0.098 (0.005)**	0.101 (0.006)**	0.101 (0.006)**	0.106 (0.006)**
Health	0.556 (0.015)**	0.563 (0.017)**	0.546 (0.016)**	0.559 (0.017)**
Female	0.147 (0.026)**	0.136 (0.028)**	0.154 (0.026)**	0.153 (0.028)**
Age	-0.000 (0.001)	-0.003 (0.001)**	-0.001 (0.001)	0.004 (0.001)**
Separated	-0.667 (0.044)**	-0.460 (0.049)**	-0.604 (0.045)**	-0.603 (0.045)**
Widow	-0.558 (0.046)**	-0.535 (0.053)**	-0.491 (0.049)**	-0.572 (0.051)**
Single	-0.346 (0.034)**	-0.401 (0.037)**	-0.422 (0.036)**	-0.285 (0.038)**
Education	0.002 (0.004)	-0.008 (0.004)*	-0.003 (0.003)	-0.002 (0.002)
Professional	0.048 (0.034)	0.024 (0.038)	-0.051 (0.035)	-0.070 (0.035)*
Intermediate	0.079 (0.032)*	-0.013 (0.035)	0.068 (0.035)*	-0.026 (0.036)
Unemployed	-0.618 (0.082)**	-0.314 (0.104)**	-0.638 (0.087)**	-0.691 (0.103)**
Disabled	-0.162 (0.070)*	-0.206 (0.080)**	-0.181 (0.072)**	-0.199 (0.070)**
Retired	0.316 (0.040)**	0.330 (0.046)**	0.264 (0.043)	0.218 (0.045)**
Homemakers	0.087 (0.030)**	0.049 (0.035)	0.060 (0.035)**	-0.019 (0.035)
Household income	0.067 (0.007)**	0.055 (0.007)**	0.060 (0.006)	0.070 (0.006)**
<i>Region level</i>				
Internet density	0.011 (0.002)**	0.026 (0.002)**	0.017 (0.002)**	0.036 (0.002)**
Unemployment rate	0.006 (0.006)**	0.049 (0.011)**	0.028 (0.11)**	0.048 (0.008)**
Variance region level	0.265	0.277	0.246	0.372
ICC (%)	2.4	4.8	2.3	4.8

* $p < 0.05$; ** $p < 0.01$

References

- Argyle, M. (2001). *The Psychology of Happiness*. East Sussex: Routledge.
- Blanchard, O. J., (2006). European unemployment: the evolution of facts and ideas. *Economic Policy*, 21(45), 5–59.
- Blanchflower, D. G., & Oswald, A. J. (2008). Is well-being U-shaped over the life cycle. *Social Science and Medicine*, 66, 1733–1749.
- Christelis, D., Georgarakos, D., & Japelli, T. (2011). Wealth shocks, unemployment shocks, and consumption in the wake of the great recession. *CSEF Working Paper*, 279, <http://www.csef.it/WP/wp279.pdf>.
- Clark, A. E. (2003). Unemployment as a social norm: Psychological evidence from panel data. *Journal of Labor Economics*, 21(2), 323–351.
- Clark, A. E., Knabe, A., & Ratzel, S. (2010). Boon or bane? Others' unemployment, well-being and job insecurity. *Labor Economics*, 17, 52–61.
- Clark, A. E., & Oswald, A. J. (1994). Unhappiness and unemployment. *The Economic Journal*, 104(424), 648–659.

- Clark, A. E., & Oswald, A. J. (2002). A simple statistical method for measuring how life events affect happiness. *International Journal of Epidemiology*, *31*, 1139–1144.
- Cotten, S. R., Ford, G., Ford, S., & Hale, T. M. (2012). Internet use and depression among older adults. *Computers in Human Behavior*, *28*, 496–499.
- Deaton, A. (2008). Income, health, and well-being around the world: Evidence from the Gallup World Poll. *Journal of Economic Perspectives*, *22*(2), 53–72.
- Deaton, A. (2012). The financial crisis and the well-being of Americans. *Oxford Economic Papers*, *64*(1), 1–26.
- Di Tella, R., MacCulloch, R. J., & Oswald, A. J. (2001). Preferences over inflation and unemployment: evidence from surveys of happiness. *American Economic Review*, *91*(1), 335–341.
- Diener, E., & Biswar-Diener, R. (2008). *Happiness: Unlocking the mysteries of psychological wealth*. Malden: Blackwell Publishing.
- European Commission (2012). Life Online Scoreboard. <http://www.ec.europa.eu/digital-agenda/en/scoreboard>.
- Franzen, A. (2000). Does the Internet makes us lonely? *European Sociological Review*, *16*(4), 427–438.
- Frey, B. S. (2008). *Happiness: A revolution in economics*. Massachusetts: MIT.
- Frey, B. S., & Stutzer, A. (2002). *Happiness and economics: How the economic and institutions affect human well-being*. Princeton: Princeton University Press.
- Graham, C. (2009). *Happiness around the World*. Oxford: Oxford University Press.
- Graham, C., & Sukhtankar, S. (2004). Does economic reduce support for market and democracy in Latin America? Some evidence from surveys of public opinion and well-being. *Journal of Latin America Studies*, *36*, 349–377.
- Gross, E. F., Juvonen, J., & Gable, S. L. (2002). Internet use and well-being in adolescence. *Journal of Social Issues*, *58*(1), 75–90.
- Helliwell, J. F., & Putnam, R. D. (2004). The social context of well-being. *The Royal Society*, *359*, 1435–1446.
- Inglehart, R., Foa, R., Peterson, C., & Welzel, C. (2008). Development, freedom and rising happiness: A global perspective (1981-2007). *Perspectives on Psychological Science*, *3*(4), 264–285.
- Kavetsos, G., & Koutroumpis, P. (2011). Technological affluence and subjective well-being. *Journal of Economic Psychology*, *32*, 742–753.
- Kraut, R., Kiesler, S., Boneva, B., Cummings, J., Hegelson, V., & Crawford, A. (2002). Internet paradox revisited. *Journal of Social Issues*, *58*(1), 49–74.
- Kraut, R., Peterson, M., Lundmark, V., Kiesler, S., Mukopadhyay, T., & Scherlis, W. (1998). Internet paradox: A social technology that reduces social involvement and psychological well-being? *American Psychologist*, *53*(9), 1017–1071.
- Lane, R. E. (2000). *The Loss of Happiness*. New Heaven: Yale University Press.
- Lim, C., & Putnam, R. D. (2010). Religion, social networks, and life satisfaction. *American Sociological Review*, *75*(6), 914–933.
- Mitchell, M., Lebow, J., Grathouse, H., & Shoger, W. (2011). Internet use, happiness, social support and introversion: A more fine grained analysis of person variables and Internet activity. *Computers in Human Behavior*, *27*, 1857–1861.
- Nie, N. H., Hillygus, D. S., & Erbring, L. (2002). Internet use, interpersonal relationships, and sociability in the Internet. In B. Wellman & C. Haythornwaite (Eds.), *Internet in everyday life*. New York: Wiley.
- Oesch, D., & Lipps, O. (2012). Does unemployment hurt less if there is more of it around? A panel analysis of life satisfaction in Germany and Switzerland. *European Sociological Review*, 1–13.
- Oswald, A. J. (1997). Happiness and economic performance. *The Economic Journal*, *107*(445), 1815–1851.
- Penard, T., & Pousing, N. (2010). Internet use and social capital: Strength of virtual ties, <http://perso.univrennes1.fr/thierry.penard/biblio/PenardPousingSocialCapital.pdf>.
- Rabe-Hesketh, S., Skrondal, A., & Pickles, A. (2004) GLLAMM Manual. <http://www.biostat.jhsph.edu/~fdominic/teaching/bio656/software/gllamm.manual.pdf>.
- Roed, K. (2002). Hysteresis in unemployment. *Journal of Economics Surveys*, *11*(4), 389–419.
- Shapiro, M. D. (2010). The effect of the financial crisis on the well-being of older Americans: Evidence from the cognitive economics study, <http://deepblue.lib.umich.edu/bitstream/2027.42/78345/1/wp228.pdf>.
- Snijders, T. A. B., & Bosker, R. J. (2011). *Multilevel analysis: An introduction to basic and advanced multilevel modeling*. London: Sage.
- Stepanikova, I., Nie, N. H., & He, X. (2010). Time on the Internet at home, loneliness and life satisfaction: Evidence from panel time-diary data. *Computers in Human Behavior*, *26*(3), 329–338.