

# Predicting Well-Being in Europe? The Effect of the Financial Crisis

**M. Azhar Hussain**

Department of Society and Globalisation, Roskilde University  
Universitetsvej 1, DK-4000 Roskilde, Denmark  
+45 4674 2838  
azharh@ruc.dk

## Reviewers:

Sorin Gabriel ANTON, Alexandru Ioan Cuza University of Iasi, Romania;  
Christopher HARTWELL, Kozminski University, Poland  
Biswajit MAITRA, University of Gour Banga, India.

## Abstract

Has the worst financial and economic crisis since the 1930s reduced the subjective well-being function's predictive power? Regression models for happiness are estimated for the three first rounds of the European Social Survey (ESS); 2002, 2004 and 2006. Several explanatory variables are significant with the expected signs and an average determination coefficient around 0.25. Based on these estimated parameters happiness is predicted for the latest three rounds of the ESS; 2008, 2010 and 2012. Happiness is slightly underestimated in both 2008 and 2010, e.g. actual happiness generally is above predicted happiness. Nevertheless, 73% of the predictions in 2008 and 57% of predictions in 2010 were within the margin of error. These correct prediction percentages are not unusually low - rather they are slightly higher than before the crisis. It is surprising that happiness predictions are not adversely affected by the crisis. On the other hand, results are consistent with the adaption hypothesis. The same exercise is conducted applying life satisfaction instead of happiness, but we reject, against expectation, that (more transient) happiness is harder to predict than life satisfaction. Fifteen ESS countries surveyed in each of the six surveys are included in the study.

Keywords: Prediction. Well-being. Happiness. Regression. European Social Survey (ESS).

## Introduction

The outbreak of the present financial crisis and the following economic crisis has had far reaching effects. The adverse macro-economic effects are well-documented and include a severe reduction in economic growth and even recession in some countries. Unemployment rates have increased tremendously in some countries since the crisis started. The tight economic circumstances and related problems have led to social unrest particularly in Southern European countries. Although the present crisis is considered to be the worst since the recession in the 1930s, its wider effects on well-being are still debated. One starting point of the

discussion is the Easterlin Paradox, which could support a claim that happiness in rich industrialized countries would not be affected much by changes in macro-economic circumstances. Indeed, some studies find no significant negative happiness effects of the financial crisis, while others do find significant effects. This paper goes along the somewhat same avenue and asks whether the predictive power of the well-being function has been affected by the financial and economic crisis since its wider effects have been so large that one could expect some well-being effects as well, e.g. well-being would be harder to predict since economic and labour market conditions have changed significantly over a short time period – the question then being whether the worst economic crisis since the 1930s has reduced the well-being function's predictive power?

Related to this, we also investigate if the predictive power in the case of life satisfaction (evaluative well-being) is greater than in the case of happiness (hedonic affect). This hypothesis is relevant since the literature (Kahneman and Krueger 2006; Kahneman and Deaton 2010; Stone and Mackie 2014) distinguishes between evaluative well-being (life satisfaction) and feelings of happiness and joy etc. (hedonic affect), where the latter is more transient than life satisfaction which reflects the assessment of a person's overall happiness. The assumption is that the predictive power of hedonic happiness may have diminished more than that of evaluative well-being because of hedonic happiness' more transient nature. We use all the harmonized European Social Survey's six rounds for the fifteen European countries who participated in each and every survey round. Well-being functions are estimated for the years representing the three rounds before the crisis. Based on these regressions, well-being levels are predicted for the years representing the three rounds conducted during and after the crisis, e.g. out of sample predictions. For each country and year, a separate set of regressions are made for females and males. The results generally point to rather stable well-being functions and the predictive power is generally not affected by the crisis. But for some specific countries we do see significant deviations between actual and predicted well-being levels, particularly when the regression year and prediction year are far apart. These results can be interpreted as being consistent with the adaption hypothesis.

The next Section reviews the literature on economic crisis and subjective well-being. The third Section presents the macro-economic environment during the analysed period 2002-2012. The fourth Section presents the data set and definition of variables. The results are presented

in the fifth Section. The last Section summarizes and concludes the study.

### **Previous literature**

The validity, reliability, and application of well-being metrics is an important concern and has thus been questioned and discussed widely (Kahneman and Krueger 2006; Helliwell *et al.* 2010; Graham 2013). Using many of the same countries included in this study, Blanchflower and Oswald (2008a) find a negative correlation between hypertension and happiness thus lending some credibility to happiness as a proper subjective well-being measure. This study is among those concerned with the effects of economic change on subjective well-being. A notable early contribution to the research area is Easterlin (1974) who shows that within countries there is a positive correlation between income and happiness, while this correlation is not found between national per capita income and national happiness once income is above some (high) level. Unsurprisingly, Easterlin's counter intuitive findings have sparked much debate ever since and numerous similar applications using other data were conducted. Hagerty and Veenhoven (2003), and Stevenson and Wolfers (2008) reject the Easterlin Paradox, Easterlin *et al.* (2011) reaffirm it. Clark *et al.* (2012) do not reject it but on the other hand show happiness equalization due to rising income. By examining the selection of countries, years, income definition, and income level and economic growth, Graham *et al.* (2010) show why both sides in the Easterlin Paradox debate might be right. In response to GDP growth's possible lack of correlation with subjective well-being, Bartolini and Bilancini (2010) suggest sociability as an alternative predictor of SWB.

One question raised by the Easterlin Paradox is how economic crises affect happiness. According to Easterlin (2009) one could expect an asymmetry in macroeconomic effects such that a drop in income would not have the same (negative) magnitude subjective well-being effect as an increase in income since individuals do not adapt to lower income because of fixed aspirations (see Gudmundsdottir (2013) and Graham (2009) for a review of how subjective well-being is affected by the macroeconomic development). The effects of the economic crisis on children's well-being have been studied by Harper *et al.* (2011), and Harper and Jones (2011). Using European and American micro-data on individuals from the 1970s to the 1990s, they find a strong correlation

between macroeconomic variables and happiness (Di Tella *et al.* 2003). Although transition countries are not the focus here, it is worth noting that Easterlin (2009) and Inglehart *et al.* (2013) find unprecedented drops in subjective well-being due to macroeconomic and political changes during the transition period.

Although the present economic crisis began only a few years back a number of studies have already examined its impact on subjective well-being. Using an unusually detailed data set with daily (though weekly averages were applied in the analysis) subjective well-being questions, Chattopadhyay (2013) finds that the 2008-2009 economic crisis had profound effects on well-being in the USA, but it is also found that once people adjust to lower living standards, happiness levels adapt and recover. Gudmundsdottir (2013) found no major changes in the Icelandic population subgroup's happiness levels before and after the onset of the crisis, e.g. 2007 compared to 2009. This is despite the major negative impact of the crisis on Iceland's economy, which saw an 8% GDP reduction and an 8-fold increase in the unemployment rate. A study involving national happiness and national GDP per capita for fifteen European countries over two ESS rounds (2008 and 2010) found no significant effect of the crisis (Greve 2012). This study is in line with the latter in the sense that multiple European countries are analysed, but differs in the sense that a micro-perspective is taken and all six rounds of the ESS rounds are utilized, meaning up till 2012. The micro-perspective is also utilized in Gudmundsdottir's analysis. But whereas the reviewed studies focus on actual happiness levels, the focus here is on the predictability of well-being levels during and after the financial and economic crisis.

A number of studies model and simulate happiness using a regression approach. Bartolini *et al.* (2012) not only utilize a regression approach, but are also able to apply fixed effects estimations using German panel data, which enables them to make good predictions of 1996-2007 well-being. This is mainly explained by changes in income, demographics and social capital. Bartolini *et al.* (2013) employing a regression approach on American data finds that a sizable share of the decline in happiness is predicted by a lower degree of social connections and institutional confidence. Using data from many countries and years, Di Tella and MacCulloch (2008) found positive happiness effects of income level, the welfare state and life expectancy, and a negative effect of the number of working hours, environmental degradation, crime, openness to trade,

inflation and unemployment. In line with these studies, the present study also utilizes a regression approach, but with the aim of scrutinizing the well-being function's predictive power during and after the financial crisis.

### **European economies around the financial crisis**

The growth rate for the fifteen European economies included in this study was 2.9% (unweighted average) during the six years (2002-2007) (Table 1). The crisis started in 2008 and already that year growth fell to 0.8% but was still positive. In the four years following 2008, the growth rate was negative 0.2% and many countries were experiencing a recession. Unemployment shows a slightly different pattern, but ending up with a higher level post 2008 compared to 2008. Long-term unemployment (duration above twelve months) showed an increase in 2009-2012 compared to 2008. The poverty rates (poverty line 60% of median contemporaneous equivalised income) remained fairly stable throughout the period, e.g. only changed 0.2% points or less. Similarly, the largest change in the Gini index was an insignificant 0.4% points.

Apart from changes in real GDP growth and changes in unemployment, the distribution of incomes was fairly stable. The impact of the financial and economic crisis is thus clearly seen in the aggregate key indicators, although the development after 2008 does not point towards any huge effects. The larger effects become clearer when we look at more disaggregated national growth numbers for each year (Figure 1). First of all we see that all countries but one (Poland) experienced a decrease in GDP in 2009 compared to 2008. Also, we see that the unemployment rate increased significantly in 2009 compared to 2008 - from a record low of 6% to just above 8%. With a lag of one year - it takes time for short term unemployment to translate into long term unemployment - long term unemployment has increased markedly as well - from 28.1% in 2009 to 35.5% in 2010.

Poverty has remained at a high level since 2004. Similarly, the Gini coefficient has also been somewhat stable since 2009. It increased in 2008 and in 2011. Again, it is hard to see any major immediate impact of the 2008 financial melt-down on the distribution of economic resources.

Table 1. GDP growth, unemployment and income distribution. 2002-2012.

	GDP growth	Unemployment	Long-term unemployment	Poverty	Gini index
2002 - 2007	2.9	7.0	35.2	14.5	28.4
2008	0.8	6.0	30.9	14.7	28.6
2009 - 2012	-0.2	9.0	34.8	14.8	28.2

Notes: Unweighted averages for fifteen countries. Long term unemployment is the number of unemployed with a duration above 12 months as a percentage of the total number of unemployed. The 60 % of national median income threshold is used for poverty.

Source: Own calculations based on Eurostat (2014).

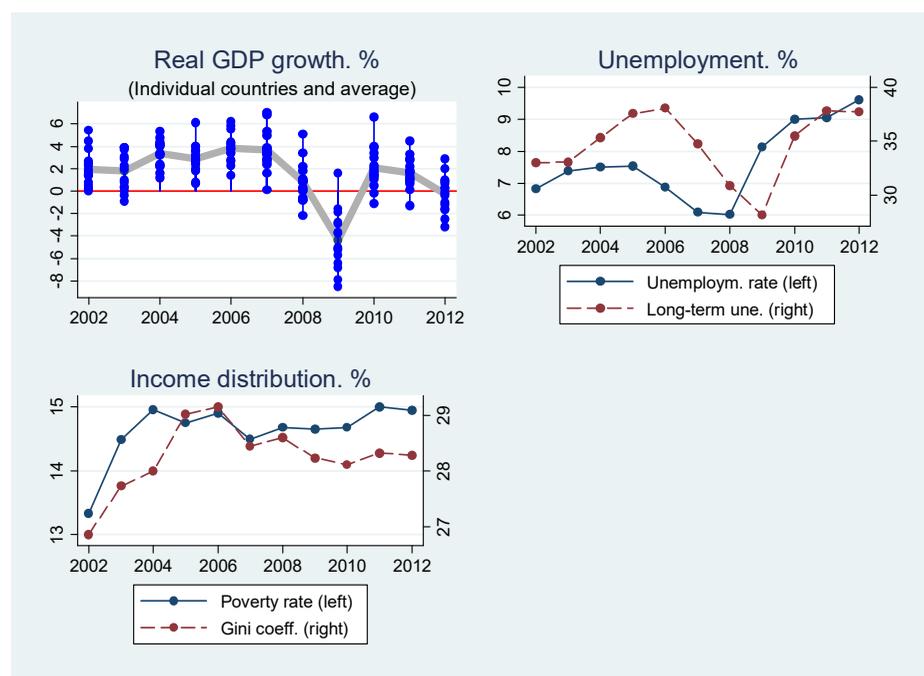


Fig. 1. Macro-economic development in fifteen European countries. 2002-2012.

But even Figure 1 may mask some more remarkable national movements around the time of the crisis. As an example we can look at best and worst performing countries in terms of GDP growth in 2009. Poland had a positive growth rate of close to 2% and Finland had a reduction in GDP

of 8.5%. Some of the main economic indicators for both economies are presented in figures A1 and A2 in the Appendix. Both countries have seen a very different development after 2008; Poland with a relatively lower increase in unemployment, and Finland with a huge decrease in inequality and to some extent in poverty in 2010. Poland was more characterized by stagnation, while Finland saw an outright recession.

### **Data and variables**

The individual level micro data applied covers all six rounds of the European Social Survey (ESS). The target population of the ESS is all national residents aged 15+, regardless of nationality or citizenship, but excluding the homeless and the institutional population. The ESS is a single-mode face-to-face survey. The six rounds represent every second year spanning the period from 2002 to 2012. Sixteen countries were surveyed in each of the six rounds of the ESS, although many more participated, but in less than six rounds. In the end we include fifteen countries and thus exclude France since it lacks the important data for subjective income for one round. The countries included are Belgium, Switzerland, Germany, Denmark, Spain, Finland, Great Britain, Hungary, Ireland, the Netherlands, Norway, Poland, Portugal, Sweden and Slovenia. A total of 173071 observations are initially available for analysis, but 678 of interviewed individuals did not report well-being levels, which reduces the sample size. A final further adjustment is needed in order to specify the final sample size, which depends on whether the survey recorded information regarding given characteristics. Education has the largest number of missing records (2018). Quite a few of these are actually not missing, but the number of years of education has been truncated at 25 years, and years above this level are excluded, which actually only affected 479 observations whose years in education was between 26 and 56 years. 26-56 years is far above a (reasonable) standard maximum number of years in education, which could be taken to be 21 years (basic schooling 10 years, high school 3 years, university 5 years, and Ph.D. 3 years). Other variables with missing values are (number of missing in parenthesis): income sufficiency (1584), crime (1170), religiosity (1128), age (644), socialization (219), household size (165), and health (90). Individuals with missing values for any of these variables are excluded from the analysis, which means the final sample size is 166160. On average 3.6% of observations are excluded (median

3.2%). The lowest reduction is observed for Norway (average 0.8% over the years and 0.6% in 2004). The largest reduction is seen for Spain with 6.6% for 2002-2012 and 12.7% in 2002). The largest effect is observed for people with more explicit political activity – their share is 45.7% of the population among the valid observations, but 32.2% among the excluded observations. Similarly, the percentage of individuals with children at home is 37.5% among valid observations, but 28.6% among excluded observations. Of course, since the share of excluded observations is very small, the difference in characteristics between valid observations and all observations is not at all large.

#### *The SWB measure*

The applied SWB measure relates to the question ‘Taking all things together, how happy would you say you are?’ The possible answers range from ‘Extremely unhappy’ (labelled 0) to ‘Extremely happy’ (labelled 10). The credibility of this SWB measure has been investigated by Blanchflower and Oswald (2008a).

For robustness purposes life satisfaction - which is a similarly important indicator within SWB analysis (Becchetti and Pelloni 2010) - is also used as a response variable for sensitivity analysis purposes. Although both SWB measures represent some dimensions of SWB, their correlation is far from perfect. Pooling all countries and survey rounds, the correlation coefficient between happiness and life satisfaction is 0.71. The average of correlation for each country and survey round (ninety samples) is 0.68 with a minimum of 0.52 (Portugal 2006) and a maximum of 0.76 (Ireland 2010). The correlation between the two SWB measures is thus not always high, but depends on country and survey round. It is hard to judge whether a correlation of 0.7 (roughly the average) or 0.76 (maximum) is high or not, but it does tell us that the two concepts to a notable degree measure different aspects of SWB.

#### *Definition of explanatory variables*

Summary statistics for the variables included in the analyses are displayed in Table A1 in the Appendix. For regression purposes we transformed some variables and also a square term was constructed for all cardinal variables in order capture non-linearity in regressions. Ordinal variables are here treated as cardinal.

Household size is taken from the question ‘Including yourself, how many people – including children – live here regularly as members of

this household?' Whether there are children in the household is based on 'Respondent has children living at home [...]'

People who are de facto married are defined from 'This question is about your legal marital status not about who you may or may not be living with. Which one of the descriptions on this card describes your legal marital status now?' In the four last survey rounds (2006, 2008, 2010 and 2012), the possible answers were extended to include a distinction between married and couples in a civil union, and thus people in a civil union, along with married ones, are classified as de facto married from 2006 and onwards.

Education is represented by the question 'About how many years of education have you completed, whether full-time or part-time? Please report these in full-time equivalents and include compulsory years of schooling', and thus indicates educational attainment through the number of years of schooling. People with schooling years exceeding 25 are excluded from the analysis since many years of schooling more likely represents an error or that people just have been spending a long time in the educational system without necessarily improving skills significantly. This top coding does not affect many persons.

Health is a subjective variable from the question 'How is your health in general? Would you say it is [...] very good, good, fair, bad, or, very bad?', e.g. using a 1-5 scale, where 5 is very good health and 1 is very bad health, which means the scale has been reversed compared to the questionnaire.

Sufficient income is on the 1-4 scale (also reversed) representing answers from 'Which of the descriptions on this card comes closest to how you feel about your household's income nowadays?' Possible answers are 'Living comfortably' (coded as 4), 'Coping', 'Finding it difficult', or 'Finding it very difficult' (coded as 1) on present income. Unfortunately we were not able to include the important objective income measure since it is not available in the ESS, although as of round 4 a decile indication of household income has been available.

Crime in the area is adduced from the question 'How safe do you – or would you - feel walking alone in this area after dark? Do – or would – you feel [...] very safe [1], safe [2], unsafe [3], or very unsafe? [4]'. Thus rather than actual crime, we use the perceived crime level.

Belonging to a discriminated group is a binary variable created from the yes/no question 'Would you describe yourself as being a member of a group that is discriminated against in this country?'

Socialization is a 7-level variable originating from the question ‘Using this card, how often do you meet socially with friends, relatives or work colleagues?’ 1 represents ‘Never’ and 7 represent ‘Every day’.

Religiosity is measured on the 0-10 scale (as is well-being) using the question ‘Regardless of whether you belong to a particular religion, how religious would you say you are? Please use this card’. 0 is ‘Not at all religious’ and 10 is ‘Very religious’.

Unemployment is measured by the question ‘Using this card, which of these descriptions applies to what you have been doing for the last 7 days? Select all that apply’. Answers with unemployment whether (‘unemployed and actively looking for a job’) or not (‘unemployed, wanting a job but not actively looking for a job’) looking for a job are both considered unemployed.

The political activism question is ‘There are different ways of trying to improve things in [country] or help prevent things from going wrong. During the last 12 months, have you done any of the following? Have you [...read out...]’. The created political activism variable is a binary 0/1 variable taking the value 1 if the person did at least one of the following activities: contacted a politician/government or local government official, worked in a political party or action group, worked in another organisation or association, worn or displayed a campaign badge/sticker, signed a petition, taken part in a lawful public demonstration, or boycotted certain products.

The satisfaction with the state of different institutions/affairs of the country is a composite variable defined as the sum of five scores/answers on the 0-10 scale regarding the economy, government, democracy, educational system, and health services using the following questions: ‘On the whole how satisfied are you with the present state of the economy in [country]?’ , ‘Now thinking about the [country] government, how satisfied are you with the way it is doing its job?’ , ‘And on the whole, how satisfied are you with the way democracy works in [country]?’ , ‘Now, using this card, please say what you think overall about the state of education in [country] nowadays?’ , and ‘Still using this card, please say what you think overall about the state of health services in [country] nowadays?’ . The total score is between 0 and 50 but this was transformed into the 0-100 scale.

The trust variable is created in a similar manner as the previous variable within the area of trust in people (three items) and trust in institutions (six items). The three people trust questions are: ‘Using this

card, generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people? Please tell me on a score of 0 to 10, where 0 means you can't be too careful and 10 means that most people can be trusted', 'Using this card, do you think that most people would try to take advantage of you if they got the chance, or would they try to be fair?', and 'Would you say that most of the time people try to be helpful or that they are mostly looking out for themselves?'. The question regarding six institutions is 'Using this card, please tell me on a score of 0-10 how much you personally trust each of the institutions I read out. 0 means you do not trust an institution at all, and 10 means you have complete trust. Firstly [...read out...] [country]'s parliament? [...] the legal system? [...] the police? [...] politicians? [...] Political parties? [...] The European Parliament? [...] the United Nations?' The total possible score is between 0 and 90, which is transformed into a 0-100 score.

### **Empirical strategy**

#### **Regressions**

The well-being function is estimated applying ordinary least squares regressions. A theoretically more obvious regression choice would be an ordered probit or logit model. But because assuming an ordinal or a cardinal well-being variable only makes a small difference in estimations (Ferrer-i-Carbonell and Frijters 2004), we here choose the OLS approach which is more straight forward and transparent in simulations. Regressions will be carried out for each country and for each of the years before the financial crisis. Furthermore, a separate set of regressions were made for females and males, see Huppert (2009), Dolan *et al.* (2008), and Helliwell (2007) on male-female well-being differentials. A stepwise procedure was applied such that only significant variables are kept for the simulation exercise – the removing significance level is 0.1 while the re-entry significance level is 0.05.

#### **Simulations**

In order to detect whether the financial crisis affected the happiness function's ability to predict happiness, we carried out a series of simulations applying the estimated parameters from 2002, 2004, and

2006 together with the values of the background variables presented in Table A1 in the Appendix. More formally, the predictions for a given country's male or females (subscripts omitted to simplify notation) in a given year is:

$$h_t^r = \beta_r X_t' \quad (1)$$

where  $\beta_r$  is a vector of estimated regression parameters based on data from year  $r$ ,  $r=\{2002, 2004, 2006\}$ , and  $X_t'$  is the average of characteristics in year  $t$ ,  $t=\{2002, 2004, 2006, 2008, 2010, 2012\}$ . The predicted happiness level in year  $t$  is  $h_t^r$  when using regression parameters from year  $r$ . The predicted and actual happiness levels are the same when regression parameters and population characteristics are from the same year, e.g.  $h_t^r = h_t$  when  $r=t$ . For non-regression years ( $r \neq t$ ), all predictions are out of sample predictions, which to our knowledge has not been done before in the happiness literature.

## Results

### Regressions

A total of ninety regression functions are estimated. Many estimated parameters are significant and very often have the expected signs. The average  $R^2$  is 0.25; 0.260 for male regressions and 0.243 for female regressions. Lowest  $R^2$  is observed for the Netherlands, Norway, Belgium, Denmark and Sweden, where the level is 0.155 - 0.189; these are all female regressions. Highest  $R^2$  (0.344 – 0.363) is seen for Sweden, Hungary (both males and females), Poland and Slovenia; there is no particular female bias at the top. The largest  $R^2$  difference between males and females is 0.174 in men's favour (Sweden 2006), while the largest one in women's favour is 0.102 (Portugal 2006). This illustrates the necessity of separate gender specific regressions.

To illustrate specific estimated regression coefficients we present the regressions for 2006 for countries with low, nearly average, and high  $R^2$ , in Table A2 in the Appendix. When both the linear and square age terms are significant (females in the Netherlands, and males in Sweden), we see the expected pattern where happiness first is reduced with increasing age, and after a certain point increases with age, e.g. we see a U-shaped pattern since we are controlling for life circumstances (Easterlin 2006;

Blanchflower and Oswald 2008b). Living with a partner is significant in all the regressions and with the expected positive sign; interestingly the partner effect is larger for females than for males. When significant, crime (Irish males) and belonging to a discriminated population subgroup (Ireland, Dutch females) has the expected negative effect on happiness. Education's effect varies a lot, but this is an effect which is not theoretically well-determined. Subjective health is significant in all regressions and with the expected negative sign. Significant family size terms always have a positive linear term and negative quadratic term; we see a hill shaped pattern, e.g. at low levels of family size, increasing the family size increases happiness, but beyond some point, happiness is reduced with family size. The first effect could represent the positive effect of socialization opportunities (up-hill), while the second effect could be due to over-crowding in the house (down-hill). Sufficient income positively affects happiness. The effect of religiosity and satisfaction with the state of institutions and other affairs is more mixed. Religion has been shown to have a positive effect on SWB but through people's social networks in their congregations (Lim and Putnam 2010). Socialization has the expected positive effect, see Becchetti *et al.* (2012) who finds a genuine causal effect of social leisure using panel data, and Bruni and Stanca (2008) who shows how relational goods' consumption effect is crowded-out by TV viewing time. Trust is not significant in many instances, but affects happiness positively when significant. Unemployment and happiness are negatively correlated as expected.

### Predictions

In Figure 2 we display the simulations based on the specification in (1). The thick solid line represents actual happiness. The dashed line represents happiness simulations based on 2002 regressions. The dot-dash-dot lines are simulations based on 2004 regressions, and finally the thick solid line is the happiness simulation based on the latest available survey from 2006 before the outbreak of the financial crisis.

We see that all three simulations (the three non-thick curves) are well-correlated. The correlation coefficient for 2008, 2010 and 2012 predictions is 0.96 between 2002 and 2004 simulations, 0.94 between 2002 and 2006 simulations, and finally 0.98 between 2004 and 2006 simulations. The correlation between actual happiness and respectively 2002, 2004, and 2006 predictions is 0.94, 0.96, and 0.97 respectively.

Thus, the correlation is higher the closer the simulation year is to the regression year. Generally, we would expect that simulation errors  $e_t^r = h_t^r - h_t$  are numerically larger the further apart are the regression ( $r$ ) and simulation years ( $t$ ). The average numerical (absolute) prediction error for 2008-2012 is 0.186, 0.142, and 0.136 for the three simulation series (2002, 2004 and 2006), e.g. the prediction error increases the older the data/regressions that is behind the simulations.

The largest prediction error for 2008 (using 2006 regressions) is seen for Hungary with males/females' happiness overestimated 0.24/0.27 happiness points. For Portugal, there is an underestimation for males/females of 0.18/0.19. The largest overestimation for 2010 (using 2006 regressions) occurs for Irish males/females (0.23/0.24), while the largest underestimation of happiness is seen for Finnish males (0.33). 2012 predictions based on 2006 regression parameters shows largest overestimation for Swedish females (0.23) and largest underestimation for Spanish males/females (0.36/0.31).

Using the 2006 predictions, we get an average prediction error of -0.029 (median -0.056) in 2008. In 2010, this error increases in magnitude to -0.092 (median -0.092). In 2012, there is a further but small increase in error to -0.105 (median -0.124). This means that happiness is generally underestimated in 2008 and more so in 2010 and 2012. Given the regression function in 2006 and given the background characteristics of the population in 2008, 2010 and 2012, actual happiness is higher than we would have expected for 2008, 2010 and 2012. E.g. the observed characteristics suggest lower happiness levels than observed in 2008, 2010 and 2012. One interpretation of this is that the crisis may as such have reduced happiness in terms of the characteristics, but we nevertheless see a higher level of actual happiness because people's happiness level has begun returning to some usual level of the individual, i.e. people got used to the crisis (the adaption hypothesis). Another interpretation is that the crisis beginning in 2008 has not lasted long enough to affect happiness in 2010 or 2012. But this argument goes against the previously mentioned result indicating that characteristics have changed such that happiness should have been lower than observed. It would also go against the fact that the transmission lags in the case of happiness should not be long, since the answer to happiness questions can be immediately affected by for instance negative crisis evaluations and future prospects signalled by experts or politicians. A third interpretation or explanation is that, although economic growth was

reduced after the crisis, the distribution of incomes was not generally adversely affected (Table 1), which also means happiness may not have been heavily negatively affected since the fraction of people with low income (the poor) did not increase. A more technical aspect is that annual data are used here, which makes it harder to detect any happiness difference over time since they might be averaged out when using an annual measure rather than when using for example a weekly happiness measure as Graham *et al.* (2010) does. Finally, it should also be pointed out that we are here focusing on the happiness function's predictive power rather than happiness levels per se, and the results here indicate that the crisis did not affect how well we are able to predict happiness, e.g. the crisis may or may not have affected happiness levels, but it seems not to have affected how well we are able to predict happiness levels.

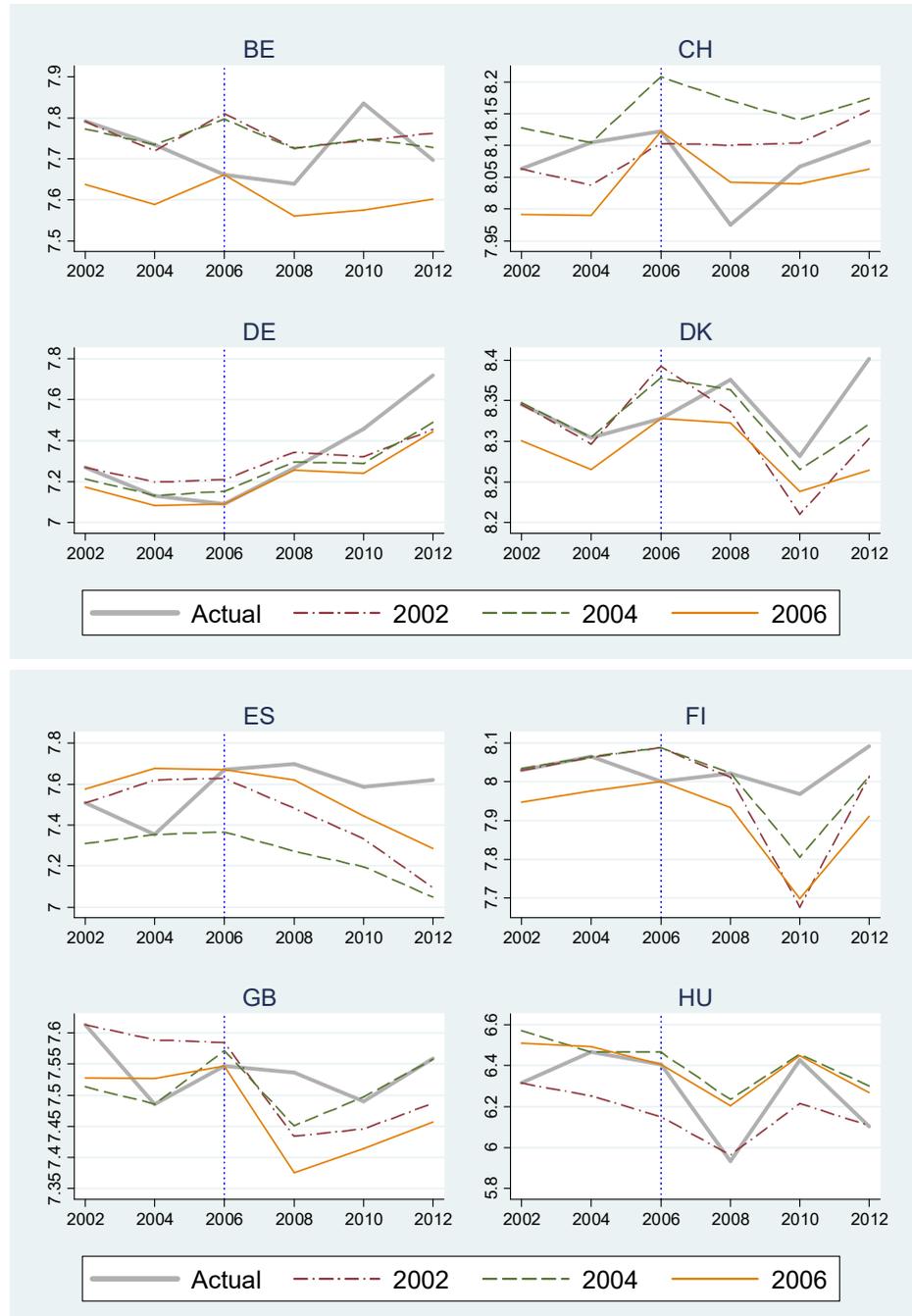
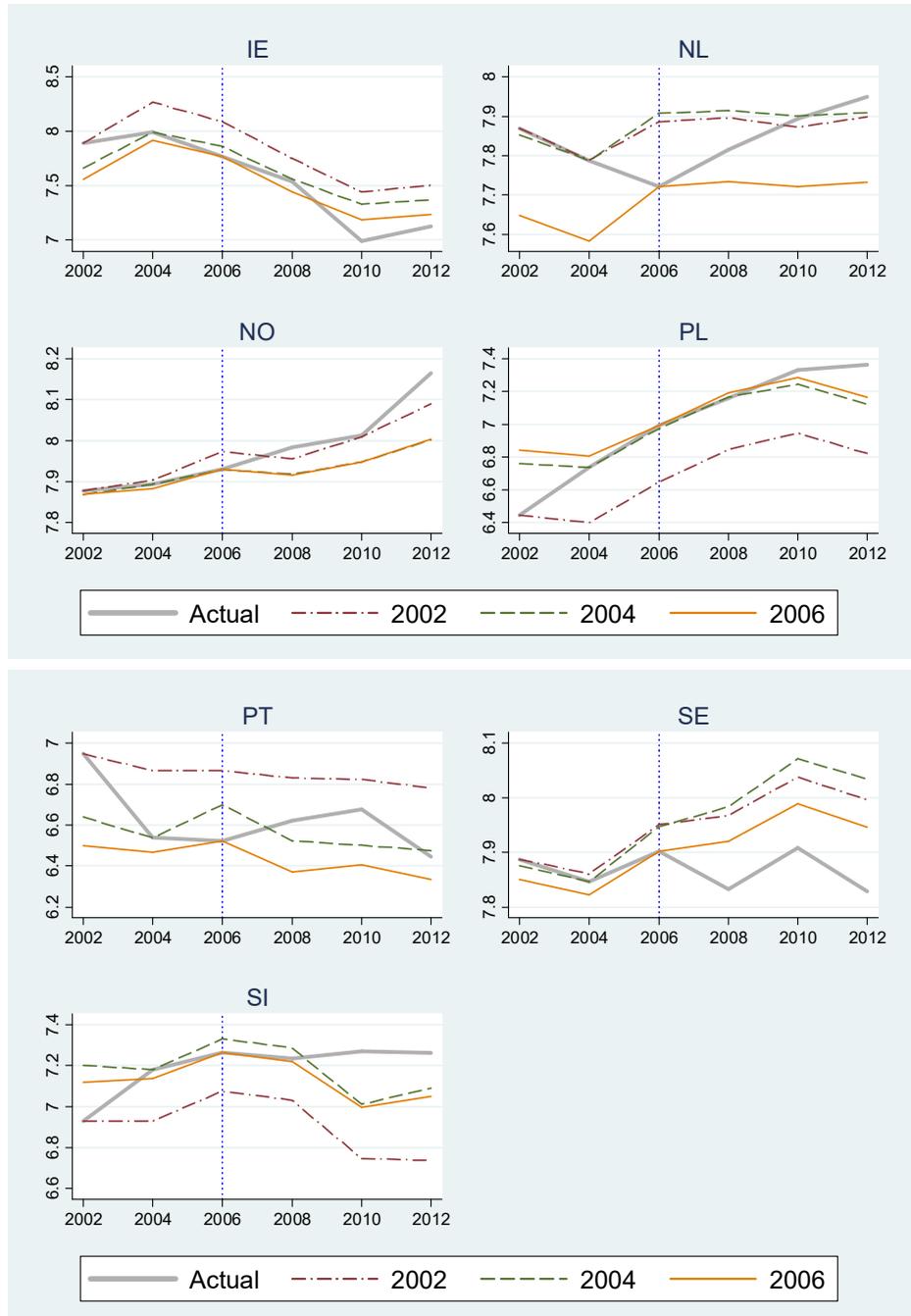


Fig. 2. Actual and predicted happiness based on 2002, 2004 and 2006 regressions.



(Fig. 2 continued)

Although, the underestimation of happiness in the prediction period 2008, 2010 and 2012 is documented above, we still need to test whether the predicted and actual happiness levels are significantly different. For this purpose, the gender specific predictions based on the 2006 regressions have been pooled into national 95% confidence intervals for simulated happiness levels displayed in Figure 3 (first sign is actual and second sign is predicted happiness levels for a given country). Generally, simulated and actual happiness levels are close. But a deeper inspection of the 95% confidence intervals reveals that some simulated levels are significantly different from the observed actual happiness levels, e.g. the confidence intervals does not simultaneously encompass the point estimates. This more often is the case in 2012 or 2010 simulations compared to 2008 simulations. Going back to the gender specific simulations, we see that some 70% of predicted happiness levels are not significantly (5% significance level) different from actual happiness levels (Table 2). Particularly good predictive power of the happiness functions are seen for Denmark, Switzerland and Norway, where 92% of prediction discrepancies are within the margin of error, and Sweden (females) follows suit with only two errors over the whole period. Particularly bad predictive power is seen for Portugal, where only two predictions were correct, e.g. within the error margin. Overall we see that the fraction of correct predictions is reduced the further away we are from the regression year 2006. Specifically for 2008, the year of the beginning of the financial crisis, 87% of predictions were correct. Two years into the crisis, in 2010, this fraction was reduced to 53%. A further, but small, reduction in predictive power was seen in 2012, where the correct fraction was down at 50%. The lower predictive power in 2010 and 2012 seems not to be related to the crisis rather it is due to the fact that we are moving further away from the regression year 2006.

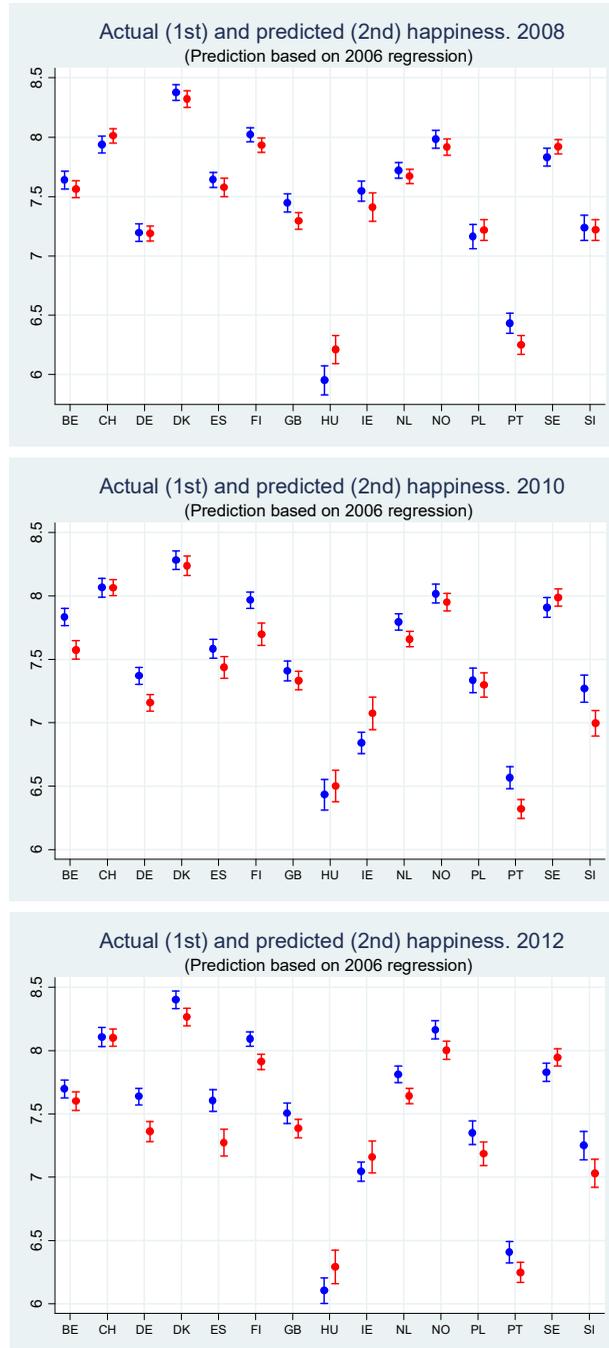


Fig. 3. Confidence interval of actual and predicted happiness. 2008-2012.

Table 2. Fraction of simulations not significantly different from actual happiness. Significance level  $\alpha=0.05$ . Regression using 2006 data.

	2002	2004	2006	2008	2010	2012	All
BE	0.5	0.5	1	1	0	1	0.67
CH	1	0.5	1	1	1	1	0.92
DE	1	0.5	1	1	0	0	0.58
DK	1	1	1	1	1	0.5	0.92
ES	0.5	0	1	1	0.5	0	0.50
FI	1	1	1	1	0	0.5	0.75
GB	0.5	1	1	0.5	1	0.5	0.75
HU	0.5	1	1	0.5	1	0.5	0.75
IE	0	1	1	1	0.5	1	0.75
NL	0	0	1	1	0.5	0	0.42
NO	1	1	1	1	1	0.5	0.92
PL	0	1	1	1	1	0.5	0.75
PT	0	0.5	1	0	0	0.5	0.33
SE	1	1	1	1	0.5	0.5	0.83
SI	0.5	1	1	1	0	0.5	0.67
All	0.57	0.73	1	0.87	0.53	0.5	0.70

Note: Separate simulations for males and females for each country and each year. Simulations based on regressions including country and gender only as dummies are available from the author.

Thus, going in the other direction, e.g. back in time, we see that the predictions two years before 2006 are better than four years before 2006 (73% and 57% correct predictions respectively); in fact the predictions during the crisis are (slightly) better than before the crisis (87% in 2008 compared to 73% in 2004 - both years 2004 and 2008 are two years away from the regression year 2006). In Table 2 we have applied a 5 % significance level. If we instead apply a 1% significance level (available from the author) the number of correct predictions increases markedly to 100% in 2008, 73% in 2010 and to 67% in 2012. And, we still observe that predictions during/after the crisis (2008 and 2010) are not worse than before the crisis (2002 and 2004).

### Southern European countries

In a European context, Southern European countries like Italy, Greece, Portugal and Spain are particularly interesting since they experienced more profound, including more violent, reactions to the aftermath of the crisis. Helliwell *et al.* (2013) finds a significant happiness decrease from 2005-07 to 2010-12 in Portugal, Italy, Spain and Greece, which is partially attributed to the crisis and (the following) higher unemployment. Italy and Greece are not included in our study because they were not surveyed in all six ESS rounds. Portugal and Spain on the other hand are included such that the predictive success of their happiness functions can be evaluated. Regarding Portugal, we see that it has the fewest correct predictions among all countries during 2008, 2010 and 2012. But we also see that this seems not to be a consequence of the crisis since Portugal also has a bad track record for the two rounds (2002 and 2004) before 2006. For Spain, we actually see a better performance after than before the crisis.

### Sensitivity analysis: Life satisfaction

As discussed in the first section we could hypothesize that life satisfaction's predictive power is higher than that of happiness since the latter (happiness and joy etc.) is more transient compared to the former (evaluative well-being). To look into this hypothesis we run a similar analysis as the above but with life satisfaction as the subjective well-being measure instead of happiness. The fraction of correct predictions using life satisfaction is displayed in Table 3. We see that the above main results are almost insensitive to applying another well-being measure. There are only minor differences, and thus we get qualitatively the same results as for happiness. The predictive power using life satisfaction is slightly lower, although the coefficient of determination  $R^2$  for the regressions is a little higher (+0.03 on average). But we still see that prediction errors in crisis years were not any higher than in years before the crisis. The correlation between results in Table 2 and Table 3 is 0.75, which supports the conclusion about qualitatively same results applying happiness and life satisfaction as the well-being measure. The transientness of happiness thus does not seem to make it harder to predict compared to life satisfaction, which goes against the expected.

Table 3. Fraction of simulations not significantly different from actual life satisfaction. Significance level  $\alpha=0.05$ . Regression using 2006 data.

	2002	2004	2006	2008	2010	2012	All
BE	0.5	0.5	1	1	0	1	0.67
CH	1	1	1	1	1	1	1
DE	1	1	1	0.5	0	0	0.58
DK	1	0.5	1	1	1	0	0.75
ES	0	0	1	0.5	0.5	1	0.50
FI	1	1	1	0.5	0.5	0	0.67
GB	0.5	1	1	1	1	0.5	0.83
HU	0.5	1	1	1	0.5	1	0.83
IE	0	1	1	1	1	1	0.83
NL	0	0	1	1	0	0	0.33
NO	1	1	1	0.5	0.5	0.5	0.75
PL	0	1	1	1	1	0.5	0.75
PT	0	0	1	0	0	0	0.17
SE	1	0.5	1	1	1	1	0.92
SI	0.5	1	1	1	0	0	0.58
All	0.53	0.70	1	0.80	0.53	0.50	0.68

Note: Separate simulations for males and females for each country and each year. Simulations based on regressions including country and gender only as dummies are available from the author.

### Robustness of results

The specificity of the results in this section is a relevant issue, since it could be that the observed insensitivity of subjective well-being to the financial crisis merely reflects the specific applied data, which then means that application of other data could produce sensitivity. While this is a potential problem, it is worth noting that the insensitivity pattern is recorded using many countries with quite differential economic, cultural and welfare state structures, which is one indication of rather robust results. The application of life satisfaction can also be interpreted as a robustness analysis, in which we again discovered insensitivity applying a different subjective well-being measure. Nevertheless, the application of other data would be relevant to either confirm or question the robustness of the results, although it is hard to see which datasets, with the same or more comprehensive structure than the ESS, are readily available to the research community.

## Summary and conclusion

The three first rounds of the European Social Survey of fifteen countries are used to model happiness using demographic and other variables as explanatory variables. Separate models are estimated for males and females for each of the three years. Many explanatory variables have significant effects on happiness. The average explanatory power of the regressions is around 0.25. Generally, the regression models underestimate happiness in 2008 and more so in 2010 and 2012, e.g. actual happiness turned out to be a little higher than expected given explanatory variables. Thus, although explanatory variables changed such that lower happiness should be expected in post crisis years (2008, 2010 and 2012) actual observed happiness was often higher. Using the 2006 regression, 87% of predictions in 2008 were correct, while this fraction was lower in post-crisis years 2010 (53%) and 2012 (50%) as expected. This success rate could indicate crisis effects, but the prediction success in pre-crisis years 2002 (57%) and 2004 (73%) is quite similar. Although happiness was generally slightly underestimated, the fraction of correct happiness predictions was not worse than in other years - in fact the predictive power of the happiness function was slightly better during pooled post-crisis years 2008-2010 compared to pooled pre-crisis years 2002-2004. The fact that happiness in Europe has not been harder to predict despite the worst economic crises since the 1930s seems to be in line with the adaption hypothesis. This notable insensitivity to the present crisis could be a European phenomenon and it remains to be seen whether using other data for other countries and other years might alter this conclusion.

## References

- Bartolini, S., & Bilancini, E. (2010). If Not Only GDP, What Else? Using Relational Goods to Predict the Trends of Subjective Well-Being. *International Review of Economics*, 57(2), 199-213.
- Bartolini, S., Bilancini, E. & Pugno, M. (2013). Did the Decline in Social Connections Depress Americans' Happiness?. *Social Indicators Research*, 110, 1033–1059.

- Bartolini, S., Bilancini, E. & Sarracino, F. (2012). Predicting the Trend of Well-Being in Germany: How Much Do Comparisons, Adaptation and Sociability Matter?. *Social Indicators Research*, 114, 169–191.
- Becchetti, L., & Pelloni, A. (2010). What Are We Learning from the Life Satisfaction Literature?. *International Review of Economics*, 60(2), 113-155.
- Becchetti, L., Ricca, E. G. & Pelloni, A. (2012). The Relationship Between Social Leisure and Life Satisfaction: Causality and Policy Implications. *Social Indicators Research*, 108, 453–490.
- Blanchflower, D. G. & Oswald, A. J. (2008a). Hypertension and Happiness across Nations. *Journal of Health Economics*, 27(2), 218-233.
- Blanchflower, D. G. & Oswald, A. J. (2008b). Is well-being U-shaped over the life cycle? *Social Science & Medicine*, 66(8), 1733-1749.
- Bruni, L. & Stanca, L. (2008). Watching alone: Relational goods, television and happiness. *Journal of Economic Behavior & Organization*, 65, 506–528.
- Clark, A. E., Flèche, S., & Claudia, S. (2012). *The Great Happiness Moderation*. Working Paper N° 2012 – 28. Paris School of Economics.
- Chattopadhyay, S. (2013). *Does the Dow get you down? The US economic crisis and subjective well-being*. In “The Financial Crisis, Subjective Well-Being, and Vulnerability: Three essays”, Ph.D. dissertation, University of Maryland.
- Di Tella, R. & MacCulloch, R. (2008). Gross national happiness as an answer to the Easterlin Paradox?. *Journal of Development Economics*, 86, 22–42.
- Dolan, P., Peasgood, T., & White, M. (2008). Do we really know what makes us happy? A review of the economic literature on the factors associated with subjective well-being. *Journal of Economic Psychology*, 29, 94–122.
- Easterlin, R. A. (2006). Life Cycle Happiness and Its Sources: Intersections of Psychology, Economics, and Demography. *Journal of Economic Psychology*, 27(4), 463-482.
- Easterlin, R. A. (2009). Lost in Transition: Life Satisfaction on the Road to Capitalism. *Journal of Economic Behavior & Organization*, 71(2), 130-145.

- Easterlin, R. A., McVey, L. A., Switek, M., Sawangfa, O., & Zweig, J. S. (2011). *The Happiness-Income Paradox Revisited*. IZA DP No. 5799. Discussion Paper Series.
- Ferrer-i-Carbonell, A. & Frijters, P. (2004). How Important is Methodology for the Estimates of the Determinants of Happiness? *Economic Journal*, 114(497), 641-659.
- Graham, C. (2009). *Happiness Around the World: The Paradox of Happy Peasants and Miserable Millionaires*. Oxford University Press.
- Graham, C. (2011). *The Pursuit of Happiness: An Economy of Well-Being*. Washington, D.C.: The Brookings Institution Press.
- Graham, C., Chattopadhyay, S., & Picon, M. (2010). *The Easterlin and Other Paradoxes: Why Both Sides of the Debate May Be Correct*. In E. Diener, D. Kahneman & J. Helliwell (Eds.), *International Differences in Well-Being* (pp. 247-290). Oxford: Oxford University Press.
- Greve, B. (2010). *Happiness and Social Policy in Denmark*. In B. Greve (Ed.), *Happiness and Social Policy in Europe* (pp. 136-144). Cheltham: Edward Elgar.
- Gudmundsdottir, D. G. (2013). The Impact of Economic Crisis on Happiness. *Social Indicators Research*, 110(3), pp. 1083-1101.
- Hagerty, M. R. & Veenhoven, R. (2003). Wealth and Happiness Revisited – Growing National Income Does Go with Greater Happiness. *Social Indicators Research*, 64, 1 – 27.
- Harper, C, & Jones, N. (2011). Impacts of Economic Crises on Child Well-being. *Development Policy Review*, 29 (5), 511-526.
- Harper, C., Jones, N., Perezniето, P., & McKay, A. (2011). Promoting Children's Well-being: Policy Lessons from Past and Present Economic Crises. *Development Policy Review*, 29 (5), 621-641.
- Helliwell, J. F. (2007). Well-being and social capital: Does suicide pose a puzzle? *Social Indicators Research*, 81, 455–496.
- Helliwell, J. F., Barrington-Leigh, C. P., Harris, A., & Huang, H. (2010). *International Evidence on the Social Context of Well-Being*. In E. Diener, D. Kahneman & J. Helliwell (Eds.), *International Differences in Well-Being* (pp. 291-327). Oxford: Oxford University Press.
- Helliwell, J., Layard, R., & Sachs, J. (2013). *World Happiness Report 2013*. UN SDSN (United Nations Sustainable Development Solutions Network SDSN).

M. Azhar Hussain 2015. Predicting Well-Being in Europe? The Effect of the Financial Crisis. *Eastern European Business and Economics Journal* 1(2): 2-31.

---

- Huppert, F. A. (2009). Psychological well-being: Evidence regarding its causes and consequences. *Applied Psychology: Health and Well-being*, 1(2), 137–164.
- Inglehart, R., Foa, R., Ponarin, E., & Welzel, C. (2013). *Understanding the Russian Malaise: The Collapse and Recovery of Subjective Well-Being in Post-Communist Russia*. National Research University Higher School of Economics WP BRP 32/SOC/2013.
- Kahneman, D., & Krueger, A. B. (2006). Developments in the Measurement of Subjective Well-Being. *Journal of Economic Perspectives*, 20(1), 3-24.
- Lima, C. & Putnam, R. D. (2010). Religion, Social Networks, and Life Satisfaction. *American Sociological Review*, 75(6), 914–933.
- Stevenson, B., & Wolfers, J. (2008). Economic Growth and Subjective Well-Being: Reassessing the Easterlin Paradox. *Brookings Papers on Economic Activity*, Spring 2008, 1-87.

## Appendix

Table A1. Summary statistics. All countries. N=166,160. 2002-2012.

	Mean	Std. Dev.	Min	Max
Happiness	7.48	1.857	0	10
Age	47.61	18.405	14	99
Children (0/1)	0.38	0.484	0	1
Household size	2.74	1.415	1	15
De facto married (0/1)	0.52	0.499	0	1
Health	3.82	0.903	1	5
Discriminated (0/1)	0.06	0.235	0	1
Income	3.10	0.822	1	4
Unemployed (0/1)	0.06	0.243	0	1
Education	12.19	4.145	0	25
Socialization	5.03	1.548	1	7
Religiosity	4.70	2.921	0	10
Non-parliamentary activism (0/1)	0.46	0.498	0	1
Crime	1.97	0.774	1	4
State of different institutions	50.33	18.791	0	100
Trust	50.27	16.819	0	100
Year 2002	0.17	0.375	0	1
Year 2004	0.16	0.371	0	1
Year 2006	0.16	0.370	0	1
Year 2008	0.17	0.374	0	1
Year 2010	0.16	0.370	0	1
Year 2012	0.17	0.377	0	1

Note: See text for definition of each variable

Source: Own calculations based on the ESS rounds 1-6.

Table A2. Regressions for selected countries. 2006.

	Ireland		Netherlands		Sweden	
	Males	Females	Males	Females	Males	Females
Age			0	-0.043**	-0.030*	
Age sq/100	0.010**		0.007*	0.039**	0.033**	
De facto married (0/1)	0.415***	0.458***	0.275*	0.467***	0.329**	0.410***
Crime	0.267***				0.502	
Crime sq./10					-1.295	
Discriminated (0/1)	-0.862**	1.107***		-0.421**		
Education	-0.037*	-0.03		-0.095		
Educ sq./100				0.339	-0.124**	-0.156**
Health	0.617***	0.402***	0.380***	0.263***	0.717***	0.364***
Household size			0.516**		0.316***	0.378*
HH size sq/10			-0.731**		-0.362**	-0.575*
Income	0.261**	1.868***	1.097**		0.383***	1.259**
Income sq./10		-2.251**	-1.391*	0.257**		-1.545*
Religiosity		-0.239**	-0.029	-0.116*		-0.127*
Religio. Sq./100	0.776**	3.157***	0	1.463**	0.387*	1.482**
Socialization	0.175***	0.189***	0.140***			0.121***
Socia. Sq/100			0	0.692*	0.658	
States satisfaction		-0.033*	0	0.017***		-0.042**
States sat. sq.	0.000***	0.000**	0.000***		0.000*	0.000**
Trust					0.012***	0.014***
Trust sq/100		0.008				
Unemployed (0/1)	-0.763**		-0.668**		-1.244***	
Constant	3.126***	2.172*	1.732*	6.763***	2.079***	3.204***
$R^2$	0.288	0.242	0.239	0.156	0.363	0.19
Adjusted $R^2$	0.277	0.231	0.229	0.145	0.352	0.179
Sample size	733	846	841	992	925	953

Note: Trust, socialization and satisfaction with states of different institutions are transformed into percentage of maximum attainable value in Table A1. Regressions for all other countries and years are available from the author. Applying survey weights does not alter main results, but these calculations are also available from the author.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

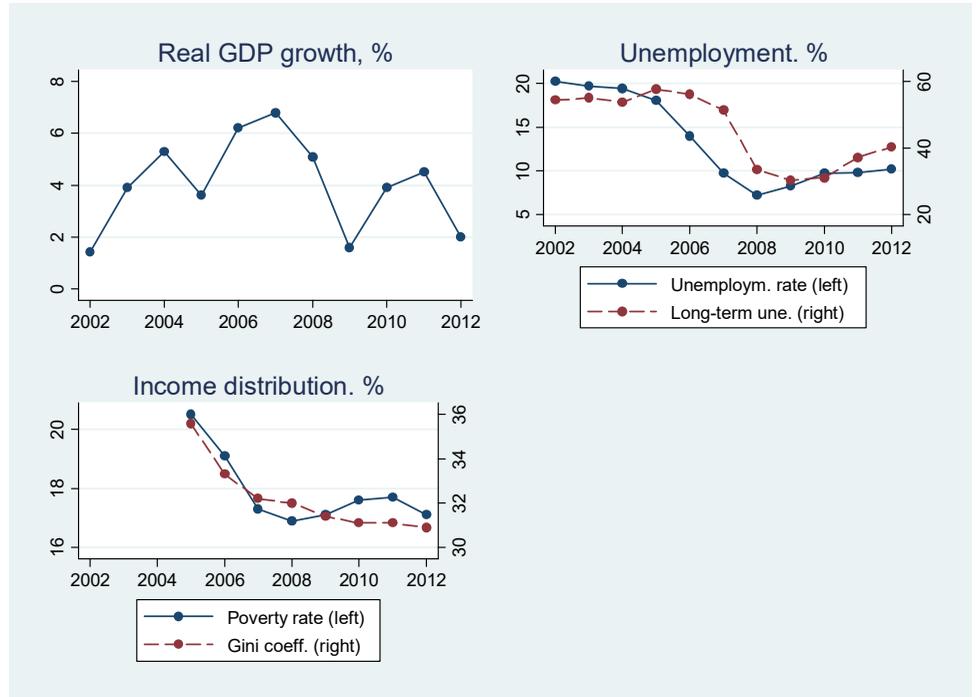


Fig. A1. Macro-economic development in Poland.

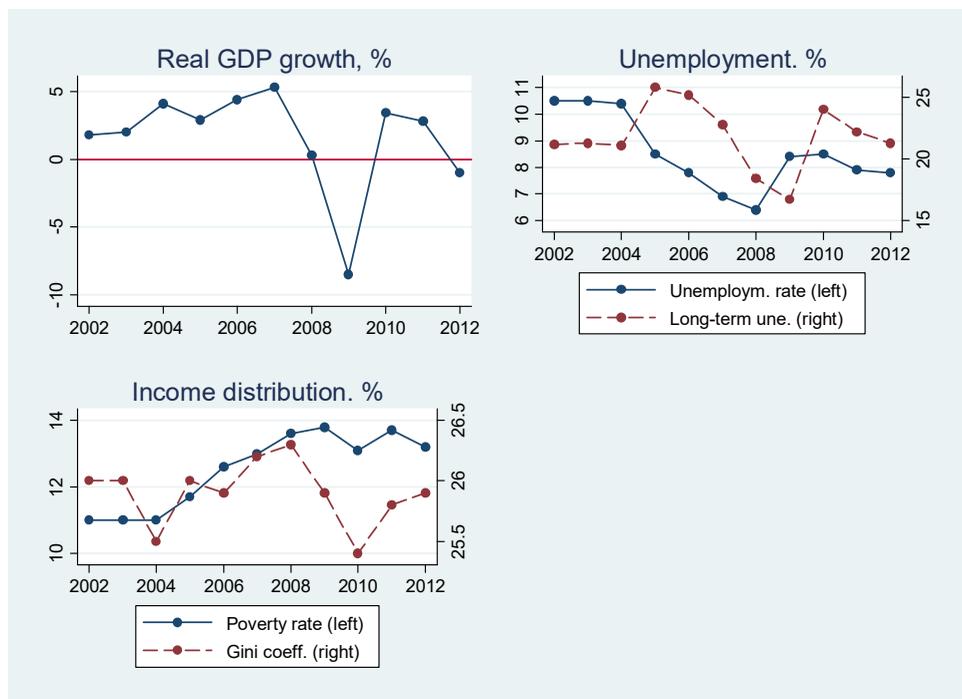


Fig. A2. Macro-economic development in Finland.