ThE Papers

Dpto. Teoría e Historia Económica
Universidad de Granada

Working Paper n. 17/05

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October 24, 2017

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Abstract

Using data from the German Socio-Economic Panel, we study the evolution of subjective well-being from 1999 to 2014. More specifically, we analyze the main determinants of changes in subjective well-being once we determine the main factors of predicted changes of subjective well-being. Moreover, we test whether these determinants exert a differential effect when considering ups and downs in subjective well-being. Our main findings indicate that, social, cultural and psychological capital predict the largest changes in subjective well-being. We also observe that absolute income has effects on changes in subjective well-being, but is not relevant at level. Additionally, adaptation is always complete except when we focus on specific changes, that is, when we distinguish between ups and downs in subjective well-being, adaptation affects the positive changes. In general, our evidence shows that all factors except bridging social capital, worries and risk have a different effect on the level and changes in subjective well-being.

Keywords: subjective well-being evolution; social comparisons; social capital; cultural capital; psychological capital.

Acknowledgements:

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1. Introduction

The growing interest in the study of subjective well-being and its determinants relies on the fact that it delivers new ways to analyze individual utility and preferences, offers a complementary approach to traditional measures of welfare and provides new tools for the design and evaluation of public policies (Kahneman and Sugden, 2005; Stutzer and Frey, 2010; Stiglitz, et al., 2011; Dolan and Metcalfe, 2012; Frey and Stutzer, 2017). Additionally, subjective well-being allows us to analyze poverty and inequality from a subjective perspective (Ferrer-i-Carbonell and Ramos, 2014; Posel and Rogan, 2016).

Specifically, indicators of subjective well-being offer a complementary approach by providing information on non-material aspects of people's well-being, such as the influence of social relations, autonomy and self-determination (Diener and Suh, 1997; Bruni and Porta, 2007; Helliwell, 2008; Stutzer and Frey, 2010). Nowadays, the multidimensional character of well-being is widely accepted. Hence, both the objective circumstances in which people live and the subjective assessment that they make of their lives influence the determination of well-being (McGillivray, 2007; Stiglitz et al., 2011; Muffels and Headey, 2013; OECD, 2013). Moreover, as several studies have pointed out, subjective well-being reported by people in surveys provides information to evaluate the goods that do not have a quoted price in the market, such as the consequences of pollution or lives saved in accidents (see, for instance, Van Praag and Baarsma, 2005; Luechinger, 2009; Kountouris and Remoundou, 2011).

In addition, given that people dynamically adapt their ambitions and that the gap between these aspirations and their actual achievements determines subjective well-being (see Stutzer, 2004 for a revision), their satisfaction over time can change in short periods. Thus, as Maggino and Facioni (2017) pointed out, it is relevant to study the determinants of subjective well-being from a dynamic approach. This involves studying not only the evolution of the main indicators of subjective well-being, but also the determinants and explanatory power of such changes over time, which have been scarcely studied in the related literature. In this line, some papers deal with the importance of studying changes in subjective well-being over time and its association with income and other factors (see Bjornskov et al., 2008; Pedersen and Schmidt, 2011; Bartolini and Sarracino, 2014).

Therefore, we analyze how changes in different characteristics or factors are associated with general changes in subjective well-being (i.e., any type of variation in subjective well-

being) and with specific changes, meaning that we differentiate between positive and negative changes in subjective well-being. To achieve these goals, we use data from the German Socio-Economic Panel (GSOEP) for the period 1999-2014. Furthermore, the longitudinal structure of the GSOEP allows us to the study the evolution of subjective well-being and its determinants.

Our main findings show that, first, it is insufficient to consider economic resources plus socio-economic characteristics for predicting general changes in subjective well-being and that social, cultural and psychological capital turn out to be relevant for these predicted changes. Secondly, we observe that some specific determinants related to income at level do not exhibit the same pattern when changes in subjective well-being are considered. The usual result in the subjective well-being literature is that relative income is what matters to determine subjective well-being and that adaptation is complete. However, our results show that these effects no longer hold when changes are considered. In particular, absolute income affects general changes in subjective well-being and exerts a larger effect than relative income. Moreover, we also find that adaptation is not complete when we disentangle positive and negative changes. Particularly, the larger the income an individual has had in the past, the higher the likelihood of a positive change in subjective well-being. Additionally, we highlight some other results related to changes in subjective well-being. We observe that the likelihood of negative changes in subjective well-being decreases when either the individual feels less deprivation, attaches more importance to social goals or feels distrust. However, these variables do not affect the probability of positive changes. Finally, although economic goals affect both the level and changes in subjective well-being, the effects go in the opposite direction. While giving more importance to economic goals implies a lower level of subjective well-being, it also implies a lower (higher) probability of a decrease (increase) in subjective well-being.

The remainder of this work is structured as follows. The literature on subjective well-being is reviewed in section 2 focusing on its variability over time and determinants. The empirical strategy is described in section 3. The dataset and variables used in the analysis are analyzed in section 4. In section 5 we provide the main results of our analysis. Finally, we discuss the conclusions in section 6.

2. Background

2.1. Subjective well-being

According to the related literature, subjective well-being could be defined as the degree to which people think and feel that their life is good, desirable and pleasant, that is, how people evaluate the intensity of their experiences in terms of positive and negative emotions, happiness or satisfaction with life (Lucas and Brent, 2007; Diener, 2009). Although subjective well-being cannot be easily and objectively measured, the evidence indicates that answers to subjective questions can be used as a proxy to measure subjective well-being (Bygren, 2004; Ferrer-i-Carbonell and Frijters, 2004). Among all possible measures of subjective well-being, we use life satisfaction rather than others such as happiness due to the generality of the term, its larger presence in the datasets and because the previous economic literature has largely focused on life satisfaction questions. In any case, using happiness or life satisfaction yields very similar results in terms of the impact of key variables[4] (Dolan and Metcalfe, 2012; Bartolini and Sarracino, 2014).

2.2. Changes in subjective well-being

As Maggino and Facioni (2017) pointed out, well-being studies should be considered and analyzed from a dynamic perspective expressed in terms of change and stability. On the one hand, given that people regularly assess their lives, their satisfaction levels could be different over their lifetime. Indeed, changes in satisfaction can take place continually, since satisfaction could be affected by mood changes or the activities in which one engages (Layard, 2005). Particularly, satisfaction could depend on certain contextual circumstances (Fujita and Diener, 2005; Lucas and Brent, 2007). Landua (1992) argued that the largest changes in level of satisfaction are mainly caused by external factors, such as financial improvements or deteriorations and familial changes, while small changes can also be due to internal reasons, such as adaptation effects or changes in mood. On the other hand, as pointed out by Stiglitz et al. (2011), well-being sustainability should be measured and assessed to determine whether its current level can at least be maintained for future generations. However, although the analysis of changes is relevant to understand the possible evolution in well-being, the concept of change is a complex term to be defined and managed through observed data (Maggino and Faicioni, 2017).

Although in the last years some studies have examined subjective well-being changes over time and how different determinants affect these changes, the evidence is still scarce and

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[4] In this study, we use the terms "*subjective well-being*," "*happiness*," "*satisfaction with life*," "*life satisfaction*" and "*general satisfaction*" as being synonymous.

difficult to compare since the studies use different measures and statistical analyses. Fujita and Diener (2005), for instance, highlighted that about 24% of respondents significantly changed their life satisfaction and that its stability is lower when the period between measurements increases. Additionally, the authors found that personality traits were more stable than life satisfaction, whereas income was about as stable as life satisfaction. Mroczek and Spiro (2005) found that life satisfaction achieves its highest point at age 65 and then declines, but that there are significant individual differences in the rate of change. They also found that whereas physical health and marital status are associated with higher life satisfaction, proximity to death is associated with a decline in life satisfaction. Pedersen and Schmidt (2011) stated that, in general, increases in income, good health, being married and the transition from unemployed to employed have a positive impact on subjective well-being, while the transition from employed to unemployed has a negative effect. Di Tella and MacCulloch (2008) and Bartolini et al. (2013) made a good prediction of satisfaction changes where increases in social capital predict the largest positive change in subjective well-being, while population aging predicts the largest negative change. Bartolini and Sarracino (2014) studied the association among trends of social capital, GDP and subjective well-being in the long, medium and short run. Their main results highlight that social capital better predicts the trends of subjective well-being in the long and medium run, while short-run changes in GDP have a more positive relationship with well-being.

2.3. Determinants of subjective well-being

Given the scarce evidence on changes in subjective well-being, in the following subsections we review the most common determinants of subjective well-being at level, which will allow us to propose an empirical model for changes in subjective well-being. In line with the existing literature, we classify the determinants of subjective well-being into three different groups: (1) economic resources; (2) social, cultural and psychological capital; and (3) socio-economic characteristics.

2.3.1. Economic resources

A vast literature has shown that what matters for subjective well-being is not only absolute income, but also the comparisons that the individual makes with oneself in the past (internal comparisons) or with others (external or social comparisons). Hence, individual subjective well-being ought to depend on all these measures, which are not mutually incompatible

(Stutzer, 2004; Ferrer-i-Carbonell, 2005; Clark et al., 2008; Di Tella et al., 2010; D'Ambrosio and Frick, 2012; Wolfers et al., 2012).

The relationship between absolute income (i.e., income in the current period) and satisfaction is not as straightforward as initially thought (for a review, see Blanchflower and Oswald, 2004; Clark et al., 2008; Lora and Chaparro, 2008). Llarger incomes are expected to be associated with greater well-being due to the benefits of higher prosperity, such as increased consumption, more choices and fewer restrictions for survival. However, Easterlin showed that increases in income are not always associated with increases in well-being (Easterlin, 1974), what is known as the *Easterlin Paradox*. One of the possible ways provided in the literature to explain this paradox is to include relative income in terms of internal and external comparisons (Clark et al., 2008; Bartolini et al., 2013).

Concerning internal comparisons, past incomes could also affect current satisfaction, for instance, via wealth (Clark et al. 2008). Nonetheless, changes in the living conditions of people may have only a transitory effect on well-being, since they tend to adapt to their past experiences or new aspirations emerge (Frey and Stutzer, 2002). Hence, sooner or later, individuals will inevitably return to a set point after a period of adaptation (Clark et al., 2008; Conceicao and Bandura, 2008; Di Tella et al., 2010; Bartolini et al., 2013). That is, individuals will feel satisfied when they are close to what they think is ideal. However, when they achieve the ideal, new aspirations arise and they will feel equally dissatisfied than before (Layard, 2005; Lucas and Brent, 2007). Therefore, if people adapt not only to their new income level but also to a situation in which this level grows constantly over time, their aspirations will also grow constantly (Bjornskov et al., 2008). This process is known as *hedonic adaptation*.

The external benchmarks refer to the idea that comparisons are made with respect to others belonging to a demographic group, such as co-workers, family members, neighbors, friends or people like oneself (the same age, education, etc.). This is often called the *relative income hypothesis*. Since people's consumption and behavior are influenced by the decisions of other members of society, what matters to them are their relative resources compared to others (Ferrer-i-Carbonell, 2005; Clark et al., 2008; D'Ambrosio and Frick, 2012; Bárcena-Martín et al., 2016). However, some considerations should be carefully discussed when dealing with social comparisons.

First, it is not an easy task to identify an appropriate reference group. The most common option taken by researchers is to establish the reference group exogenously with people with common and observable characteristics. To do so, it should be taken into account that the reference group with the greatest influence is probably the social group to which the individual under analysis belongs, since people do not compare themselves to those who they consider unattainable (Ferrer-i-Carbonell, 2005; Clark and Senik, 2010).

Second, social comparisons can be made in a symmetric or asymmetric way. In this study, we focus on asymmetric comparison effects, that is, people care differently about comparisons with people who are richer or poorer than them (upward and downward comparisons, respectively).

And third, the reference point to make comparisons could be defined as either the average income of the reference group to which the individual belongs, called the *mean dependence framework,* or by making comparisons with all income levels of people within the reference group. By taking all comparisons into account, it would be possible to incorporate the idea of proximity (D'Ambrosio and Frick, 2012; Bárcena-Martín et al., 2016), that is, the importance that people attach to incomes closer to theirs in the distribution is different from those that are further away.

Under the mean dependence framework, the most frequent result is that upward comparisons are more likely to be relevant that downward ones (see Blanchflower and Oswald, 2004; Ferrer-i-Carbonell, 2005; Bartolini et al., 2013). For instance, Ferrer-i-Carbonell (2005) found that poorer individuals' well-being is negatively influenced by the fact that their income is lower than the average income of their reference group, while being above the mean does not affect subjective well-being. As Lora and Chaparro (2008), D'Ambrosio and Frick (2012) and Bárcena-Martín et al. (2016) have described, the upward negative effect could be interpreted as *envy,* so good news for some people are bad news for others, and a possible upward positive effect as a *signal*, that is, other people's results contain information on how to improve one's own status. For the case of downward comparisons, the effect on subjective well-being may also be either negative or positive. There exists a *compassion* effect when individuals feel compassion toward other people who have lower incomes; however, when the effect turns out to be positive, there is a *pride* effect.

However, the mean dependence framework has a shortcoming. It does not consider that an individual with a given income might not feel as happy in a society with high inequality (high

dispersion in the income distribution) as in an economy with low inequality. As several studies have shown for the case of European countries, individuals in more unequal societies report, on average, a lower score on the satisfaction scale (Alesina et al., 2004; Schwarze and Härpfer, 2007; Delhey and Dragolov, 2014; Ferrer-i-Carbonell and Ramos, 2014). Nevertheless, some methodological proposals allow measuring social comparisons taking the whole distribution (see Yitzhaki, 1979; Hey and Lambert, 1980; Chakravarty, 1997; D'Ambrosio and Frick, 2007, 2012; Bárcena-Martín et al., 2016). For instance, D'Ambrosio and Frick (2007) find that upward comparisons have a negative effect on satisfaction (*envy*), while downward comparisons exert a positive effect (*pride*).

2.3.2. Social, cultural and psychological capital

Following the scheme proposed by Muffels and Headey (2013) based on the classification of Sen's (2005) capabilities approach, the literature has distinguished among social, cultural and psychological capital.

Social capital has received increased attention as determinant of subjective well-being in recent years (Helliwell and Putnam, 2004; Sabatini, 2009; Sarracino, 2010; Bartolini et al., 2013; Bartolini and Sarracino, 2014). However, there is still no commonly accepted definition or consensus about how to measure it. Social capital includes measures of a person or group of networks, personal relationships, general trust and civic participation, known as *relational goods* (Bartolini et al., 2013). Some types of social capital are more informal, such as a group of people meeting in a bar, while others are highly social forms such as belonging to certain associations. Taking into account this distinction, the literature has differentiated between two kinds of social capital: bonding social capital, which refers to closed networks of relatives or friends, and bridging social capital, which implies cross-cutting ties such as membership in associations and trade unions or attending different social and cultural events. Studies have shown that people with active social relationships tend to be happier with their lives. Moreover, bridging social capital exerts the highest effect on subjective well-being (see, for instance, Helliwell and Putnam, 2004; Bartolini et al., 2013; Bárcena-Martín et al., 2016).

Cultural capital, on the other hand, can be defined as the values and goals in the individual's life, showing that, while the objectives of social and family life make people happier, the effect of economic goals is less conclusive (Muffels and Headey, 2013).

According to Headey (2008), economic goals are zero sum (profits for one imply losses for others) and family and social life goals positive sum domains (profits do not come at the cost of others).

Finally, like Muffels and Headey (2013), we consider personality traits as part of psychological capital, which includes the so-called "Big Five Indicators" (BFI) of neuroticism, extraversion, openness, agreeableness and conscientiousness; the LOC index as an external measure of the degree of control over one's life; and a reciprocity measure (negative and positive). The existing results have shown that people with more extraversion, openness, agreeableness and conscientiousness and with less neuroticism are happier. In addition, a negative relationship is expected between subjective well-being and both LOC and negative reciprocity, and a positive relationship between subjective well-being and positive reciprocity (Budría and Ferrer-i-Carbonell, 2012; Bárcena-Martín et al., 2016).

2.3.3. Socio-economic characteristics

The related literature considers a set of socio-economic characteristics such as gender, area where the individual lives, age, marital status, years of education, health status, household characteristics like the presence of children and adults in the household or household size, home ownership and variables related to the labor market like being employed or unemployed.

Several studies have shown that females, people who live in West Germany, who are living with a partner or are married, and who have good health are happier (see, for instance, Ferrer-i-Carbonell, 2005; Mroczek and Spiro, 2005; Bartolini et al., 2013; Bárcena-Martín et al., 2016). In addition, there is no conclusive evidence about the effects of age on satisfaction. Some studies have demonstrated that the effect of age on subjective well-being has a U-shape, where people are happier during the first and the last years of their lives. Other studies, such as that of Bárcena-Martín et al. (2016), have shown that satisfaction enhances with age. In contrast, Bartolini et al. (2013) obtained a quadratic but negative relationship between age and subjective well-being, showing that old age is associated with low levels of satisfaction. The results concerning years of education are inconclusive. Some studies have shown that education has a negative effect on subjective well-being because more educated individuals have more aspirations and expectations (Bárcena-Martín et al., 2016). Other studies, like that of D'Ambrosio and Frick (2007), have shown that more educated people are happier, while others, such as Bartolini et al. (2013), have found no relationship between education and

satisfaction. The presence of children and adults in the household could have a positive effect (Bartolini et al., 2013; Bárcena-Martín, 2016), negative effect (Ferrer-i-Carbonell and Frijters, 2004) or even no effect (D'Ambrosio and Frick, 2012). The evidence indicates that home ownership has a positive effect on subjective well-being because there is a positive feeling of living in one's own place, and this is better than living in houses where you have to pay rent even when the dwelling is more spacious and better equipped (D'Ambrosio and Frick, 2012). As regards the labor market, being unemployed has a negative effect on subjective well-being, while being a worker has a positive effect (see, for instance, D'Ambrosio and Frick, 2007, 2012; Bartolini et al., 2013).

3. Empirical strategy

Our reference empirical model deals with the determination of subjective well-being level, from which we predict changes in subjective well-being. Based on the existing literature, the model can be written as follows:

$$SWB_{it} = \alpha_0 + \alpha_1 y_{it} + \alpha_2 y_{i,t-k} + \alpha_3 f(y_{it}, y_{jt}) + \alpha_4 SC_{it} + \alpha_5 CC_{it} + \alpha_6 PC_{it} + \rho' X_{it} + \gamma' DT_t + \varepsilon_{it} \quad (1)$$

for i=1…N, t=1…T, where y_{it} is absolute income; $y_{i,t-k}$ is the k-periods lagged income, that is, *hedonic adaptation*; $f(y_{it}, y_{jt})$ denotes the social comparisons between individual i's income (y_{it}) and individual j's income (y_{jt}); SC_{it}, CC_{it} and PC_{it} are social, cultural and psychological capital, respectively; X_{it} is a set of socio-economic characteristics; DT_t includes time dummies which account for yearly changes that are the same for all people[5]; and ε_{it} is the error term. Following the proposal of Van Praag and Ferrer-i-Carbonell (2008), we rely on probit-adapted ordinary least squares (POLS). We cardinalize reported subjective well-being to account for the fact that differences among categories of satisfaction may not have the same meaning. In order to control for individual heterogeneity, we specify a model with individual random effects and Mundlak's corrections (see, for instance, Ferrer-i-Carbonell and Frijters, 2004). Thus, the error term is assumed to be $\varepsilon_{it} = \lambda_i \bar{z}_i + \omega_i + \pi_{it}$, where $\lambda_i \bar{z}_i + \omega_i$ is Mundlak's correction and π_{it} is the error term, with, $\omega_i \sim N(0, \sigma_\omega^2)$, $\pi_{it} \sim N(0,1)$ and $\text{Cov}(\omega_i, \pi_{it})$=0. The Mundlak variables ($\bar{z}_i$) used in this work are time-average values of

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[5] Year dummies allow us to control, to some extent, the year in which each individual has been introduced into the sample.

absolute income, years of education, number of adults and number of children in the household.

In order to predict changes in subjective well-being from the determinants, as in Di Tella and MacCulloch (2008) and Bartolini et al. (2013), we use the following expression from Equation (1):

$$\Delta\overline{SWB} = \sum \boldsymbol{\beta}\left(Z_{2014} - Z_{1999}\right) \tag{2}$$

where $\Delta\overline{SWB}$ is the predicted change in subjective well-being for the period 1999-2014; $\boldsymbol{\beta}$ is the vector that captures a selected set of significantly different from zero coefficients estimated from Equation (1)[6]; and Z_{2014} and Z_{1999} are the average weighted values of each variable in 2014 and 1999, respectively, except for the time dummies and Mundlak's term. In addition, note that this prediction procedure is not just a simple decomposition of variation for at least two reasons. First, we only select the estimated coefficients that are statistically significant. And secondly, we calculate the variations of variables using the weights provided in the GSOEP (see Bartolini et al., 2013).

We then explore whether changes in subjective well-being are determined by changes in what we denote as *time-varying* explanatory variables. We consider a variable as a time-varying variable if it undergoes significant yearly changes.[7] Thus, taking into account the first difference of Equation (1), we obtain:

$$\Delta SWB_{it} = \lambda_0 + \theta'\Delta W_{it} + \Delta\pi_{it} + \lambda SWB_0 \tag{3}$$

where ΔSWB_{it} is the first difference of subjective well-being, that is, a change in subjective well-being; ΔW_{it} is the first difference of the explanatory variables considered; $\Delta\pi_{it}$ is the first difference of the error term; and SWB_0 is the initial level of the dependent variable.

Finally, to disentangle whether the variables affect positive and negative changes to subjective well-being equally, we estimate a multinomial probit model following Pedersen and Schmidt (2011). More specifically, for this case, the dependent variable can take three

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[6] As we will see in Section 5, we present the estimation results for two different levels of significance (5% and 10%).

[7] In order to identify the time-varying explanatory variables, and for the sake of robustness of the estimation results, we focus on the proportion of zeros in the first differences of each variable at three different levels: less than 30%, 50% and 80% of zeros (see Section 5).

possible values: increase, decrease or maintain subjective well-being. This equation can be written as:

$$\Pr(\Delta SWB^{*}_{it,j} = j) = F(\eta' \, \Delta W_{it} + \Delta \pi_{it} + \delta \, SWB_{0}) \tag{4}$$

where j=increase, decrease and maintain that is, the first difference has been positive, negative and zero, respectively, where $\Delta SWB^{*}_{it,j}$ captures subjective well-being changes; F is the normal cumulative distribution function; ΔW_{it} denotes all changes in the variables; $\Delta \pi_{it,j}$ is the error term; and SWB_{0} is the initial level of the dependent variable.

4. Data and variables

4.1. Data

For the empirical analysis, we employ data from the German Socio-Economic Panel (GSOEP). The period of analysis is 1999–2014, for which the most recent data are available.[8] In order to avoid the duplication of observations, we consider the responses of the household head.[9] Following D'Ambrosio and Frick (2012), to control for potential panel, we consider people with three or more interviews as a proxy for the interviewing experience in the panel. Additionally, we have only considered people with consecutive observations. Due to the sample constraints and missing data, the final number of observations is 65,259. The GSOEP has been chosen due to its longitudinal structure and because it includes data on private households related to a great deal of dimensions of interest to the study of subjective well-being. For instance, the GSOEP allows us to study hedonic adaptation; social comparisons; social, cultural and psychological capital; and various socio-economic aspects. But what is most important to our study, considering that subjective well-being is not stable over time, is that the availability of these data enables us to investigate that variability.

4.2. Variables

4.2.1. Subjective well-being

The GSOEP gathers information about individuals' satisfaction with life as a whole by means of the following question: *How satisfied are you with your life, all things considered? Please*

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[8] The data used in this study were extracted and treated using Stata14. Any data or computational errors in this study are our own.
[9] Household head is defined as the person responsible for a household.

answer according to the following scale: 0 "completely dissatisfied" and 10 "completely satisfied". It is assumed that people assess their utility and classify it under one of the available categories, that is, people are able and willing to answer questions about satisfaction (see, for instance, Bárcena-Martín et al., 2016). This variable is denoted by *General Satisfaction*. The main descriptive statistics of all the variables for the last available year (2014) are reported in Table 1. We observe that mean *General Satisfaction* is 7.06, with a standard deviation of 1.70 on an 11-point scale (0-10), in line with previous studies. We also observe that 29.92% and 30.59% of the population experiences ups and downs of satisfaction, respectively. These percentages give us an idea about the variability of subjective well-being. In addition, we include Figure 1 with data for the whole period (1999-2014) to illustrate the evolution of subjective well-being.

-------Insert Table 1 here-------

-------Insert Figure 1 here-------

4.2.2. Economic resources

Income enables us to model different determinants of subjective well-being. First, we use household income to measure absolute income (y_{it} in Equation 1) as in D'Ambrosio and Frick (2012), because it provides a measure of the more regular income components received by all household members at the time of the interview. In order to compare income over time, all income measures are deflated to 2011 prices.[10] Furthermore, to control for differences in household size and economies of scale, we apply the OECD-modified equivalence scale which assigns a value of 1 to the first adult in the household, 0.5 to each remaining adult and 0.3 to each child. We consider income in logarithmic form. We denote absolute income as *Equiv_Income*

Secondly, for the income adaptation process ($y_{i,t-k}$ in Equation 1), related studies consider different numbers of lags, for instance, three years (Layard et al., 2009; Bartolini et al. 2013) or four years (Di Tella et al., 2010). In this study, we opt for four-period lag income in order not to lose so many observations.[11] Di Tella et al. (2010) and Bárcena-Martín et al. (2016) use both lagged income and the average of the four-year lags. We denote this variable as *Adaptation*.

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[10] The consumer price index (CPI) used in this analysis is given in the GSOEP.
[11] The decision to use four-period lag income has implied that 1999–2014 is the period that was finally analysed, although we have data from 1995.

Finally, we have built three different and alternative measures of social comparisons ($f(y_{it}, y_{jt})$ in Equation 1), all of them under the assumption of asymmetric comparisons.[12] As a general consideration and in line with the related literature, we use the terms *Relative Deprivation* (D_{it}) and *Relative Affluence* (A_{it}) to reflect the idea of upward and downward comparisons, respectively. As Ferrer-i-Carbonell (2005), we have built the reference group by grouping together all individuals who have a similar educational level, are in the same age bracket and live in the same region.[13]

Following Ferrer-i-Carbonell (2005), the first benchmark measure of social comparisons considers the comparisons depending on their position above or below the average income of the reference group, known as the *mean dependence framework*. Specifically, we define the variables $D_{1,it}$ and $A_{1,it}$ as:

$$D_{1,it} = \begin{cases} \bar{y}_t - y_{it} & if \ y_{it} < \bar{y}_t \\ 0 & if \ y_{it} \geq \bar{y}_t \end{cases} \quad and \quad A_{1,it} = \begin{cases} y_{it} - \bar{y}_t & if \ y_{it} > \bar{y}_t \\ 0 & if \ y_{it} \leq \bar{y}_t \end{cases} \tag{5}$$

where $D_{1,it}$ and $A_{1,it}$ measure how poorer or richer, respectively, people are regarding the average income of the reference group $\left(\bar{y}_t\right)$ to which they belong.

For the second and third measures of social comparisons we abandon *the mean dependence framework* to include all comparisons along the income distribution. Based on the formal specification of Yitzhaki (1979) and Hey and Lambert (1980), we define the total deprivation assigned to a person with an income y_{it} as the sum of all differences between this person's income and the income of each individual in his/her reference group whose income is higher. We are referring to the set of individuals with a higher income than i; that is, the better off set $B_i(y)$. We use a similar reasoning to measure the total affluence that considers comparisons with all individuals with lower income, that is, the set of individuals with a lower income than i, $W_i(x)$. On this basis, we specify the second measure of social

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[12] The analysis was also performed for the *mean dependence framework* under symmetric comparisons (see Section 5).

[13] Particularly, for education, we have used three categories according to years of formal education: less than 10 years, 10 to 12 years, and 12 years or more. Similarly, the age brackets are: younger than 25, 25–34, 35–44, 45–65, and 66 or older. Finally, the regions are West and East Germany. This combination generates 30 different reference groups.

comparisons considering the indexes $D_{2,it}$ and $A_{2,it}$ for individual i with income y_{it} as follows[14]:

$$D_{2,it}(y_{it}, y_{jt}) = \begin{cases} \sum_{j \in B_i(y)}(y_{jt} - y_{it}) & if \ y_{it} < y_{jt} \\ 0 & if \ y_{it} \geq y_{jt} \end{cases} \quad and \quad A_{2,it}(y_{it}, y_{jt}) = \begin{cases} \sum_{j \in W_i(y)}(y_{it} - y_{jt}) & if \ y_{it} > y_{jt} \\ 0 & if \ y_{it} \leq y_{jt} \end{cases} \quad (6)$$

The third measure of social comparison is obtained by dividing the differences in income by the number of individuals to whom the income is compared multiplied by the mean of the income distribution, that is, the income gaps have been normalized through mean income as proposed by Chakravarty (1997). Thus, we move from the absolute deprivation or affluence concept (simply the sum of the gaps between an individual's income and the incomes of all individuals richer or poorer than him/her, respectively) to consider the relative concept of deprivation and affluence (income gaps are normalized through mean income). As pointed out by D'Ambrosio and Frick (2012), this normalization could be more appropriate to compare different time periods or different societies.

To correct for the possibility of tiny differences among incomes and therefore a person with a slightly lower y_{it} than y_{jt} could not feel deprivation, we consider a margin h over the reference income in those reference groups with lower income variability.[15] Hence, we build the indexes $D_{3,it}$ and $A_{3,it}$ as follows:

$$D_{3,it}(y_{it}, y_{jt}) = \begin{cases} \dfrac{\sum_{j \in B_i(y)}(y_{jt} - y_{it})}{n\,\overline{y}_t} & if \ y_{it} < y_{jt} \ and \ y_{it} \notin \left[-h\,\overline{y}_t, h\,\overline{y}_t\right] \\ 0 & if \ y_{it} \geq y_{jt} \ or \ y_{it} \in \left[-h\,\overline{y}_t, h\,\overline{y}_t\right] \end{cases} \quad and$$

$$A_{3,it}(y_{it}, y_{jt}) = \begin{cases} \dfrac{\sum_{j \in W_i(y)}(y_{it} - y_{jt})}{n\,\overline{y}_t} & if \ y_{it} > y_{jt} \ and \ y_{it} \notin \left[-h\,\overline{y}_t, h\,\overline{y}_t\right] \\ 0 & if \ y_{it} \leq y_{jt} \ or \ y_{it} \in \left[-h\,\overline{y}_t, h\,\overline{y}_t\right] \end{cases} \quad (7)$$

4.2.3. Social, cultural and psychological capital

As regards social capital (SC_{it} in Equation 1) according to Putnam (2000), the OECD (2001) defines social capital as "networks together with shared norms, values and understandings

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[14] This measure of *Relative Deprivation* and *Relative Affluence* has been used in D'Ambrosio and Frick (2007, 2012) and Bárcena-Martín et al. (2016).

[15] We present the estimation for two different levels of the margin 10% and 5% (see Section 5).

that facilitate cooperation within or among groups." We consider two different dimensions of social capital: relationships with family and friends (bonding social capital) and with cross cultural ties (bridging social capital). The GSOEP asks respondents about the frequency with which they meet with family and friends and their participation in different type of events. The respondents can respond according to the following frequencies relative to the above indicators: 1 "*every day*," 2 "*every week*," 3 "*every month*," 4 "*less frequently*," or 5 "*never*." Following Sabatini (2009), we construct the dummy variable *Bonding_SC,* which takes the value of 1 if the respondent meets with relatives and friends at least once a month (as shown in Table 1, 38.8% of our sample presents this type of social capital). As in Bartolini et al. (2013), we have chosen the reported frequency "*at least once a month*" as a threshold because it captures the sample variation well. Bridging social capital is measured by a linear index constructed with the individual's responses about attending social gatherings, cultural events, cinema, pop or jazz concerts, church or other religious events, participating in sports, performing volunteer work and participating in local politics. We recode those variables to make "*every day*" correspond to the highest value in the scale and the category "*never"* correspond to the lowest one. We have used the principal components analysis and, normalizing between 0 and 1, we obtain the variable *Bridging_SC* (as shown in Table 1, 34.9% of our sample presents this type of social capital).

Concerning cultural capital (CC_{it} in Equation 1), we consider that life goals can be divided into three categories: economic goals (success at work, having a home and affording things), family goals (importance of having a partner or children) and social goals (helping others, being fulfilled, having good relationships with friends, travel or political activity). All these questions are of the type *"Importance of"* and the responses take values from 1 "*very important*" to 4 "*unimportant.*" Once more, we have rearranged this scale and using principal component analysis we synthesize the maximum amount of information of the three categories in the first component. The categories are then normalized between 0 and 1 and we obtain the variables *Eco_Goals*, *Fam_Goals*, and *Soc_Goals*. In our sample, we observe that the proportion of people who attach importance to their family, economic and social goals are 78%, 58% and 55%, respectively.

Following Bárcena-Martín et al. (2016), we consider a group of variables that reflect the concerns of the individual regarding economic development, finances, peace and the environment to capture another aspect of social or cultural capital known as "values." These

variables take the value of 1 if the respondent is "*very concerned*," 2 if he/she is "*somewhat concerned*" and 3 "*not concerned at all*." Again, we have rearranged this scale and using principal component analysis, we obtain the *Worries* variable, which has also been normalized between 0 and 1 (on average 46% of our sample is concerned about the above issues). Additionally, we have constructed a variable concerning trust, which includes variables related to trust in other people, if they cannot trust anyone and if they are wary of foreigners. The responses to these variables take values from 1 "*totally agree*" to 4 "*totally disagree*." Rearranging this scale and using the principal component analysis, the first component normalized between 0 and 1 is the variable *Mistrust*. In our sample, 52% of individuals feel mistrust when dealing with other people. In addition, following Conceicao and Bandura (2008), we include risk attitudes as part of cultural capital. This variable takes values according to the following scale: 0 means lower risk willingness (i.e., "*none*") and 10 means higher risk willingness (i.e., "*very*"). We denote the variable as *Risk*, which has been standardized to take a mean 0 and variance 1. We find that, on average, the willingness to take risk is about 4.64 over 10.

In line with Muffels and Headey (2013), we consider personal traits as part of psychological capital (PC_{it} in Equation 1). The psychological literature indicates that relatively stable personality traits influence how people respond to subjective well-being questions (Ravallion and Lokshin, 2001; Budría and Ferrer-i-Carbonell, 2012). In this study, we consider the same type of indicators to measure personal traits as in Budría and Ferrer-i-Carbonell (2012), including the BFI (*neuroticism, extraversion, openness, agreeableness* and *conscientiousness*), the *LOC* index on external measures to measure the degree of control over life and a positive (*Rep_Pos*) and negative (*Rep_Neg*) reciprocity measure. The five personality traits included in the BFI have been obtained after aggregating across a total of 15 items included in the GSOEP. In addition, some items have been recorded because a higher score negatively correlates with the specific dimension under evaluation. As Table 1 shows, the individuals in our sample are more conscientious (5.878 on average) and exhibit less negative reciprocity toward other people (2.972 on average).

The LOC index is surveyed in the GSOEP by means of a total of 10 items, of which six measure external LOC. Positive and negative reciprocity measures are modeled by aggregation across three items each of these variables. All these variables take values on a scale from 1 if the respondent states that it "*does not apply*," (i.e., the respondent considers

that he/she does not have that personal trait) to 7 if the respondent states that it "*does apply*" (i.e., the respondent considers that he/she has that personal trait). In order to facilitate the interpretation of the results, *BFI, LOC, Rep_Pos* and *Rep_Neg* have been standardized to take the mean zero and unit variance.

To conclude, information on the variables that capture social, cultural and psychological capital was not collected every year in the GSOEP. In line with Muffels and Headey (2013), we have imputed the values for the missing year with the immediately preceding year with information and, if this is the first year, we have replaced it with the first data available.

4.2.4. Socio-economic characteristics

We consider the socio-economic characteristics commonly used in the literature (X_{it} in Equation 1). We construct the dummy variable *Male,* which takes the value of 1 if the respondent is male (in 2014, 57.9% of our sample comprises males). The variable *East* takes the value of 1 if the respondent is living in East Germany (26.8% of respondents are from the East Germany). The variable *Age* is the age of the respondent measured in years. The average age in our sample is 58.18 years. Following previous studies and in order to test nonlinearity in the relationship between age and subjective well-being, we also include the variable *Age2,* which is age squared, in the statistical analysis. To capture marital status, we define the dummy variable *Living Partner* that takes the value of 1 if the respondent is currently living with his/her partner. In addition, we incorporate information about the number of children and adults in the household (*Children and Adults*). In our sample, on average, a proportion of about 58.8% of individuals live with a partner and have an average of 0.33 children. The variable *Years Education* measures the number of years of formal education (on average, the individuals in our sample have spent 12.78 years in education). The dummy variable *Good Health* takes the value of 1 if the respondent states that he/she has at least a satisfactory current health status (on average, 78.8% of our sample is in good health). The dummy variable *Owner* takes the value of 1 if the respondent currently owns a dwelling. A proportion of 55.6% of our sample owns a dwelling. To capture information for employment status, we define the dummy variable *Employed*, which takes the value of 1 if the respondent was employed in the previous year. As shown in Table 1, more than half of the respondents (58.9%) are employed in our sample.

5. Results

For the sake of comparability with previous studies, we briefly present the estimated results for subjective well-being at level in Table 2. Each column of the table (Models 1-3) corresponds to the three different indexes of *Relative Deprivation* and *Relative Affluence*. In the main text we report the results without considering the mean dependence framework and consider a margin *h* of 10% for the indexes of social comparisons. For the sake of simplicity, we have omitted the estimated parameters corresponding to socio-economic variables, time dummies and Mundlak's correction from the table.[16]

-------Insert Table 2 here-------

All the estimated results of the level of subjective well-being are as expected.[17] As in previous studies, absolute income is not a relevant aspect unless a relative income concept is taken (Model 3). We find that adaptation is complete. Thus, the initial impact of earning more income vanishes over time, that is, a higher income four years ago does not continue having effects on current satisfaction. Additionally, the asymmetric comparison effects are confirmed. Individuals that suffer deprivation report a lower level of subjective well-being and those experiencing affluence show a higher level of subjective well-being. As in the related literature, the negative effect of *Relative Deprivation* can be interpreted as the *envy* effect being stronger than the *signal* effect, while the positive effect of *Relative Affluence* can be explained by the fact that the *pride* effect dominates the *compassion* effect.

Our findings also confirm that bridging social capital has a larger effect than bonding social capital.[18] Regarding cultural capital, we find that individuals who attach more importance to family and social goals report a higher level of satisfaction. The opposite case is true for economic goals. Experiencing a higher level of worries or being distrustful or having lower risk willingness decrease subjective well-being. Concerning psychological capital, being less neurotic, more extraverted, more open, more agreeable, more conscientious and higher positive reciprocity and lower negative reciprocity are associated with higher

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[16] We present the corresponding estimated parameters in the Online Appendix (see Table 2a). Note that the table in the Online Appendix maintains the number of the original table included in the main text.

[17] As we indicated in previous footnotes, we also performed the analysis of subjective well-being at level considering both the mean dependence framework under symmetric comparisons and the indexes of Relative Deprivation and Relative Affluence of Model 3 considering h=5% (see tables 2b and 2c in the Online Appendix, respectively). The results hold for any alternative.

[18] We have performed the specific test for this confirmation. Particularly, we test a linear combination of parameters in order to determine if the difference between the coefficients of bonding and bridging is statistically significant. For the three models we find a *p*-value of 0.000.

levels of subjective well-being. Moreover, people with a lower *LOC* (they think that external circumstances play a small role in their life) report higher satisfaction.

In terms of the influence of standard socio-economic characteristics, again, we end up with similar results to the previous studies. Particularly, we find that *Males* are less satisfied and that living in the *East* of Germany has a negative effect over Germans' subjective well-being. Moreover, we find a U-shaped relationship between age and subjective well-being in our analysis. People living in couples are happier, while the presence of children and adults in the household are not significant. *Years Education* does not affect satisfaction, except in Model 3, where it has a negative effect. Additionally, a good state of health and being an owner of a dwelling has a positive effect on subjective well-being, while being employed the previous year has a negative effect.

As regards our main goals, Table 3 presents the prediction of changes in subjective well-being over time based on the previous estimation at the individual level. This table reports the results for the selected set of significantly different from zero variables at the 10% level.[19] We observe an actual total change of subjective well-being of 0.031. As shown in columns 3-5, the estimated predicted change of subjective well-being is around 0.020 for the three models corresponding to each index of deprivation and affluence. Thus, as in Bartolini et al. (2013), we have been able to predict changes in satisfaction in the same direction as the observed change, although our prediction is farther from the actual change than theirs.

In order to get some intuition of how each type of variable contributes to predicting this change, we present the corresponding prediction for each group of determinants separately (economic resources, social capital, cultural capital, psychological capital and socio-economic characteristics). Specifically, economic resources practically do not contribute to predicting changes in subjective well-being. Moreover, whereas cultural and psychological capital drive the largest positive change, social capital produces a negative change in subjective well-being through bridging social capital. In fact, a comparison of the results of Bartolini et al. (2013) with ours suggests that although social capital predicts a positive change in their work and negative here, in both studies social capital predicts the largest change in subjective well-being and socio-economic characteristics produce a negative change. Nonetheless, the negative changes in social capital and socio-economic

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[19] The results for the 5% significance level are available in Table 3a of the Online Appendix. Note that the main results slightly change.

characteristics have been offset by the positive predicted change of cultural and psychological capital, which results in a positive prediction of subjective well-being.

-------Insert Table 3 here-------

We now focus on the analysis of general changes in subjective well-being, meaning any type of variation in subjective well-being (Table 4). In the main text we present the estimation for variables whose proportion of zeros in the first differences is less than 80%.[20] It is important to note that we go beyond the prediction to identify the determinants that explain changes in subjective well-being. Moreover, in this analysis we can use the extra information of many more variables, not only those which are statistically significantly different from zero.

-------Insert Table 4 here-------

Additionally, we would like to mention that to avoid the effect of tiny changes in the income, we have disregarded any change lower than 1% in all variables which include income in their differences.[21]

We observe two interesting results here. First, the negative effect of initial level of general satisfaction,[22] meaning that when people start out with a high level of satisfaction, their satisfaction over time can only get worse.[23] Secondly, there exists a group of variables that exerts a different effect on level and on changes; namely, absolute income, having economic and family goals and being distrustful. On the one hand, although absolute income changes explain changes in subjective well-being, absolute income exerts no effect neither at either level or in the prediction of changes. On the other hand, having economic and family goals and being distrustful display an effect at level but not in changes. However, Pedersen and Schmidt (2011) found that, using the European Community Household Panel, changes in absolute income does not affect changes in satisfaction in Germany.

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[20] We have also performed the analysis considering those variables whose proportion of zeros in first differences is less than 50% and less than 30%. These results are available in Table 4a and 4b of the Online Appendix, respectively. The set of available variables when the proportion of zeros is lower is smaller, therefore we opt in for the largest threshold in the main text, which is 80%, to include as many variables as possible.

[21] We have also considered a margin of 0.5% and 5% to avoid tiny changes in the income variables and most of the results are similar. They are available in the Online Appendix (see Table 4c).

[22] We have checked whether there are individuals with an initial level of subjective well-being of 10 and it is not the case in our sample.

[23] As a robust check, we have considered an alternative option to capture the initial situation, that is, we include the level determinants instead of the initial value of subjective well-being (see Table 4d of the Online Appendix).

Note that we can compare how absolute income and social capital affect prediction and general changes in satisfaction. We can affirm that for the whole period (Table 3) social capital is more relevant than absolute income for predicting changes in subjective well-being. However, when dealing with yearly changes (Table 4), it is possible to state that absolute income plays a more important role than social capital in the estimation of changes in subjective well-being.[24] These affirmations are in line with Bartolini and Sarracino (2014).

Finally, in order to analyze specific changes in subjective well-being, that is, whether ups and downs of subjective well-being are determined differently, we report the multinomial estimation results in Table 5.

--------Insert Table 5 here-------

Taking as a reference category the situation in which subjective well-being does not change, our results indicate, first, that some factors have a differential effect, that is, the asymmetric effect over the probability of subjective well-being increases or decreases. In particular, we observe that the likelihood of negative changes in subjective well-being decreases when the individual either feels less deprivation, attaches more importance to social goals or is less distrustful. By contrast, only adaptation and the initial level of satisfaction make an increase in subjective well-being more likely. Notice that a striking feature of adaptation is that it has no effects either on the level of subjective well-being or when we deal with general changes in satisfaction, that is, those cases in which adaptation is complete.

Secondly, our results show that the remaining variables have a symmetric effect, that is, these variables affect both increases and decreases in subjective well-being. We observe that increases in absolute income, the intensity of bridging social capital, the importance attached to economic goals, risk attitudes or being less worried reduce the probability of a negative change and increase the probability of a positive change in satisfaction. It should be mentioned that although the particular case of economic goals did not exert any effect on general changes in satisfaction, it does affect at level and specific changes in satisfaction. Surprisingly, however, both effects go in the opposite direction. More specifically, when

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[24] We have performed a test to determine if the difference between the coefficients of changes in absolute income and changes in bridging is statistically significant. Particularly, we test a linear combination of parameters. For all models, it is statistically significant, except in Model 2.

more importance is given to economic goals, satisfaction is affected negatively, while an increase in importance produces changes in satisfaction.

Finally, changes in the affluence felt by the individual and changes in the importance given to family goals do not affect either increases or decreases in satisfaction, although these variables exerted effects on satisfaction at level.

To sum up, the main findings show that, first, social, cultural and psychological capital predict the largest changes in subjective well-being. Secondly, absolute income has effects on changes in subjective well-being in terms of both increases and decreases, but it is not relevant at level. Thirdly, adaptation is always complete except when we deal with specific changes in subjective well-being, which affect the likelihood of a positive change. Fourthly, as expected, social comparisons have an effect; namely, relative deprivation decreases subjective well-being, while relative affluence has no effect on subjective well-being. Finally, economic goals have opposite effects on the level and on changes, since they affect level negatively and changes in satisfaction positively.

6. Conclusions and discussion

Taking into account that subjective well-being is the regular assessment that people make of their life, it could be considered a short-lived phenomenon. Hence, the study of the evolution of the determinants of changes in subjective well-being over time is key to understanding subjective well-being under a dynamic approach. Thus, the main goal of our paper has been to analyze how changes over time in different factors affect changes in general satisfaction, as well as to examine how these changes are associated with increases or decreases in general satisfaction (positive or negative changes, respectively).

Like the work of Maggino and Facioni (2017), our results support the idea that subjective well-being should be analyzed from a dynamic perspective and highlight the convenience of distinguishing between the analysis of subjective well-being at level and its changes. For instance, we find that absolute income and adaptation do not affect satisfaction at level but that changes in these determinants explain changes in satisfaction. Thus, in the particular case of adaptation, it is always complete except when we analyze specific changes in satisfaction. In the opposite case, affluence and family goals are only relevant in explaining satisfaction at level. Social capital exerts a positive effect on changes in satisfaction and cultural capital depends on the factor under consideration. Additionally, when we focus on the determinants

of subjective well-being over time, another remarkable result is that, in general, when someone starts outs very satisfied, their satisfaction can only get worse over time. Moreover, some other insights can be gained when distinguishing between increases and decreases in subjective well-being. This approach has enabled us to detect that some variables have an asymmetric effect over the probability of increases or decreases in subjective well-being.

In line with Helliwell and Putnam (2004), Helliwell (2006), Sarracino (2010) and Bartolini and Sarracino (2014), another striking result of our study is that it confirms the importance of social contacts in subjective well-being and its changes. In fact, like Bartolini et al. (2013), our evidence shows that the large effect of bridging social capital at level drives the highest predictions of changes in general satisfaction. Indeed, economic resources plus socio-economic characteristics are insufficient to predict changes in satisfaction. Social, cultural and psychological capital are relevant and necessary in order to predict changes in subjective well-being. Furthermore, like in Bartolini and Sarracino (2014), our findings show that social capital is more relevant than absolute income when considering the whole period to predict changes in satisfaction. However, absolute income plays a more relevant role than social capital in the estimation of yearly changes in satisfaction.

Our results could help to provide more realistic assumptions to the theoretical models in which the individual is the main economic agent. Moreover, these findings could also contribute to the development of public policies in two directions. Firstly, although economic growth is a strategic policy objective, it does not necessarily make citizens happier. In this regard, public policies will be considered optimal depending on the importance that people attach to income in absolute or relative terms. Particularly, our evidence shows that, as in previous studies, social comparisons are more relevant for subjective well-being than absolute income when analyzing subjective well-being at level. Hence, in this case, Easterlin's Paradox has been confirmed. Therefore, governments should not only focus on macroeconomic indicators such as economic growth, but also on progress and social well-being (Frey and Stutzer, 2002; Boyce et al., 2010; Wolfers et al., 2012). For instance, as Sarracino (2010) proposed, governments should give more attention to the effects of future economic policies on the provision and preservation of social capital given its relevance for subjective well-being and because it can become a relevant feature of future development policies. However, when we focus on the analysis of changes (i.e., satisfaction over time), what is more important for people is their own situation, that is, absolute income is more

relevant than relative income. Thus, for the case of changes, we cannot confirm Easterlin's Paradox.

In this context, a contentious issue remains concerning whether additional indicators should complement the use of GDP or totally replace it (Bartolini and Sarracino, 2014). Our findings are in line with several studies (McGilivray, 2007; Stiglitz et al., 2011; Muffels and Headey, 2013; OECD, 2013), which indicate that both the objective circumstances in which people live and the subjective assessment that they make of their life influence well-being. Thus, as previous studies (Diener and Suh, 1997; Bruni and Porta, 2007; Helliwell, 2008; Stutzer and Frey, 2010), our findings also support the idea that subjective well-being indicators should complement traditional measures of welfare. Therefore, we must understand what actually produces happiness and which changes encourage it to ensure happy citizens and societies.

On the other hand, the knowledge of what affects increases or decreases in subjective well-being over time could be useful for estimating the social benefits and costs in the design, implementation and evaluation of public spending programs. In particular, the negative effect of deprivation felt by an individual, which produces negative changes in satisfaction, provides us information about the presence of a feeling of envy when people compare themselves to others. However, changes in affluence do not affect the probability of changes in satisfaction. Thus, the distributive relevance of public spending programs should be considered in the design of public policies (Alesina et al., 2004; Schawarze and Härpfer, 2007).

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TABLES

Table 1. Descriptive statistics of general satisfaction and explanatory variables (2014).

Dependent variable	Mean	SD	Min	Max	%Positive change[a]	%Negative change[a]
	7.060	1.697	0	10	29.92	30.59

Explanatory variables

	Mean	SD	Min	Max		
Economic Resources[b]						
Equiv_Income	18.53	11.69	1.135	331.1		
Adaptation	18.06	11.45	0	25.28		
Relative Deprivation						
$D_{i,t,1}$	0.002	0.030	0	0.027		
$D_{i,t,2}{}^{c}$	0.142	0.015	0	0.170		
$D_{i,t,3}$	0.005	0.003	0	0.138		
Relative Affluence						
$A_{i,t,1}$	0.001	0.002	0	0.025		
$A_{i,t}{}^{c}$	0.138	0.193	0	0.194		
$A_{i,t,3}$	0.003	0.004	0	0.113		
Social Capital						
Bonding_SC	0.388	0.487	0	1		
Bridging_SC	0.349	0.178	0	1		
Cultural Capital						
Eco_Goals	0.575	0.182	0	1		
Fam_Goals	0.776	0.226	0	1		
Soc_Goals	0.548	0.145	0	1		
Worries	0.460	0.244	0	1		
Mistrust	0.520	0.178	0	1		
Risk	4.641	2.286	0	10		
Psychological Capital						
Neuroticism	3.682	1.193	1	7		
Extraversion	4.799	1.1	1	7		
Openness	4.553	1.169	1	7		
Agreeableness	5.366	0.957	1.333	7		
Conscientiousness	5.878	0.877	2.333	7		
LOC	3.600	0.915	1	7		
Rep_pos	5.856	0.883	2	7		
Rep_neg	2.972	1.401	1	7		
Socio-economic						
Male	0.579	0.494	0	1		
East	0.268	0.443	0	1		
Age	58.18	15.06	23	99		
Living Partner	0.588	0.492	0	1		
Children	0.331	0.74	0	6		
Adults	1.895	0.76	1	7		
Years Education	12.78	2.862	7	18		
Good Health	0.788	0.409	0	1		
Owner	0.556	0.497	0	1		
Employed	0.589	0.492	0	1		

Note: [a] The first difference is positive or negative. [b] All income variables are measured in hundreds of euros. [c] These variables are shown in their natural logarithmic form. Adapted from the German Socio-Economic Panel.

Table 2. Estimation results for general satisfaction of German citizens, 1999-2014.

	Model 1	Model 2	Model 3
Economic Resources			
Equiv_Income	0.052	0.327	0.926**
	(0.384)	(0.319)	(0.254)
Adaptation	-0.077	-0.091	-0.091
	(0.157)	(0.157)	(0.157)
Relative Deprivation (D_{it})	-0.234***	-0.275***	-0.107***
	(0.034)	(0.047)	(0.013)
Relative Affluence (A_{it})	0.065*	0.236***	0.048**
	(0.034)	(0.048)	(0.015)
Social Capital			
Bonding_SC	0.034**	0.035**	0.035**
	(0.011)	(0.011)	(0.011)
Bridging_SC	0.452***	0.456***	0.452***
	(0.038)	(0.038)	(0.038)
Cultural Capital			
Eco_Goals	-0.046	-0.050*	-0.048*
	(0.027)	(0.027)	(0.027)
Fam_Goals	0.102***	0.103***	0.103***
	(0.021)	(0.022)	(0.022)
Soc_Goals	0.177***	0.177***	0.175***
	(0.040)	(0.040)	(0.040)
Worries	-0.513***	-0.512***	-0.512***
	(0.028)	(0.028)	(0.028)
Mistrust	-0.285***	-0.282***	-0.284***
	(0.029)	(0.029)	(0.029)
Risk	0.013**	0.012*	0.012*
	(0.006)	(0.006)	(0.006)
Psychological Capital			
Neuroticism	-0.105***	-0.105***	-0.105***
	(0.007)	(0.007)	(0.007)
Extraversion	0.031***	0.031***	0.031***
	(0.005)	(0.005)	(0.005)
Openness	0.018***	0.017***	0.017***
	(0.004)	(0.004)	(0.004)
Agreeableness	0.029***	0.030***	0.030***
	(0.003)	(0.003)	(0.003)
Conscientiousness	0.041***	0.042***	0.042***
	(0.004)	(0.004)	(0.004)
LOC	-0.081***	-0.081***	-0.080***
	(0.007)	(0.007)	(0.007)
Rep_Pos	0.031***	0.030***	0.030***
	(0.004)	(0.004)	(0.004)
Rep_Neg	-0.008**	-0.008**	-0.007**
	(0.003)	(0.003)	(0.003)
Constant	-0.825**	-0.942***	-1.429***
	(0.246)	(0.179)	(0.191)
Socio-economic characteristics	Yes	Yes	Yes
Mundlak's correction	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Number of observations	80,444	80,444	80,444
R-squared	0.296	0.295	0.296

Note: POLS regression with standard errors in parentheses, using clustering. Columns 2-4 show different models with different specifications of relative income. *$p<0.1$, **$p<0.05$, ***$p<0.001$.

Table 3. Prediction of general satisfaction in 1999-2014.

	Data	Model 1	Model 2	Model 3
	Δ1999-2014	Predicted ΔSWB	Predicted ΔSWB	Predicted ΔSWB
Total change	**0.031**	**0.019**	**0.022**	**0.017**
Economic Resources [a]	0.159	-0.002	0.000	0.001
Equiv_Income	0.006			0.005
Relative Deprivation (D_{it})				
$D_{1,it}$	0.016	-0.004		
$D_{2,it}$	0.012		-0.003	
$D_{3,it}$	0.052			-0.006
Relative Affluence (A_{it})				
$A1_{,it}$	0.021	0.001		
$A_{2,it}$	0.015		0.003	
$A_{3,it}$	0.037			0.002
Social Capital[a]	-0.093	-0.056	-0.056	-0.056
Bonding_SC	0.033	0.001	0.001	0.001
Bridging_SC	-0.126	-0.057	-0.057	-0.057
Cultural Capital[a]	-0.093	0.049	0.051	0.051
Eco_Goals	-0.053		0.003	0.003
Fam_Goals	-0.055	-0.006	-0.006	-0.006
Soc_Goals	0.016	0.003	0.003	0.003
Worries	-0.083	0.042	0.042	0.042
Mistrust	-0.027	0.008	0.008	0.008
Risk	0.109	0.001	0.001	0.001
Psychological Capital[a]	-0.391	0.034	0.034	0.034
Neuroticism	-0.223	0.023	0.023	0.023
Extraversion	0.065	0.002	0.002	0.002
Openness	0.140	0.002	0.002	0.002
Agreeableness	-0.092	-0.003	-0.003	-0.003
Conscientiousness	-0.037	-0.002	-0.002	-0.002
LOC	-0.144	0.012	0.012	0.012
Rep_pos	-0.042	-0.001	-0.001	-0.001
Rep_neg	-0.058	0.000	0.000	0.000
Socio-economic characteristics[a]	-0.063	-0.006	-0.007	-0.014
Male	-0.061	0.005	0.005	0.005
East	-0.001	0.000	0.000	0.000
Age	0.071	-0.114	-0.115	-0.117
Age2	0.083	0.148	0.151	0.152
Living Partner	-0.123	-0.019	-0.020	-0.019
Years Education	0.061			-0.008
Good Health	-0.054	-0.031	-0.032	-0.032
Owner	0.050	0.003	0.003	0.003
Employed	-0.089	0.002		0.002

Note: N=80,444. "ΔSWB" refers to predicted change in subjective well-being. [a] These rows indicate the total predicted change by that group of variables for each model. Additionally, the values of variables that are non-significant at least at the 10% level have been omitted in this table.

Table 4. Changes in general satisfaction. Estimates of first differences.

	Model 1	Model 2	Model 3
Economic Resources			
D.Equiv_Income	2.149***	0.828*	1.343**
	(0.412)	(0.421)	(0.530)
D.Adaptation	0.069	0.056	0.030
	(0.238)	(0.244)	(0.238)
D.Relative Deprivation (D_{it})	-0.177**	-0.281**	-0.114**
	(0.043)	(0.089)	(0.043)
D.Relative Affluence (A_{it})	-0.096	0.281**	0.056**
	(0.082)	(0.118)	(0.025)
Social Capital			
D.Bridging_SC	0.300**	0.302**	0.302**
	(0.074)	(0.074)	(0.074)
Cultural Capital			
D. Eco_Goals	0.043	0.045	0.044
	(0.037)	(0.036)	(0.037)
D. Fam_Goals	-0.006	-0.004	-0.006
	(0.025)	(0.024)	(0.025)
D. Soc_Goals	0.119**	0.114**	0.114**
	(0.045)	(0.045)	(0.044)
D.Worries	-0.247***	-0.247***	-0.246***
	(0.032)	(0.032)	(0.032)
D.Mistrust	-0.017	-0.018	-0.018
	(0.027)	(0.029)	(0.028)
D.Risk	0.041***	0.041***	0.041***
	(0.008)	(0.008)	(0.008)
Initial General Satisfaction	-0.074**	-0.072**	-0.073**
	(0.023)	(0.022)	(0.022)
Constant	-0.053***	-0.058***	-0.063***
	(0.004)	(0.007)	(0.004)
Year dummies	Yes	Yes	Yes
Number of observations	65,269	65,269	65,269

Note: Standard errors in parentheses, using clustering. "D." means the first difference of the variable. * $p<0.1$, ** $p<0.05$, ***$p<0.001$.

Table 5. Multinomial probit estimation on the change in general satisfaction.

Variables	Negative changes in SWB[a]			Positive changes in SWB[b]		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Economic Resources						
D.Equiv_Income	-0.546**	-0.620**	-0.351	1.397***	0.743*	0.817**
	(0.235)	(0.258)	(0.376)	(0.253)	(0.417)	(0.262)
D.Adaptation	0.003	0.026	0.050	0.298**	0.315**	0.290**
	(0.165)	(0.167)	(0.163)	(0.139)	(0.141)	(0.138)
D.Relative Deprivation (D_{it})	0.125***	0.141**	0.066**	-0.002	-0.123**	-0.031
	(0.022)	(0.050)	(0.020)	(0.026)	(0.051)	(0.026)
D.Relative Affluence (A_{it})	-0.038	-0.040	-0.035**	-0.054	0.110	0.029**
	(0.038)	(0.066)	(0.017)	(0.055)	(0.094)	(0.014)
Social Capital						
D.Bridging_SC	-0.174***	-0.175***	-0.181***	0.098**	0.098**	0.103**
	(0.049)	(0.050)	(0.047)	(0.043)	(0.043)	(0.041)
Cultural Capital						
D.Eco_Goals	-0.068***	-0.071***	-0.068***	0.022***	0.022***	0.020***
	(0.018)	(0.017)	(0.014)	(0.004)	(0.004)	(0.003)
D.Fam_Goals	-0.011	-0.011	-0.014	0.019	0.019	0.023
	(0.023)	(0.022)	(0.025)	(0.021)	(0.021)	(0.022)
D.Soc_Goals	-0.070***	-0.066***	-0.066***	-0.008	-0.009	-0.009
	(0.009)	(0.009)	(0.009)	(0.014)	(0.014)	(0.014)
D.Worries	0.120***	0.121***	0.126***	-0.112***	-0.111***	-0.116***
	(0.015)	(0.015)	(0.015)	(0.016)	(0.017)	(0.016)
D.Mistrust	0.021**	0.022**	0.022**	0.010	0.010	0.010
	(0.006)	(0.007)	(0.011)	(0.019)	(0.019)	(0.023)
D.Risk	-0.018**	-0.018**	-0.018**	0.016***	0.016***	0.016***
	(0.005)	(0.005)	(0.005)	(0.003)	(0.003)	(0.003)
Initial General Satisfaction	0.004	0.002	0.002	-0.057***	-0.057***	-0.057***
	(0.007)	(0.007)	(0.007)	(0.010)	(0.010)	(0.010)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	65,269	65,269	65,269	65,269	65,269	65,269

Note: Standard errors in parentheses, using clustering. "SWB" refers to subjective well-being and "D." means the first difference of the variable. [a] These coefficients are the marginal effects concerning negative changes in *General Satisfaction*. [b] These coefficients are the marginal effects concerning positive changes in *General Satisfaction*.* $p<0.1$, ** $p<0.05$, ***$p<0.001$.

Figure 1. Variation of time-average weighted general satisfaction in Germany (1999-2014). Adapted from the German Socio-Economic Panel.

Table 2a. Estimation results for General Satisfaction of German citizens, 1999-2014 (socio-economic, time dummies and Mundlak's corrections).

	Model 1	Model 2	Model 3
Socio-Economic Characteristics			
Male	-0.081***	-0.082***	-0.082***
	(0.006)	(0.006)	(0.006)
East	-0.164***	-0.160***	-0.153***
	(0.015)	(0.016)	(0.017)
Age	-1.595***	-1.607***	-1.638***
	(0.251)	(0.243)	(0.259)
Age2	1.794***	1.824***	1.844***
	(0.191)	(0.187)	(0.196)
Living Partner	0.156***	0.161***	0.158***
	(0.011)	(0.011)	(0.011)
Children	0.010	0.013	0.012
	(0.026)	(0.026)	(0.027)
Adults	0.006	0.004	0.005
	(0.018)	(0.019)	(0.018)
Years Education	-0.105	-0.100	-0.137**
	(0.065)	(0.061)	(0.064)
Good Health	0.584***	0.586***	0.585***
	(0.012)	(0.012)	(0.012)
Owner	0.050***	0.050***	0.050***
	(0.009)	(0.009)	(0.009)
Employed	-0.022*	-0.018	-0.022*
	(0.011)	(0.011)	(0.011)
Time dummies			
dummy_1999	0.058***	0.059***	0.059***
	(0.001)	(0.001)	(0.001)
dummy_2001	0.094***	0.094***	0.093***
	(0.005)	(0.006)	(0.006)
dummy_2002	0.045***	0.044***	0.044***
	(0.006)	(0.006)	(0.006)
dummy_2003	0.118***	0.118***	0.118***
	(0.008)	(0.008)	(0.008)
dummy_2004	0.058***	0.057***	0.057***
	(0.008)	(0.008)	(0.008)
dummy_2005	0.116***	0.116***	0.116***
	(0.006)	(0.006)	(0.006)
dummy_2006	0.024**	0.023**	0.023**
	(0.006)	(0.006)	(0.006)
dummy_2007	0.037***	0.037***	0.037***
	(0.009)	(0.009)	(0.009)
dummy_2008	0.078***	0.077***	0.077***
	(0.010)	(0.011)	(0.011)
dummy_2009	0.066***	0.065***	0.066***
	(0.009)	(0.009)	(0.009)
dummy_2010	0.123***	0.122***	0.123***
	(0.009)	(0.009)	(0.009)
dummy_2011	0.073***	0.072***	0.073***
	(0.011)	(0.012)	(0.011)
dummy_2012	0.085***	0.083***	0.084***
	(0.011)	(0.012)	(0.011)
dummy_2013	0.109***	0.108***	0.109***
	(0.013)	(0.013)	(0.013)
dummy_2014	0.075***	0.073***	0.074***
	(0.012)	(0.012)	(0.012)
Mundlak's correction			
Mean(Equiv_income)	0.077**	0.073**	0.073**
	(0.026)	(0.026)	(0.025)
Mean(Years Education)	0.012	0.009	0.011
	(0.007)	(0.007)	(0.007)
Mean(Children)	0.002	0.001	0.001
	(0.027)	(0.027)	(0.027)
Mean(Adults)	-0.009	-0.010	-0.010
	(0.019)	(0.019)	(0.019)

Note: POLS regression with standard errors in parentheses, using clustering. Columns 2-4 show different models with different specification of relative income. *$p<0.1$, **$p<0.05$, ***$p<0.001$

Table 2b. Estimation results for General Satisfaction of German citizens, 1999-2014 (symmetric comparisons effects and *mean dependence framework*).

	Model 1	Model 2	Model 3
Economic Resources			
Equiv_Income	1.547***	1.969***	2.183***
	(0.195)	(0.200)	(0.196)
Adaptation	-0.077	-0.115	-0.123
	(0.157)	(0.158)	(0.158)
Reference Income	-0.149***		
	(0.033)		
Relative Deprivation + Relative Affluence	-0.084***	-0.057*	-0.024**
	(0.010)	(0.027)	(0.007)
Social Capital			
Bonding_SC	0.034**	0.035**	0.035**
	(0.011)	(0.011)	(0.011)
Bridging_SC	0.452***	0.457***	0.456***
	(0.038)	(0.038)	(0.038)
Cultural Capital			
Eco_Goals	-0.046	-0.052*	-0.051*
	(0.027)	(0.027)	(0.027)
Fam_Goals	0.102***	0.106***	0.106***
	(0.021)	(0.022)	(0.022)
Soc_Goals	0.177***	0.180***	0.178***
	(0.040)	(0.040)	(0.040)
Worries	-0.513***	-0.513***	-0.514***
	(0.028)	(0.028)	(0.028)
Mistrust	-0.285***	-0.283***	-0.284***
	(0.029)	(0.029)	(0.029)
Risk	0.013**	0.011*	0.012*
	(0.006)	(0.006)	(0.006)
Psychological Capital			
Neuroticism	-0.105***	-0.105***	-0.104***
	(0.007)	(0.007)	(0.007)
Extraversion	0.031***	0.031***	0.031***
	(0.005)	(0.005)	(0.005)
Openness	0.018***	0.016***	0.016***
	(0.004)	(0.004)	(0.004)
Agreeableness	0.029***	0.030***	0.030***
	(0.003)	(0.003)	(0.003)
Conscientiousness	0.041***	0.042***	0.042***
	(0.004)	(0.004)	(0.004)
LOC	-0.081***	-0.081***	-0.081***
	(0.007)	(0.007)	(0.007)
Rep_Pos	0.031***	0.030***	0.030***
	(0.004)	(0.004)	(0.004)
Rep_Neg	-0.008**	-0.007**	-0.007**
	(0.003)	(0.003)	(0.003)
Constant	-0.825**	-1.868***	-2.176***
	(0.246)	(0.169)	(0.166)
Socio-economic Characteristics	Yes	Yes	Yes
Mundlak's correction	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Number of observations	80,444	80,444	80,444
R-squared	0.295	0.295	0.296

Note: POLS regression with standard errors in parentheses, using clustering. Columns 2-4 show different models with different specification of relative income under symmetric comparisons effects. *$p<0.1$, **$p<0.05$, ***$p<0.001$.

Table 2c. Estimation results for General Satisfaction of German citizens, 1999-2014, considering h=5% in Model 3.

	Model 3.1
Economic Resources	
Equiv_Income	1.047**
	(0.274)
Adaptation	-0.092
	(0.157)
Relative Deprivation (D_{it})	-0.110***
	(0.014)
Relative Affluence (A_{it})	0.040**
	(0.017)
Social Capital	
Bonding_SC	0.035**
	(0.011)
Bridging_SC	0.452***
	(0.038)
Cultural Capital	
Eco_Goals	-0.046
	(0.027)
Fam_Goals	0.102***
	(0.022)
Soc_Goals	0.175***
	(0.040)
Worries	-0.513***
	(0.028)
Mistrust	-0.284***
	(0.029)
Risk	0.012*
	(0.006)
Psychological Capital	
Neuroticism	-0.105***
	(0.007)
Extraversion	0.031***
	(0.005)
Openness	0.017***
	(0.004)
Agreeableness	0.030***
	(0.003)
Conscientiousness	0.042***
	(0.004)
LOC	-0.080***
	(0.007)
Rep_Pos	0.030***
	(0.004)
Rep_Neg	-0.007**
	(0.003)
Constant	-1.523***
	(0.231)
Socio-economic Characteristics	Yes
Mundlak's correction	Yes
Year dummies	Yes
Number of observations	80,444
R-squared	0.296

Note: POLS regression with standard errors in parentheses, using clustering. Column 2 shows the indexes of *Relative Deprivation* and *Relative Affluence* of Model 3 considering a margin of 5% (h=5%). *$p<0.1$, **$p<0.05$, ***$p<0.001$.

Table 3a. Prediction of General Satisfaction in 1999-2014 (at 5% level).

	Data	Model 1	Model 2	Model 3
	Δ1999-2014	Predicted ΔSWB	Predicted ΔSWB	Predicted ΔSWB
Total change	**0.031**	**0.015**	**0.018**	**0.011**
Economic Resources[a]		-0.004	0.000	0.001
Equiv_Income	0.006			0.005
Relative Deprivation (D_{it})				
$D_{1,it}$	0.016	-0.004		
$D_{2,it}$	0.012		-0.003	
$D_{3,it}$	0.052			-0.006
Relative Affluence (A_{it})				
$A1_{,it}$	0.021			
$A_{2,it}$	0.015		0.003	
$A_{3,it}$	0.037			0.002
Social Capital[a]		-0.056	-0.056	-0.056
Bonding_SC	0.033	0.001	0.001	0.001
Bridging_SC	-0.126	-0.057	-0.057	-0.057
Cultural Capital[a]		0.049	0.047	0.047
Eco_Goals	-0.053			
Fam_Goals	-0.055	-0.006	-0.006	-0.006
Soc_Goals	0.016	0.003	0.003	0.003
Worries	-0.083	0.042	0.042	0.042
Mistrust	-0.027	0.008	0.008	0.008
Risk	0.109	0.001		
Psychological Capital[a]		0.034	0.034	0.034
Neuroticism	-0.223	0.023	0.023	0.023
Extraversion	0.065	0.002	0.002	0.002
Openness	0.140	0.002	0.002	0.002
Agreeableness	-0.092	-0.003	-0.003	-0.003
Concientiousness	-0.037	-0.002	-0.002	-0.002
LOC	-0.144	0.012	0.012	0.012
Rep_pos	-0.042	-0.001	-0.001	-0.001
Rep_neg	-0.058	0.000	0.000	0.000
Socio-Economic Characteristics[a]		-0.008	-0.007	-0.016
Male	-0.061	0.005	0.005	0.005
East	-0.001	0.000	0.000	0.000
Age	0.071	-0.114	-0.115	-0.117
Age2	0.083	0.148	0.151	0.152
Living Partner	-0.123	-0.019	-0.020	-0.019
Years Education	0.061			-0.008
Good Health	-0.054	-0.031	-0.032	-0.032
Owner	0.050	0.003	0.003	0.003
Employed	-0.089	0.002		

Note: N=80,444. "ΔSWB" means predicted change of subjective well-being. [a] These rows indicate the total predicted change by that group of variables for each model. Additionally, the valor of those variables that are no-significant at least at the 5% level has been omitted in this table.

Table 4.a. Changes of General Satisfaction first differences estimates (selected variables following the criteria of less than 50% of zeros).

	Model 1	Model 2	Model 3
Economic Resources			
D.Equiv_Income	2.164***	0.861*	1.369**
	(0.400)	(0.430)	(0.526)
D.Adaptation	0.072	0.060	0.032
	(0.241)	(0.248)	(0.242)
D.Relative Deprivation (D_{it})	-0.177**	-0.287**	-0.113**
	(0.043)	(0.089)	(0.043)
D.Relative Affluence (A_{it})	-0.096	0.276**	0.055**
	(0.082)	(0.116)	(0.026)
Social Capital			
D.Bridging_SC	0.304**	0.306**	0.307**
	(0.075)	(0.076)	(0.075)
Cultural Capital			
D. Eco_Goals	0.046	0.048	0.047
	(0.037)	(0.036)	(0.037)
D. Fam_Goals	-0.004	-0.003	-0.004
	(0.025)	(0.024)	(0.025)
D. Soc_Goals	0.122**	0.116**	0.116**
	(0.044)	(0.045)	(0.044)
D.Worries	-0.245***	-0.246***	-0.246***
	(0.032)	(0.032)	(0.032)
D.Mistrust	-0.026	-0.027	-0.027
	(0.029)	(0.031)	(0.030)
Initial General Satisfaction	-0.074**	-0.072**	-0.073**
	(0.023)	(0.022)	(0.022)
Constant	-0.053***	-0.058***	-0.063***
	(0.004)	(0.007)	(0.004)
Year dummies	Yes	Yes	Yes
Number of observations	65,269	65,269	65,269

Note: Standard errors in parentheses, using clustering. "D." means the first difference of the variable. Columns 2-4 show different models with different specification of relative income. * $p<0.1$, ** $p<0.05$, ***$p<0.001$.

Table 4b. Changes of General Satisfaction first differences estimates (selected variables following the criteria of less than 30% of zeros).

	Model 1	Model 2	Model 3
Economic Resources			
D.Equiv_Income	2.107***	0.860*	1.368**
	(0.295)	(0.431)	(0.526)
D.Adaptation	0.011	0.060	0.032
	(0.248)	(0.248)	(0.241)
D.Relative Deprivation (D_{it})		-0.287**	-0.113**
		(0.089)	(0.043)
D.Relative Affluence (A_{it})		0.276**	0.056**
		(0.116)	(0.026)
Social Capital			
D.Bridging_SC	0.308**	0.306**	0.307**
	(0.075)	(0.076)	(0.075)
Cultural Capital			
D. Eco_Goals	0.047	0.047	0.046
	(0.033)	(0.033)	(0.033)
D. Soc_Goals	0.115**	0.116**	0.115**
	(0.045)	(0.045)	(0.044)
D.Worries	-0.247***	-0.246***	-0.246***
	(0.032)	(0.032)	(0.032)
D.Mistrust	-0.027	-0.027	-0.027
	(0.031)	(0.031)	(0.030)
Initial General Satisfaction	-0.073**	-0.072**	-0.073**
	(0.022)	(0.022)	(0.022)
Constant	-0.065***	-0.058***	-0.063***
	(0.005)	(0.007)	(0.004)
Year dummies	Yes	Yes	Yes
Number of observations	65,269	65,269	65,269

Note: Standard errors in parentheses, using clustering. "D." means the first difference of the variable. Columns 2-4 show different models with different specification of relative income. * $p<0.1$, ** $p<0.05$, ***$p<0.001$.

Table 4c. Changes of General Satisfaction first differences estimates (margin of 0.5% and 5% to avoid the income volatility).

	Model 1'	Model 1"	Model 2'	Model 2"	Model 3'	Model 3"
Economic Resources						
D.Equiv_Income	2.218***	1.663***	1.016*	0.424	1.543**	0.455
	(0.417)	(0.345)	(0.475)	(0.556)	(0.544)	(0.391)
D.Adaptation	0.079	0.177	0.066	0.138	0.039	0.133
	(0.242)	(0.304)	(0.249)	(0.309)	(0.243)	(0.299)
D.Relative Deprivation (D_{it})	-0.173**	-0.193***	-0.275**	-0.294**	-0.107**	-0.143**
	(0.043)	(0.044)	(0.090)	(0.085)	(0.042)	(0.051)
D.Relative Affluence (A_{it})	-0.103	0.001	0.244*	0.331**	0.045*	0.107**
	(0.081)	(0.077)	(0.125)	(0.152)	(0.025)	(0.026)
Social Capital						
D.Bridging_SC	0.300**	0.302**	0.302**	0.303**	0.302**	0.302**
	(0.074)	(0.074)	(0.074)	(0.075)	(0.074)	(0.074)
Cultural Capital						
D. Eco_Goals	0.043	0.043	0.045	0.046	0.044	0.044
	(0.037)	(0.037)	(0.036)	(0.036)	(0.037)	(0.037)
D. Fam_Goals	-0.006	-0.006	-0.005	-0.004	-0.006	-0.005
	(0.025)	(0.024)	(0.024)	(0.024)	(0.025)	(0.024)
D. Soc_Goals	0.119**	0.119**	0.114**	0.113**	0.113**	0.112**
	(0.045)	(0.045)	(0.045)	(0.046)	(0.044)	(0.044)
D.Worries	-0.245***	-0.247***	-0.246***	-0.247***	-0.246***	-0.247***
	(0.031)	(0.031)	(0.032)	(0.031)	(0.032)	(0.032)
D.Mistrust	-0.017	-0.018	-0.018	-0.019	-0.018	-0.017
	(0.027)	(0.027)	(0.029)	(0.029)	(0.028)	(0.028)
D.Risk	0.041***	0.041***	0.041***	0.041***	0.041***	0.041***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Initial General Satisfaction	-0.074**	-0.074**	-0.072**	-0.072**	-0.073**	-0.073**
	(0.023)	(0.023)	(0.022)	(0.022)	(0.022)	(0.022)
Constant	-0.055***	-0.046***	-0.059***	-0.054***	-0.064***	-0.063***
	(0.004)	(0.004)	(0.007)	(0.007)	(0.004)	(0.005)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	65,269	65,269	65,269	65,269	65,269	65,269

Note: Standard errors in parentheses, using clustering. "D." means the first difference of the variable. Columns 2, 4, and 6 show the models with different specification of relative income, considering a margin of 0.5% to avoid he income volatility. Columns 3, 5, and 7 show the models with different specification of relative income, considering a margin of 5% to avoid the income volatility. * $p<0.1$, ** $p<0.05$, *** $p<0.001$.

Table 4d. Changes of General Satisfaction first differences estimates with the rest of explanatory variables at level.

	Model 1	Model 2	Model 3
Income			
D.Equiv_Income	2.380***	0.295	1.640**
	(0.421)	(0.487)	(0.559)
D.Adaptation	0.020	0.023	-0.001
	(0.220)	(0.222)	(0.220)
D.Relative Deprivation (D_{it})	-0.135**	-0.316**	-0.095**
	(0.035)	(0.090)	(0.039)
D.Relative Affluence (A_{it})	-0.168**	0.396**	0.033
	(0.069)	(0.144)	(0.024)
Social Capital			
Bonding_SC	-0.003	-0.003	-0.003
	(0.010)	(0.010)	(0.010)
D.Bridging_SC	0.281***	0.282***	0.283***
	(0.066)	(0.067)	(0.066)
Cultural Capital			
D. Eco_Goals	0.056*	0.057**	0.058**
	(0.026)	(0.025)	(0.026)
D. Fam_Goals	-0.009	-0.008	-0.010
	(0.028)	(0.027)	(0.028)
D. Soc_Goals	0.132**	0.128**	0.128**
	(0.044)	(0.045)	(0.044)
D.Worries	-0.249***	-0.249***	-0.249***
	(0.033)	(0.033)	(0.034)
D. Mistrust	-0.016	-0.017	-0.017
	(0.025)	(0.027)	(0.026)
D.Risk	0.038***	0.038***	0.038***
	(0.007)	(0.007)	(0.007)
Psychological Capital			
Neuroticism	0.014	0.014	0.014
	(0.010)	(0.010)	(0.010)
Extraversion	-0.001	-0.001	-0.001
	(0.006)	(0.006)	(0.006)
Openness	-0.001	-0.001	-0.001
	(0.006)	(0.006)	(0.006)
Agreeableness	0.001	0.001	0.001
	(0.006)	(0.006)	(0.006)
Conscientiousness	-0.003	-0.003	-0.003
	(0.005)	(0.005)	(0.005)
LOC	0.008	0.007	0.008
	(0.010)	(0.010)	(0.010)
Rep_Pos	-0.000	0.000	-0.000
	(0.007)	(0.007)	(0.007)
Rep_Neg	-0.001	-0.001	-0.001
	(0.006)	(0.006)	(0.006)

	Model 1	Model 2	Model 3
Socio-Economic Characteristics			
Male	0.001	0.001	0.001
	(0.013)	(0.013)	(0.013)
East	0.013	0.014	0.016
	(0.011)	(0.011)	(0.011)
Age	0.432*	0.401	0.430
	(0.244)	(0.237)	(0.250)
Age2	-0.375*	-0.347*	-0.367*
	(0.202)	(0.196)	(0.205)
Living Partner	-0.022*	-0.020	-0.021
	(0.012)	(0.012)	(0.012)
Children	-0.006	-0.007	-0.006
	(0.007)	(0.007)	(0.007)
Adults	-0.001	-0.002	-0.003
	(0.007)	(0.007)	(0.007)
Years Education	-0.009	-0.009	-0.010
	(0.022)	(0.022)	(0.022)
Good Health	-0.006	-0.005	-0.007
	(0.010)	(0.011)	(0.010)
Owner	0.150***	0.150***	0.150***
	(0.008)	(0.008)	(0.008)
Employed	-0.009	-0.007	-0.011
	(0.014)	(0.013)	(0.013)
Constant	-0.246**	-0.243**	-0.253**
	(0.062)	(0.061)	(0.066)
Year dummies	Yes	Yes	Yes
Number of observations	66,527	66,527	66,527
R-squared	0.021	0.021	0.021

Notes: Standard errors in parentheses, using clustering. "D." means the first difference of the variable. * $p<0.1$, ** $p<0.05$, ***$p<0.001$.