Happy for How Long? How Social Capital and GDP relate to Happiness over Time

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Abstract

What does predict the evolution over time of subjective well-being? We correlate the trends of subjective well-being with the trends of social capital and/or GDP. We find that in the long and medium run social capital largely predicts the trends of subjective well-being. In the short-term this relationship weakens. Indeed, in the short run, changes in social capital predict a much smaller portion of the changes in subjective well-being than over longer periods. GDP follows a reverse path, thus confirming the Easterlin paradox: in the short run GDP is more positively correlated to well-being than in the medium-term, while in the long run this correlation vanishes.

Keywords: Easterlin paradox, economic growth, subjective well-being,

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social capital, time-series, WVS - EVS and ESS.

JEL codes: D06, D60, I31, O10

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1. Introduction

"Does economic growth improve the human lot?" And, beyond GDP, what else could we consider to possibly improve people's well-being? We find that social capital is an excellent predictor of the trends of well-being in the long and medium-term and much less so in the short run. Moreover, consistently with Easterlin and Angelescu (2009) and Easterlin et al. (2010), we find that GDP follows a reverse path compared to social capital: it correlates very well with SWB in the short-term, much less so in the medium and not at all in the long run.

Until recently, the belief prevailed that the trends of subjective well-being (SWB) were substantially flat. This belief was fed by the popularization of the "Easterlin Paradox". Easterlin (1974, 1995) documented that the well-being reported by individuals living in industrialized countries had not shown any significant improvements in the last decades, despite a substantial increase in the GDP.

Two explanations in this regard have obtained wide consensus: the so-called "hedonic treadmill" and the "positional treadmill". In particular, economists have explored the possibility that these treadmills regulate the dynamics of income aspirations, which, in turn, may offset the positive effect of rising income (e.g. Stutzer (2004)). The basic idea is that SWB is negatively affected by the level of one's income aspirations. Aspirations may depend either on the income of one's own reference group or on one's own past income. We

refer to the first case as the positional treadmill, following the well-rooted tradition in economics and sociology that emphasizes the role of social comparisons and social status (e.g. Veblen (1899); Duesenberry (1949)). We refer to the second case as the hedonic treadmill, following the insights of the adaptation theory (see e.g. Frederick and Loewenstein (1999) and references therein).[3]

Adaptation theory assumes that changes in living conditions (for example, in economic conditions) have a transitory effect on well-being. Neither rising prosperity nor increased adversity fully affects happiness. As time goes by, people tend to revert to their baseline level of well-being. The same mechanism applies to aggregates, such as nations (Blanchflower, 2008).

Social comparison theory argues that what matters for an individual's satisfaction is his/her relative position regarding the selected group of people he/she respects and to whom he/she wants to resemble. These people form what is called a "reference group" (Layard et al., 2009; Di Tella et al., 2007; Ferrer-i Carbonell, 2005; Diener et al., 1993). Therefore, the general improvement in the absolute positions brought about by economic growth results in no significant increase in average SWB, because the relative gains and losses compensate each other. A large number of micro-level studies pro-

[3]Besides the role of income aspirations, SWB data have been used to investigate the inflation-unemployment trade-off (Di Tella et al., 2001, 2003), the role of political institutions (Frey and Stutzer, 2000), the impact of environmental pollution (Welsch, 2006, 2007; Ferrer-i Carbonell and Gowdy, 2007), the costs of unemployment (Clark and Oswald, 1994), and of inequality (Alesina et al., 2004; Graham and Pettinato, 2002; Frey and Stutzer, 2002a).

vide evidence in support of both adaptation and social comparison theories (Clark et al., 2008).

All-in-all, the message conveyed by happiness studies - consisting of a substantial stability in the trends of SWB, explained by plausible theories and supported by robust empirical evidence - has contributed to increase the number of those who think that the use of GDP as an indicator of well-being or progress is on the wane. A growing number of scholars feels that it is time to dedicate to "something else" - at least in part - some of the enormous attention and policy efforts that contemporary societies pour into economic growth. Several reasonable alternatives have been put forward to assume the role of this "something else": social capital, social tolerance, political freedom, religiosity, health (Inglehart, 2009; Stevenson and Wolfers, 2008; Deaton, 2008). However, whether additional indicators should complement the use of GDP (this position, for example, was taken by the OECD and the Sarkozy Commission[4] (Stiglitz et al., 2009)) or entirely replace it (see e.g. Layard (2005)) remains a contentious issue. Yet, this disagreement remains confined within a growing consensus that GDP ought to play a more limited role than in the past.

This message conveyed by happiness economics has been recently challenged by two new developments. First, the growing availability of long time series on SWB reveals that well-being varies somewhat substantially over time (Stevenson and Wolfers, 2008; Inglehart, 2009). In particular, SWB seems to increase in some countries, while decreasing in others. For instance,

[4]see for example http://www.stiglitz-sen-fitoussi.fr/en/index.htm

within developed countries, it is noteworthy that SWB rose in many Western European countries, whereas it fell slightly in the United States.

Secondly, a couple of influential papers by Stevenson and Wolfers (2008) and Sacks et al. (2010) claim that the Easterlin paradox does not hold, after finding the existence of a positive and significant relationship between GDP and SWB over time.

However, Easterlin and Angelescu (2009) and Easterlin et al. (2010) question the robustness of these results arguing that they fail to distinguish between the long and the short run. Indeed, the time horizon is the essence of the disagreement between Easterlin and collaborators and Wolfers and colleagues. Easterlin argues that the positive and significant relation estimated by Wolfers and his collaborators is driven by the inclusion of countries with short time series in their sample. Easterlin et al. (2010) document that GDP matters for SWB in the short run, but that this correlation vanishes in the long-run. Di Tella et al. (2001) already identified the tendency for SWB and GDP to vary together during periods of contractions and expansions.

In a recent study, Clark (2011) (see also Clark and Georgellis (2010)) put forward a third point further challenging the traditional message conveyed by happiness studies. Clark (2011) emphasizes that the potential alternatives to GDP may suffer from the same adaptation and social comparisons effects that prevent economic growth from having a positive impact on well-being in the long-term. His argument is the following. Scholars dedicated much attention to the relationship between income and well-being. We know that adaptation and income comparisons are present in this relationship. In comparison, very little efforts were devoted to explore whether social comparisons

and adaptation are present in the relationship between SWB and the potential alternatives to GDP. Clark (2011) summarizes the small literature which has investigated this latter issue by concluding that there is some evidence of social comparisons and/or adaptation with respect to unemployment, marriage, divorce, widowhood, the birth of the first child, layoffs, health, social capital and religion. In some cases, as for social capital, his evidence seems weak. Clark (2011) caution against diverting attention towards "something else" beyond GDP before we make sure that this something else is not subject to the same shortcomings and concludes that more research is needed.

This observation has potentially depressive implications with respect to the prospects for the progress and welfare of human societies. If it were documented that the alternatives to GDP are subject to adaptation and social comparisons, this would lead to the conclusion that no improvement in our living conditions could permanently increase our well-being, leaving us with the meagre consolation that neither could any severe misfortune depress us permanently. This stance could lead to extremely negative conclusions about the usefulness of policy-making for well-being.

Summarizing, these challenging views cast doubts on the traditional message conveyed by happiness studies. Indeed, if i) trends in SWB show a substantial variability across countries; ii) GDP turns out to be a good predictor of the latter and iii) the alternative measures to GDP are subject to adaptation and social comparisons, then all this would suggest the need for great caution in downsizing the role of GDP as an indicator of well-being and progress.

The evidence presented in this paper supports instead the view that the

message of happiness economics should not change. The centrality of GDP should be reduced. Moreover, social capital should assume a more prominent role than its current one, at least in those social choices that relate to the long and the medium run. Indeed, also social capital, as well as economic growth, can be the target for policies aimed at preserving/fostering it (Helliwell, 2011; Rogers et al., 2010; Bartolini, 2013).

The OECD (2001, p. 41) gives a definition of social capital (SC), consistent with that of Putnam (2000), as "networks together with shared norms, values and understandings that facilitate co-operation within or among groups". This definition refers to a very far-reaching concept. Indeed, in its statistical embodiments, social capital includes measures that are quite dissimilar, ranging from voter turnout, to trust in institutions, to the quantity and quality of intimate relationships and social bonds among individuals.

Recent studies document that this latter component of social capital - the relational one, also labelled as "relational goods" (Gui and Sugden, 2005; Uhlaner, 1989) – is well correlated with SWB in micro data (see the pioneering studies by Helliwell (2001, 2006) and Helliwell and Putnam (2004); see also Bruni and Stanca (2008), Becchetti et al. (2008), Bartolini et al. (2011)). Moreover, Becchetti et al. (2009) provided a causal analysis showing that social capital has a remarkable impact on SWB.

However, the existence of a cross-sectional correlation does not imply the existence of a correlation over time. After all the contrast between cross-sections and long-term time-series is the essence of the Easterlin paradox. As correctly pointed out by Clark, this contrast may be replicated by any cross-sectional correlate of SWB beyond income. The problem is that the

relationship over time between SWB and its correlates is still a largely unexplored issue. In particular, to the best of our knowledge, the techniques for the correlation of time-series adopted by Stevenson, Easterlin and collaborators have never been applied to any other correlate of well-being except GDP. As far as social capital is concerned, we try to fill this gap.

We find that the association between our proxies of social capital and well-being tends to set slowly and to be durable. Conversely, GDP is associated with well-being over the business cycle, but this correlation tends to wane over longer periods. This evidence is compatible with both the notion that income is subject to adaptation and social comparisons and with the idea that, vice-versa, social capital is not subject to the same forces. Obviously, these results must be taken with caution because of the possible existence of spurious correlations and/or endogeneity issues, a possibility that is implicit in the bivariate or trivariate methodology employed.

The paper is organized as follows. Section 2 presents our data while section 3 discusses the relevant methodological aspects. Section 4 presents our findings and section 5 concludes.

2. Data

The set of countries included in our sample depends on the availability of internationally comparable time series on social capital variables, which are very scarce. Our main sources of information are the integrated World Val-

ues Survey - European Values Study (WVS/EVS)[5] and the European Social Survey[6] (ESS) data-bases. When analysing the relationship among the variations of SC, GDP and SWB in the long run, we use the WVS/EVS data-set. For the medium and short run we adopt the ESS data-base.

2.1. World Values Survey and European Values Study data

WVS/EVS data-base offers a large compilation of surveys collected in more than 80 countries representing more than 80% of the world's population.

This data-base provides information about economic, social, cultural and political features, surveying national representative samples in each wave. In particular this database provides information on "individual beliefs about politics, the economy, religious, social and ethical topics, personal finances, familial and social relationships, happiness and life satisfaction" [7]. Data have been collected in six waves (1980 - 84; 1989 - 93; 1994 - 99; 1999 - 2004; 2005 - 2007 and 2008 - 2009) for a total of more than 400,000 observations covering a period of about 30 years.

However, present study focuses on a smaller sample of 27 countries for a total of about 169000 observations. This restriction is imposed by the limited

[5]The five waves WVS data-set together with detailed instructions on how to integrate it with EVS data-set is freely available on-line. For more details, please refer to: http://www.wvsevsdb.com/wvs/WVSData.jsp. The last wave of the EVS is available on the following web address: http://www.europeanvaluesstudy.eu/evs/data-and-downloads

[6]http://www.europeansocialsurvey.org

[7]Bruni and Stanca (2008, p. 6)

availability of long time series for our variables of interest. We consider as long-term a time horizon of at least 15 years.

Our sample is further restricted to countries with at least 3 waves of observations for both SWB and SC variables. The reason for this choice is to reduce the risk that the trends of the relevant variables are affected by wave-specific biases due to shocks and/or measurement errors. This choice is a reasonable compromise between using only two waves – which would maximize the above mentioned risk – and using four or more waves, which would excessively reduce our sample size.

Furthermore, our sample does not include transition economies because in the first years of the transition to capitalism the economic, cultural and institutional shock was so dramatic that, arguably, deeply affected SWB far beyond the evolution over time of SC or GDP. The inclusion of the waves collected close to the beginning of the transition, which are presumably strongly influenced by such powerful confounders, might result in misleading conclusions. At the same time, if we were to exclude the observations that were collected close to the institutional shock of 1989, no transition country would satisfy our long time-span requirement. Therefore, the need to monitor the relationship over time of our variables in relatively stable conditions imposed the exclusion of transition economies from the long-term analysis.

Tables A.4 on page 40 and A.5 on page 41 in the Appendix summarize the cross-country and waves availability of observations for the long run analysis considering two proxies of SWB.

SWB in WVS/EVS is proxied by answers to two questions: the first one concerns the overall feeling of happiness and the second one concerns the

respondent's satisfaction with life. More specifically, the first proxy ranges on a 1 to 4 scale and is based on answers to the question: *"All considered you would say that you are: 1. very happy; 2. pretty happy; 3. not too happy; 4. not at all happy?"*. This variable has been recoded so that the category "very happy" corresponds to the highest value in the scale and the category "not at all happy" corresponds to the lowest one.

The second proxy of SWB is the so-called "life satisfaction". This variable is observed through the question: "all things considered, how satisfied are you with your life as a whole these days?". Possible answers range on a 1 to 10 scale in which the lowest value corresponds to "dissatisfied" and the highest to "satisfied".

The two proxies of SWB are not always observed in the same wave. Thus, our analyses are based on sub-sets of the data when each of the two proxies of SWB were observed jointly with the proxies of SC. Conversely, availability of data about GDP do not raise any problem.

We proxy individual SC by observing the respondent's participation in various kinds of groups and associations. During interviews, people are asked whether they are members or not of a list of groups or associations. This list is quite large and contains participation in religious, cultural, sport, professional and many other kind of associations (for the complete list of groups or associations see the Appendix on page 64). We created a dichotomic variable taking values of 1 if the respondent declares to participate to at least one group or association, 0 otherwise.

Finally, we include data about GDP per capita (constant 2000 US$) from

the World Development Indicators (WDI).[8] Consistently with previous studies, we used the logarithm of GDP per capita to take into account the non-linear relationship between subjective well-being and GDP (Easterlin et al., 2010; Sacks et al., 2010).

Descriptive data and missing values for each variable are presented in tab.B.10 and tab.B.11 on page 49 for happiness and life satisfaction data, respectively. The small number of missing data and the absence of specific patterns of missingness rule out the risk of biased estimates [9]

2.2. European Social Survey data

When computing the short and the medium-term variations we resort to the ESS. To shorten the time horizon of our analysis we could in principle split our period of observation on the WVS/EVS into shorter sub-periods defined by a certain distance between the waves. However, in our WVS/EVS sample the distances between two consecutive observations are highly irregular, ranging from 1 to 14 years which is definitely not a short nor a medium-term. Table A.8 on pag.44 and tab.A.9 on pag.46 in the Appendix provide an overview of the distances among waves in all the considered countries. As a consequence, in the WVS/EVS it is impossible to attribute the variations

[8]World Development Indicators and Global Development Finance, http://databank.worldbank.org/ddp/home.do?Step=12&id=4&CNO=2 We excluded Northern Ireland from our sample because the World Development Indicators provide no data on GDP for this country.

[9]Please refer to Appendix Appendix B on page 48 for a detailed description of available data.

between contiguous surveys to the long, medium or short run. To have data that are measured at regular intervals is the key point to identify which time horizon is measured by such intervals.

Therefore, when computing the medium and short-term changes we use ESS data. Indeed, most of the time series in the ESS reach 6 years which is a reasonable medium-term. Moreover, it is possible to compute short-term changes by splitting the 6 years period of observations into the shortest possible sub-periods, defined by the interval between contiguous waves. In the ESS this interval is two years for almost all countries. Therefore, we split the available ESS time series into biannual intervals for each country and we compute the variation from one wave to another for each variable separately. Biannual intervals are short enough to be considered as short-term.

The European Social Survey was first run in 2002 and, since then, it has been conducted regularly every two years in 2004, 2006 and 2008. The ESS is designed to observe the interaction between institutions and people's attitudes, beliefs and behaviours across Europe. This feature makes ESS a useful source of data for present study since it provides, among others, information about SC and well-being on a relatively large sample of countries surveyed at regular intervals over time. However, given its European perspective, it provides information on a smaller number of countries (about 30) than the WVS/EVS.

Tables A.6 on page 42 and A.7 on page 43 in the Appendix summarize the cross-country and wave availability of observations for shorter run analysis and for the two available proxies of SWB respectively.

The actual sample size includes 24 countries for a total of about 153800

observations. It is mainly constituted by western European countries, transition economies from Eastern Europe, Israel and Turkey. In this case, we included transition countries in our ESS sample because they started being surveyed more than 10 years after the institutional shock. Arguably, such a period is long enough to make the impact of the collapse of socialism on our variables negligible. Finally, Bulgaria, Cyprus, Italy, Luxembourg and the Russian federation have been excluded because they have been observed only in 2002 and 2004, a too short period to perform a medium-term analysis.

As for the WVS/EVS, also the ESS questionnaire includes questions on happiness and life satisfaction. The wording of the life satisfaction question is identical to the one asked in the WVS/EVS. The only difference is that the answers are on an eleven points scale instead of ten (0 means extremely dissatisfied and 10 means extremely satisfied).

The wording of the happiness question is only slightly different from the WVS/EVS ("taking all things together, how happy would you say you are?", while the possible answers range from 0 ("extremely unhappy") to 10 ("extremely happy"), instead of the four points Likert scale of the WVS/EVS.

No time series on membership in groups and associations are available in the ESS. However, time series about another proxy of SC, namely trust in others, are observed. More precisely, trust is proxied by answers to three questions. Respondents have been asked to rate their perceptions about whether most people can be trusted or not, whether other people try to take advantage of them and whether they try to be helpful or rather looking for themselves. Each of these three questions ranges on a 0 to 10 scale, where the lowest category corresponds to the worst judgement and the highest to

the best one [10]

Given the similarities among these three questions both in terms of wording and in terms of substantive meaning, we run a factor analysis to check whether they could be grouped to proxy one latent concept. We first performed a factor analysis on the pooled sample (see tab.D.16) and subsequently we analyzed the sample wave by wave (see tab.D.17). In both cases factor loadings suggest that the three variables are largely mirroring the same fundamental concept that we label social trust. Therefore, in our regressions we use the social trust index as obtained by means of factor analysis[11].

Finally, we use the logarithmic form of the GDP per capita (constant 2000 US$) from the World Development Indicators (WDI)[12].

Table C.14 and tab.C.15 on page 50 report descriptive statistics and percentages of missing data for the considered variables. The percentages of missing data are small enough to rule out the risk of biased estimates[13].

[10]Notice that the WVS/EVS provides long time series on a trust question. The respondents are asked whether most people can be trusted or not with a wording very similar to the ESS analogous question. However, differently from the ESS, the answer is dichotomic in the WVS/EVS (yes/no). Arguably, the answer on an eleven points scale in the ESS provides a better and more sensible scaling for the answer than the binary one from the WVS/EVS.

[11]For more details please refer to the Appendix Appendix D on page 52

[12]World Development Indicators and Global Development Finance, http://databank.worldbank.org/ddp/home.do?Step=12&id=4&CNO=2

[13]For more details please refer to the Appendix Appendix C on page 50

3. Empirical strategy

Previous empirical works about the relationship between economic growth and SWB over time are based on bivariate regressions of aggregate measures of SWB and per capita income (Stevenson and Wolfers, 2008; Sacks et al., 2010; Easterlin and Angelescu, 2009; Easterlin et al., 2010). Since our primary scope is to investigate the relationship between SC and SWB over time, a natural strategy is to adopt the same bivariate approach, where of course we substitute for GDP with SC in our baseline regression model (see eq. 3 and eq. 4). Moreover, we also aim at comparing the potential of the time series of social capital and GDP to predict the variation over time of SWB.

To these aims, we develop our empirical strategy in three steps: i) we compute the trends of the proxies of SC, GDP and SWB; ii) we run bivariate regressions of the trends of SWB on the trends of SC and log of GDP per-capita, separately. The second specification is basically meant to replicate on our samples what has been done by previous studies on the relationship between SWB and GDP over time; iii) we provide trivariate regressions of SWB on both trends of log GDP and SC to account for eventual spurious correlations. However, results from bivariate analysis turn out to be substantially confirmed.

The risk of spurious correlations should not be underestimated. Indeed, the literature on economic growth and SC pointed out that these two variables may be related to each other in many ways (Knack and Keefer, 1997; Roth, 2009; Zak and Knack, 2001). For instance, Putnam et al. (1993) showed that there are paths through which SC fosters economic growth. Conversely, there is also a long standing tradition emphasizing that economic growth

can erode the stock of SC over time (Polanyi, 1968; Hirsch, 1976) (see also Bartolini and Bonatti (2008)). An implication of these possible relationships between GDP and SC is that to focus exclusively on bivariate correlations with SWB might lead to spurious correlations. However, our findings from trivariate analysis seem to rule out this possibility.

3.1. Estimating trends

We compute the long and the medium-term trends for the various proxies of SC and SWB by regressing them on a time variable containing all the years when the dependent variable was observed (Easterlin and Angelescu, 2009; Easterlin et al., 2010). Trends are computed for each country separately. The coefficient of the time variable represents the estimated average yearly variation for the specific dependent variable.

Since we have various indicators of SC and SWB, our regression methodology changes depending on the nature of the dependent variable: in case of a dichotomous variable (i.e. membership in groups or organizations), we adopted a probit model with robust standard errors reporting marginal effects. The resulting equation is:

$$Pr(Proxy_i^j = 1|YEAR_i^j) = \phi(\beta^j \cdot YEAR_i^j + \mu_i^j) \tag{1}$$

where ϕ is a normal cumulative distribution function. Index j stands for the various proxies of SC and SWB, while index i stands for individuals. Marginal effects of coefficients are subsequently computed.

In case of an ordered dependent variable taking discrete values (i.e. feeling of happiness or satisfaction with life) ordered probit or logit models should

be applied (Ferrer-i Carbonell, 2005). However, there is a robust evidence that in such cases the use of an OLS model is equivalent to these alternative techniques in terms of the sign and of the significance of the coefficients (Ferrer-i Carbonell and Frijters, 2004; Blanchflower, 2008). Moreover, OLS models have a strong advantage: they allow a direct comparison between regressors from various regressions. Therefore, we adopt the following OLS model:

$$Proxy_i^j = \alpha + \beta^j \cdot YEAR_i^j + \mu_i^j \tag{2}$$

The same equation is also adopted to compute the trend of the index of social trust (in the ESS) and of the logarithm of GDP per capita.

Previous works use different methods to compute economic growth. Easterlin and Angelescu (2009) and Easterlin et al. (2010) used the growth rate of the logarithm of GDP, while Stevenson and Wolfers (2008) and Sacks et al. (2010) adopted the difference between the logarithm of GDP at the beginning and at the end of the period. Both specifications overlook what happened to GDP between the initial and the final year of the time series. The problem with this choice is that it ignores the intermediate information, thereby increasing the risk that the variation of GDP is affected by wave-specific biases due to shocks and/or measurement errors. Our estimation of the yearly variation of the logarithm of GDP reduces this risk because it uses also the intermediate information.

To compute the short-term variations we split our period of observation into the shortest possible sub-periods, defined by the interval between contiguous waves (see section 2). This exercise is possible only with ESS data

where such intervals are regular. In this case we simply calculate the variation of the variable of interest in the interval defined by two consecutive waves.

Long, medium and short run changes in our variables, have been computed applying the original weights provided in WVS/EVS or ESS.

3.2. Bivariate and trivariate analysis

To check the correlation among respectively long, medium and short run changes of SWB and SC or GDP we run bivariate linear regressions with robust standard errors. Formally, we estimate the two following models:

$$SWB_j^{trend} = \alpha_j + \beta_j \cdot SC_j^{trend} + \mu_j \tag{3}$$

$$SWB_j^{trend} = \alpha_j + \beta_j \cdot lnGDP_j^{trend} + \mu_j \tag{4}$$

where SWB^{trend}, SC^{trend} and $lnGDP^{trend}$ represent the standardized estimated variations of SWB, SC and GDP as previously computed; μ is the error term and the index j refers to countries.

Notice that our method is different from the one applied by Easterlin and colleagues. They measure short time variations of SWB and the logarithm of GDP as the "deviation at each date of the actual value from the trend value"[14], thus defining the short term as a departure from the long term trend. Differently from Easterlin and colleagues, our method allows to

[14]Easterlin et al. (2010, p. 22465)

directly compare short-term coefficients with longer term ones from eq. 3, 4 and 5.

To check the possibility that our bivariate regressions are the outcome of spurious correlations we also run a set of trivariate regressions in which we correlate the variations of SWB with the variations of both SC and GDP. Hence, we test a linear model with robust standard errors resulting in the following trivariate equation:

$$SWB_j^{trend} = \alpha_j + \beta_{1,j} \cdot SC_j^{trend} + \beta_{2,j} \cdot lnGDP_j^{trend} + \mu_j \qquad (5)$$

where the only difference with eq. 3 is that a third term including the change of the logarithm of GDP has been added.

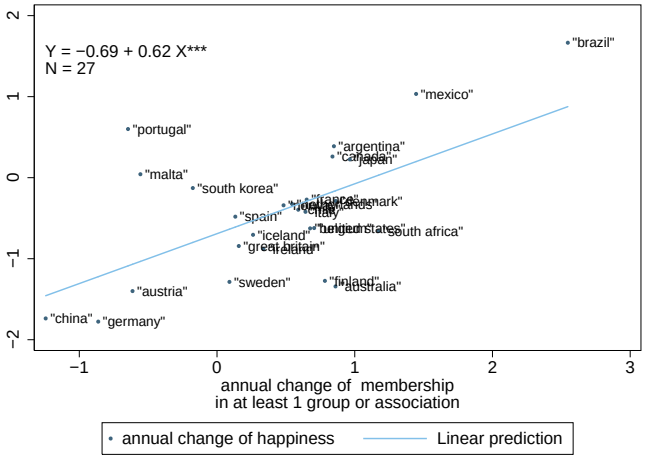
4. Results

4.1. The long-term (15 years)

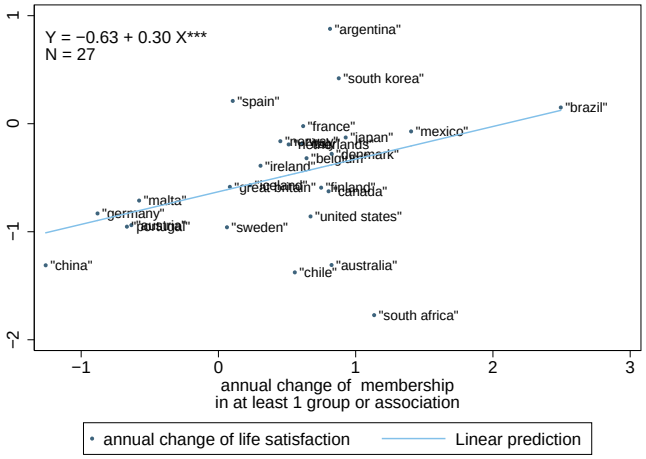
In the long run changes in both life satisfaction or happiness are strongly and positively correlated to the trends of SC. Figures 1a and 1b graphically summarize this result. An increase by one standard deviation in the trend of group membership is associated with a 0.62 point increase in the trend of happiness and 0.30 point increase in the trend of life satisfaction.

Fig. 2a and 2b inform that when we substitute for social capital with GDP, its long run trends are unrelated to the trends of life satisfaction and negatively and significantly correlated with the trends of happiness.

Results from trivariate analysis substantially confirm the evidence from bivariate analysis (see tab. 1). The dimension and the significance of the

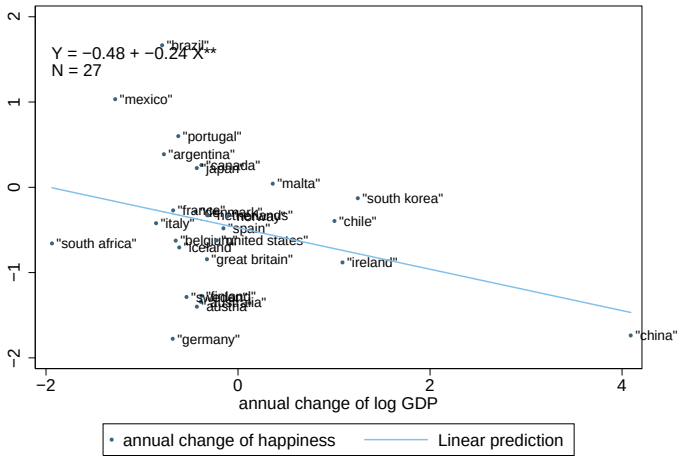


(a) *feeling of happiness.*

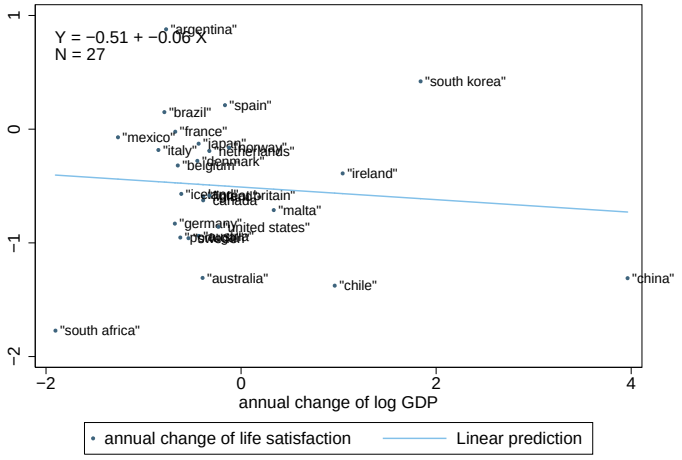


(b) *satisfaction with life.*

Figure 1: Correlations among long-term trends of proxies of subjective well-being and of social capital. Each dot on the scatterplot associates the long-term trend of SWB - on the y axis - with the long-term trend of group membership for each country. The regression line simply depicts the correlation between the two variables.



(a) *Happiness and the the logarithm of GDP.*



(b) *Life satisfaction and the logarithm of GDP.*

Figure 2: Correlations among long-term trends of proxies of subjective well-being and of the logarithm of GDP. Each dot on the scatterplot associates the long-term trend of SWB - on the y axis - with the long-term trend of GDP. The regression line simply depicts the correlation between the two variables.

coefficients of SC remains very similar to the ones resulting from bivariate analysis. The only exception concerns the long run correlation between happiness and GDP, which turns out to be non-significant.

Table 1: Trivariate regressions of long-term trends of proxies of subjective well-being over trends of SC and GDP (standardized variables).

	(1) happiness	(2) life satisfaction
membership in group or association	0.608**	0.330**
	(2.19)	(3.58)
log GDP	−0.0100	0.0447
	(−0.07)	(0.35)
Constant	−0.690***	−0.634***
	(−3.88)	(−6.87)
Observations	27	27
Adjusted R^2	0.302	0.087

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$

Stevenson and Wolfers (2008) claim that in some waves of the WVS/EVS the samples of some countries are not representative of the overall population[15]. However, as reported in Appendix Appendix I on page 60 our results

[15]The list includes the first three waves of Argentina, Chile, China and India and the first wave of South Africa. After excluding the first three waves, the first four countries

are robust to the exclusion of those countries.

The message of our long-term analysis is that SC matters a lot in predicting the trends of SWB. As far as GDP is concerned, our results are consistent with the Easterlin paradox.

do not satisfy the requirement of 15 years length of time series. Hence, they are exluded from the sample in our robustness check. Please, refer to Appendix Appendix I on page 60.

4.2. The medium-term (6 years)

Easterlin and Angelescu (2009) and Easterlin et al. (2010) argue that the relationship between SWB and GDP changes if we shift the focus from the long run to shorter periods. Recent works provided convincing evidence that SWB is sensitive to the business cycle (Sacks et al., 2010; Easterlin et al., 2010; Di Tella and MacCulloch, 2008).

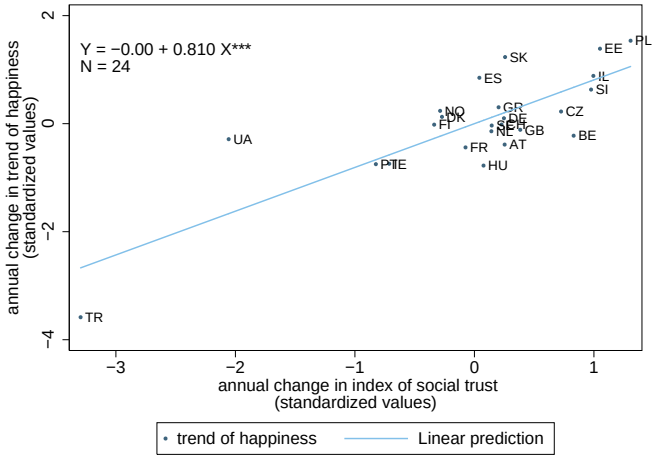
Do the results on the relationship between SWB and SC also vary when we consider a shorter time horizon? We try to answer this question by shifting our analysis from the long to the medium and short run. For the reasons exposed in section 2, we perform this kind of analysis adopting ESS data.

For our medium-term estimates, we consider countries with at least 6 years of distance between the first and the last wave. Austria, Estonia, Slovakia and Ukraine have been surveyed in three out of four waves. In these cases the maximum available time-span is 4 years. Those countries have not been dropped to keep our sample of a reasonable size to run econometric analysis.

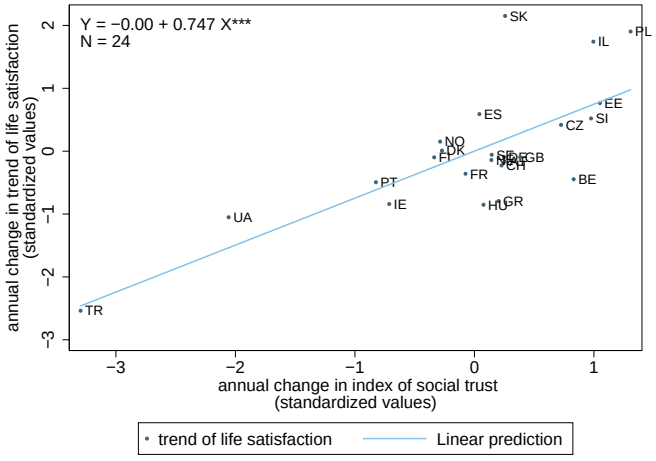
In the medium-term we find a positive bivariate correlation between the changes in SWB and in the index of social trust. Figures 3a and 3b graphically summarize this result[16].

Coefficients are large in both happiness and life satisfaction regressions (see tab. F.20 on page 56 in the Appendix). One more standard deviation in the change of the index of social trust correlates with a 0.81 point increase in

[16]The list of country acronyms in the ESS data-base is available on page 66 in the Appendix.

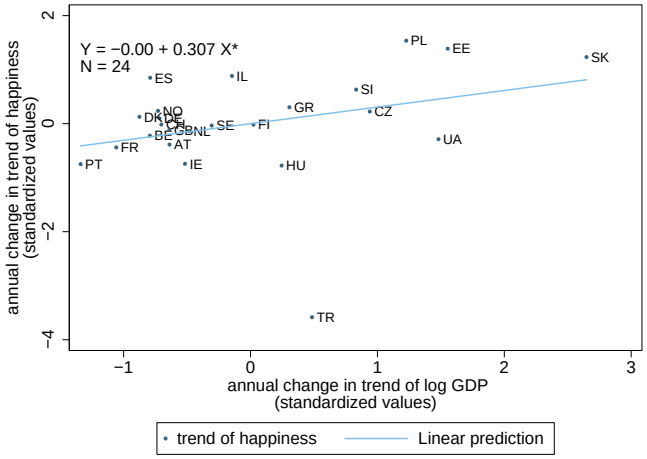


(a) *Happiness and the index of social trust.*

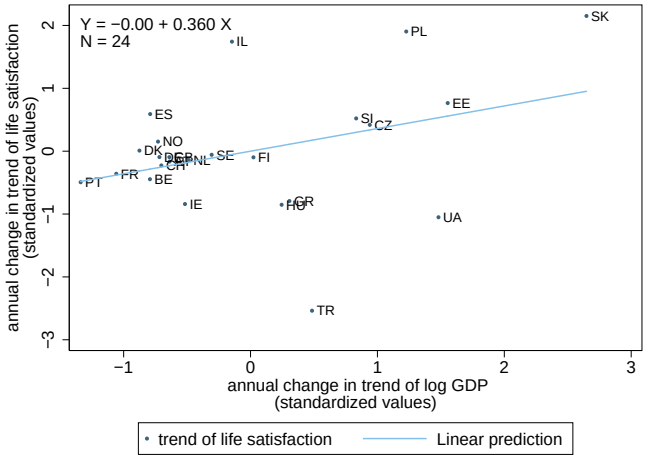


(b) *Life satisfaction and the index of social trust.*

Figure 3: Correlations among medium-term trends of subjective well-being and the changes in the index of social capital. Each dot on the scatterplots associates the medium-term trend of SWB - on the y axis - with the medium-term trend of the index of social trust. The regression line simply depicts the correlation between the two variables.



(a) *Happiness and the the logarithm of GDP.*



(b) *Life satisfaction and the logarithm of GDP.*

Figure 4: Correlations among medium-term trends of subjective well-being and of the logarithm of GDP. Each dot on the scatterplots associates the medium-term trend of SWB - on the y axis - with the medium-term trend of the logarithm of GDP. The regression line simply depicts the correlation between the two variables.

the variation of happiness and 0.75 point increase for life satisfaction. The position of Turkey in the scatterplot - looking like an outlier - can cast the doubt that our result is driven by the inclusion of this country. However, this is not the case. Even if we delete this country, the coefficients are still large and significant [17].

As for GDP figures 4a and 4b inform that the coefficient of GDP turns positive and weakly significant for happiness, while it remains non-significant for life satisfaction (see also tab. F.20 on page 56 in the Appendix).

This latter coefficient turns out to be significant (at 10%) in trivariate regressions while the coefficient for happiness increases its significance (at 5%). Both coefficients maintain a similar magnitude compared to the bivariate analysis (see tab. 2).

When considering the variations of SC, trivariate analysis confirms the results of bivariate regressions, both in terms of the large magnitude of the coefficients (0.79 for happiness and 0.73 for life satisfaction) and in terms of their high significance.

The coefficients of SC turn to be more than 2 times bigger than the ones of GDP and more statistically significant. Interestingly, both the magnitude and the significance of the coefficients of SC and of the logarithm of GDP are similar in both happiness and life satisfaction regressions.

In conclusion, our results on the long and the medium-term are not different for SC, which is a very good predictor of SWB in both cases. Our findings differ for GDP, whose predictive capacity gives some signals of life

[17] See tab.G.21 and G.22 on page 57 in the Appendix for a check excluding Turkey from the sample.

Table 2: Trivariate regressions of trends of subjective well-being over changes of the index of social trust and trends of GDP (standardized variables).

	happiness	life satisfaction
index of social trust	0.797^{***}	0.731^{***}
	(4.03)	(8.06)
trend of log GDP	0.268^{**}	0.323^{*}
	(2.41)	(2.02)
Constant	$-7.96e-10$	$5.56e-10$
	(-0.00)	(0.00)
Observations	24	24
Adjusted R^2	0.702	0.630

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$

only in the medium-term.

4.3. The short-term (2 years)

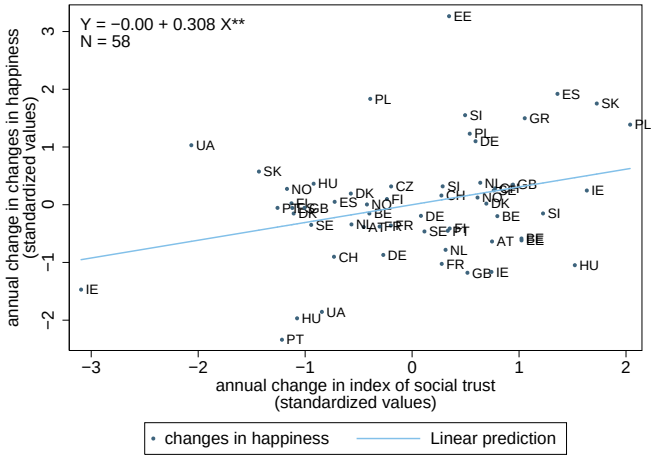
The picture depicted so far by the long and medium-term analysis - made of null or weak correlations between the changes in SWB and GDP and robust correlations with the changes of SC - is remarkably altered by the short-term analysis.

Data from the ESS allow to further reduce the length of our trends turning our attention to the relationship among biannual variations in our variables of interest[18].

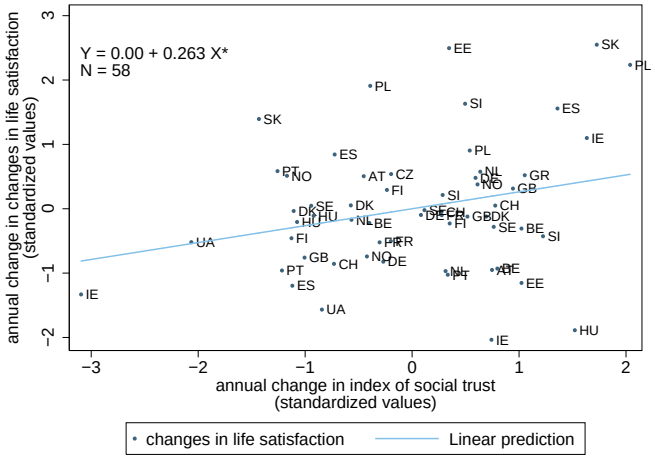
Figure 5a and 5b show that in the short run both happiness and life satisfaction are positively and significantly correlated with the index of social trust. We emphasize that both the significance and the magnitude of the coefficients of social trust are much smaller and less significant than in the medium-term, in both happiness and life satisfaction regressions.

Figures 6a and 6b provide a confirmation of previous findings in the literature. In the short run, the variations of SWB, both for happiness and life satisfaction, are largely and significantly correlated with the short-term changes of GDP. Coefficients are very large and significant at 1% level: an increase by one standard deviation in the variation of the logarithm of GDP

[18]The number of available observations is 58 short-term coefficients and not 72 as expected given the number of observations in the medium-term. Indeed, the short-term coefficients less than triple the medium-term ones because not all the countries have been surveyed in all waves. When one or more waves are missing for a given country, the number of short-term coefficients is accordingly lower. The countries for which at least one wave is missing are: Austria, Czech Republic, Estonia, Greece, Israel, Slovakia, Turkey and Ukraine.



(a) *Happiness and the index of social trust.*



(b) *Life satisfaction and the index of social trust.*

Figure 5: Correlations among short-term trends of subjective well-being and the changes in the index of social capital. Each dot on the scatterplots associates the short-term trend of SWB - on the y axis - with the short-term trend of the index of social trust for each country. The regression line simply depicts the correlation between the two variables.

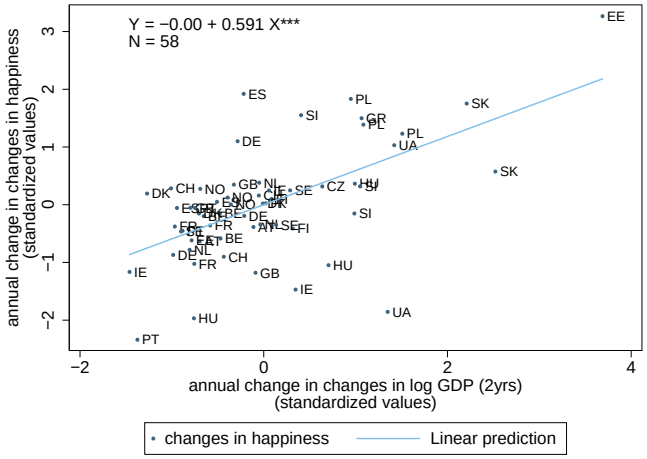
is associated with more than 0.59 point increase for happiness and 0.54 point for life satisfaction (see also the second line of table H.23 on page 59 in the Appendix).

Summarizing, the bivariate analysis suggests that when considering a shorter time span, the correlation between SWB and SC remarkably weakens. Instead, the correlation between SWB and GDP sharply strengthens.

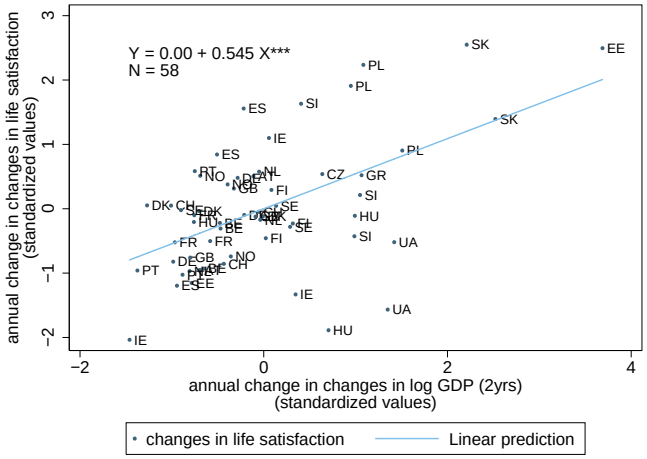
These results are confirmed in the trivariate regressions. The first column of tab. 3 shows that both SC and GDP have positive and significant coefficients. Contrary to what happens when we consider longer time spans, the coefficient of the logarithm of GDP is almost 2 times larger than the SC one. An increase by one standard deviation in the logarithm of GDP goes with a 0.57 point increase in happiness, while the variation of social trust goes with only 0.25 point increase. This result gets even more striking when considering the second column of tab.3. Indeed, when regressing the variations of life satisfaction over the variations of SC and GDP the coefficient of social trust turns not significant - though positive - while the coefficient of GDP is confirmed as being very large (0.52) and significant at 1%.

Summarizing, we find evidence that the changes over time of SC, as proxied by group membership and social trust, are a strong correlate of the trends of SWB. However, the strength of this relationship weakens when moving from the long and medium to the short run. When considering trends of more than 15 years, the variations of SC are the only significant correlate of SWB, while - as pointed out by Easterlin and colleagues - economic growth does not play any significant predictive role.

The size of the coefficients and their significance levels are extremely sta-



(a) *Happiness and the the logarithm of GDP.*



(b) *Life satisfaction and the logarithm of GDP.*

Figure 6: Correlations among short-term trends of subjective well-being and of the logarithm of GDP. Each dot on the scatterplots associates the short-term trend of SWB - on the y axis - with the variation of the logarithm of GDP for each country. The regression line simply depicts the correlation between the two variables.

Table 3: Trivariate regressions of trends of subjective well-being over changes of the index of social trust and trends of GDP (standardized variables).

	(1) happiness	(2) life satisfaction
index of social trust	0.255^{**}	0.214
	(2.18)	(1.58)
changes in log GDP (2yrs)	0.568^{***}	0.525^{***}
	(4.69)	(4.73)
Constant	$-3.27e-09$	$1.76e-09$
	(-0.00)	(0.00)
Observations	58	58
Adjusted R^2	0.393	0.318

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$

ble across models and show a remarkable pattern: moving from the medium to the short-term relationships, the coefficients of the changes of SC become about 3 times smaller. By the same token, coefficients of GDP increase by more than 2 times. In other words, our results suggest that in the short run GDP fluctuations are closely correlated with the variation of well-being. However, this correlation is attenuated in the medium-term and wipes out in the long run.

5. Conclusions

Available evidence documents that social capital is well correlated to subjective well-being in micro data. However, the existence of a cross-sectional correlation does not imply also the existence of a correlation between trends. Does social capital predict well-being over time as well? The literature exclusively focused on the inter-temporal relationship between GDP and well-being, overlooking this issue. The aim of our research is to compare the trends of GDP and of social capital as predictors of the trends of subjective well-being. In particular, we run bivariate and trivariate regressions of trends of subjective well-being on trends of social capital and/or of GDP using a methodology for the correlation of time-series similar to the one applied by Stevenson and Wolfers (2008); Sacks et al. (2010); Easterlin and Angelescu (2009); Easterlin et al. (2010). We analyze three different time horizons: long, medium and short run.

Our data sources are the World Values Survey - European Social Survey (WVS/EVS) for the long run and the European Social Survey (ESS) for

the medium and the short-term. These data-bases provide internationally comparable time-series on social capital and subjective well-being for many world countries (WVS/EVS) and for Europe (ESS). A major limitation of this study lies in the scarcity of time-series of social capital. The data-bases at hand allow to work only on two proxies – although very relevant – of social capital: associational activity and trust. In particular, in the WVS/EVS we have to rely on the average associational activity as a proxy of social capital, while in the ESS we have to adopt an index of social trust based on the answers to three questions about people's trustworthiness, honesty and helpfulness. In other words, the limits of the time-series on social capital do not allow us to adopt the same proxies in the long run on one side and in the medium and short run on the other. This suggests to be prudent in interpreting our results as referred to social capital in general. Finally, in both data-bases , subjective well-being is proxied by happiness and life satisfaction.

Our results suggest that the length of the time horizon of the analysis greatly matters. We find that the trends of subjective well-being over the long (15 years) and the medium-term (6 years) are largely predicted by the trends of our proxies of social capital. However, in the short-term (2 years) social capital seems to matter less. Indeed, the short run change in social trust predicts a much smaller portion of the variation of subjective well-being, compared to the medium-term. Coefficients turn out to be about 3 times smaller than in the medium run and less significant. GDP follows a reverse path compared to our proxies of social capital: its weak medium-term correlation with subjective well-being turns into a strong one in the short run.

Indeed, the coefficients from the short run regressions are almost two times larger than the ones from the medium run and more significant. Moreover, GDP is also two times more strongly correlated with SWB than social trust, while in the medium-term the correlation is more than two times weaker. As far as the long run is concerned, our findings confirm the Easterlin paradox: economic growth is unrelated to increasing well-being.

Summarizing, the relationship between SWB and GDP tends to vanish as time goes by. Conversely, the association between social capital and well-being seems to establish slowly and to be durable. This evidence is compatible with both the notion that income is subject to adaptation and social comparisons and with the idea that, conversely, social capital is not subject to the same forces.

Appendix A. Descriptive tables

Table A.4: Availability across waves of joint observations of social capital and happiness in the WVS/EVS.

	1981-1984	1989-1993	1994-1999	1999-2004	2005-2007	2008-2009	Total
Argentina	1005	1002	1079	1280	1002	0	5368
Australia	1228	0	2048	0	1421	0	4697
Austria	0	1460	0	1522	0	1510	4492
Belgium	1145	2792	0	1912	0	1509	7358
Brazil	0	1782	1149	0	1500	0	4431
Canada	1254	1730	0	1931	2164	0	7079
Chile	0	1500	1000	1200	1000	0	4700
China	0	1000	1500	1000	2015	0	5515
Denmark	1182	1030	0	1023	0	1507	4742
Finland	1003	588	987	1038	1014	1134	5764
France	1200	1002	0	1615	1001	1501	6319
Germany	0	3437	2026	2036	2064	2075	11638
Iceland	927	702	0	968	0	808	3405
Ireland	1217	1000	0	1012	0	1013	4242
Italy	1348	2018	0	2000	1012	1519	7897
Japan	1204	1011	1054	1362	1096	0	5727
South Korea	0	1251	1249	1200	1200	0	4900
Malta	467	393	0	1002	0	1500	3362
Mexico	1837	1531	2364	1535	1560	0	8827
Netherlands	1221	1017	0	1003	1050	1554	5845
Norway	1051	1239	1127	0	2115	0	5532
Portugal	0	1185	0	1000	0	1553	3738
South Africa	1596	0	2935	3000	2988	0	10519
Spain"	2303	4147	1211	2409	1200	1500	12770
Sweden	954	1047	1009	1015	1003	1187	6215
Great Britain	1167	1484	0	0	1041	1561	5253
United States	2325	1839	1542	1200	1249	0	8155
Total	25634	37187	22280	33263	28695	21431	168490
Observations	168490						

Table A.5: Availability across waves of joint observations of social capital and life satisfaction in the WVS/EVS.

	1981-1984	1989-1993	1994-1999	1999-2004	2005-2007	2008-2009	Total
Argentina	1005	1002	1079	1280	1002	0	5368
Australia	1228	0	2048	0	1421	0	4697
Austria	0	1460	0	1522	0	1510	4492
Belgium	1145	2792	0	1912	0	1509	7358
Brazil	0	1782	1149	0	1500	0	4431
Canada	1254	1730	0	1931	2164	0	7079
Chile	0	1500	1000	1200	1000	0	4700
China	0	1000	1500	1000	2015	0	5515
Denmark	1182	1030	0	1023	0	1507	4742
Finland	1003	588	987	1038	1014	1134	5764
France	1200	1002	0	1615	1001	1501	6319
Germany	0	3437	2026	2036	2064	2075	11638
Iceland	927	702	0	968	0	808	3405
Ireland	1217	1000	0	1012	0	1013	4242
Italy	1348	2018	0	2000	1012	1519	7897
Japan	1204	1011	1054	1362	1096	0	5727
South Korea	970	1251	0	1200	1200	0	4621
Malta	467	393	0	1002	0	1500	3362
Mexico	1837	1531	2364	1535	1560	0	8827
Netherlands	1221	1017	0	1003	1050	1554	5845
Norway	1051	1239	1127	0	2115	0	5532
Portugal	0	1185	0	1000	0	1553	3738
South Africa	1596	0	2935	3000	2988	0	10519
Spain	2303	4147	1211	2409	1200	1500	12770
Sweden	954	1047	1009	1015	1003	1187	6215
Great Britain	1167	1484	0	1000	1041	1561	6253
United States	2325	1839	1542	1200	1249	0	8155
Total	26604	37187	21031	34263	28695	21431	169211
Observations	169211						

Table A.6: Availability of happiness and social capital variables across countries and waves in the ESS.

Countries	Years				Total
	2002	2004	2006	2008	
Austria	2115	2101	2227	0	6443
Belgium	1839	1758	1789	1748	7134
Switzerland	2013	2115	1783	1795	7706
Czech Republic	1249	2759	0	1927	5935
Germany	2885	2819	2878	2718	11300
Denmark	1471	1447	1468	1589	5975
Estonia	0	1894	1370	1574	4838
Spain	1618	1622	1833	2487	7560
Finland	1984	2003	1883	2182	8052
France	1485	1792	1973	2057	7307
Great Britain	2028	1863	2364	2331	8586
Greece	2511	2363	0	2034	6908
Hungary	1628	1456	1460	1497	6041
Ireland	1945	2216	1717	1756	7634
Israel	2352	0	0	2302	4654
Netherlands	2336	1868	1870	1760	7834
Norway	2032	1748	1741	1540	7061
Poland	1991	1626	1631	1520	6768
Portugal	1452	1973	2083	2277	7785
Sweden	1958	1913	1901	1815	7587
Slovenia	1453	1390	1419	1241	5503
Slovakia	0	1409	1655	1712	4776
Turkey	0	1759	0	2115	3874
Ukraina	0	1788	1755	1558	5101
Total	38345	43682	36800	43535	162362
Observations	162362				

Table A.7: Availability of life satisfaction and social capital variables across countries and waves in the ESS.

Countries	Years				Total
	2002	2004	2006	2008	
Austria	2115	2101	2227	0	6443
Belgium	1839	1758	1789	1748	7134
Switzerland	2013	2115	1783	1795	7706
Czech Republic	1249	2759	0	1927	5935
Germany	2885	2819	2878	2718	11300
Denmark	1471	1447	1468	1589	5975
Estonia	0	1894	1370	1574	4838
Spain	1618	1622	1833	2487	7560
Finland	1984	2003	1883	2182	8052
France	1485	1792	1973	2057	7307
Great Britain	2028	1863	2364	2331	8586
Greece	2511	2363	0	2034	6908
Hungary	1628	1456	1460	1497	6041
Ireland	1945	2216	1717	1756	7634
Israel	2352	0	0	2302	4654
Netherlands	2336	1868	1870	1760	7834
Norway	2032	1748	1741	1540	7061
Poland	1991	1626	1631	1520	6768
Portugal	1452	1973	2083	2277	7785
Sweden	1958	1913	1901	1815	7587
Slovenia	1453	1390	1419	1241	5503
Slovakia	0	1409	1655	1712	4776
Turkey	0	1759	0	2115	3874
Ukraina	0	1788	1755	1558	5101
Total	38345	43682	36800	43535	162362
Observations	162362				

Table A.8: Number of years between two consecutive waves of the WVS/EVS data-set when the happiness variable is available. Each columns reports the distance in years from the previous wave for each country. Figures show that the intervals vary considerably from wave to wave and from country to country. In some cases the distances are short enough to allow a short-term trend analysis, while in most cases only longer-term analysis would be possible.

country	wave 1	wave 2	wave 3	wave 4	wave 5	wave 6
Argentina	.	7	4	4	7	.
Australia	.	.	14	.	10	.
Austria	.	.	.	9	.	9
Belgium	.	9	.	9	.	10
Brazil	.	.	6	.	9	.
Bulgaria	.	.	7	2	7	2
Canada	.	8	.	10	6	.
Chile	.	.	6	4	5	.
China	.	.	5	6	6	.
Czech Republic	.	.	8	1	.	9
Denmark	.	9	.	9	.	9
Estonia	.	.	6	3	.	9
Finland	.	9	6	4	5	4
France	.	9	.	9	7	2
Germany	.	.	7	2	7	2
Great Britain	.	9	.	.	16	3

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Table A.8 – continued from previous page

country	wave 1	wave 2	wave 3	wave 4	wave 5	wave 6
Hungary	.	.	7	1	.	9
Iceland	.	6	.	9	.	10
Ireland	.	9	.	9	.	9
Italy	.	9	.	9	6	4
Japan	.	9	5	5	5	.
Latvia	.	.	6	3	.	9
Lithuania	.	.	7	2	.	9
Malta	.	8	.	8	.	9
Mexico	.	9	6	4	5	.
Netherlands	.	9	.	9	7	2
Norway	.	8	6	.	12	.
Poland	.	.	8	2	6	3
Portugal	.	.	.	9	.	9
Romania	.	.	5	1	6	3
Russian Federation	.	.	5	4	7	2
Slovakia	.	.	8	1	.	9
Slovenia	.	.	3	4	6	3
South Africa	.	.	14	5	6	.
South Korea	.	.	6	5	4	.
Spain	.	9	5	4	8	1
Sweden	.	8	6	3	7	3
United States	.	8	5	4	7	.

Table A.9: Number of years between two consecutive waves of the WVS/EVS data-set when the life satisfaction variable is available. Each columns reports the distance in years from the previous wave for each country. Figures show that the intervals vary considerably from wave to wave and from country to country. In some cases the distances are short enough to allow a short-term trend analysis, while in most cases only longer-term analysis would be possible.

country	wave 1	wave 2	wave 3	wave 4	wave 5	wave 6
Argentina	.	7	4	4	7	.
Australia	.	.	14	.	10	.
Austria	.	.	.	9	.	9
Belgium	.	9	.	9	.	10
Brazil	.	.	6	.	9	.
Bulgaria	.	.	7	2	7	2
Canada	.	8	.	10	6	.
Chile	.	.	6	4	5	.
China	.	.	5	6	6	.
Czech Republic	.	.	8	1	.	9
Denmark	.	9	.	9	.	9
Estonia	.	.	6	3	.	9
Finland	.	9	6	4	5	4
France	.	9	.	9	7	2
Germany	.	.	7	2	7	2
Great Britain	.	9	.	9	7	3

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Table A.9 – continued from previous page

country	wave 1	wave 2	wave 3	wave 4	wave 5	wave 6
Hungary	.	.	7	1	.	9
Iceland	.	6	.	9	.	10
Ireland	.	9	.	9	.	9
Italy	.	9	.	9	6	4
Japan	.	9	5	5	5	.
Latvia	.	.	6	3	.	9
Lithuania	.	.	7	2	.	9
Malta	.	8	.	8	.	9
Mexico	.	9	6	4	5	.
Netherlands	.	9	.	9	7	2
Norway	.	8	6	.	12	.
Poland	.	.	8	2	6	3
Portugal	.	.	.	9	.	9
Romania	.	.	5	1	6	3
Russian Federation	.	.	5	4	7	2
Slovakia	.	.	8	1	.	9
Slovenia	.	.	3	4	6	3
South Africa	.	.	14	5	6	.
South Korea	.	8	.	11	4	.
Spain	.	9	5	4	8	1
Sweden	.	8	6	3	7	3
United States	.	8	5	4	7	.

Appendix B. Data missingness in the WVS/EVS data-set

Descriptive data and missing values for each variable are presented in tab.B.10 and tab.B.11 for happiness and life satisfaction data, respectively.

The numerosity of the overall sample in the two cases is substantially similar with a difference of about 1600 more observations for satisfaction with life data. Figures from the sixth column of tab.B.10 and tab.B.11 inform that less than 1% of the data are missing. The only exception is represented by data about feeling of happiness. In this case the percentage of missingness is 1.3%. Data missingness is further explored in tab.B.12 and tab.B.13 where figures are contrasted over waves. In all the considered cases, percentages of missingness are of negligible size and, as such, they are not likely to bias estimates[19].

Table B.10: Descriptive statistics for variables jointly observed with feeling of happiness in the WVS/EVS dataset.

variable	mean	sd	min	max	obs	missing
feeling of happiness	3.170	0.674	1	4	166261	0.0132
membership in at least 1 group	0.603	0.489	0	1	167983	0.00301
log GDP per capita	9.503	0.862	5.970	10.65	168490	0

[19]For a more detailed discussion on data missingness and its implications for econometric analysis, please refer to Schafer (1997, 1999); Allison (2001)

Table B.11: Descriptive statistics for variables jointly observed with life satisfaction in the WVS/EVS dataset.

variable	mean	sd	min	max	obs	missing
satisfaction with life	7.355	2.068	1	10	167906	0.00771
membership in at least 1 group	0.598	0.490	0	1	168704	0.00300
log GDP per capita	9.501	0.867	5.970	10.65	169211	0

Table B.12: Percentage of data missingness across waves for variables jointly observed with feeling of happiness in the WVS/EVS dataset.

variable	wave 1	wave 2	wave 3	wave 4	wave 5	wave 6	total
feeling of happiness	0.0209	0.0256	0.00678	0.00776	0.00634	0.00705	166261
membership in at least 1 group	0	0	0.00148	0	0.00227	0.0191	167983
log GDP per capita	0	0	0	0	0	0	168490

Table B.13: Percentage of data missingness across waves for variables jointly observed with life satisfaction in the WVS/EVS dataset.

variable	wave 1	wave 2	wave 3	wave 4	wave 5	wave 6	total
satisfaction with life	0.0122	0.00764	0.00571	0.00785	0.00746	0.00434	167906
membership in at least 1 group	0	0	0.00157	0	0.00227	0.0191	168704
log GDP per capita	0	0	0	0	0	0	169211

Appendix C. Data missingness in the ESS data-set

The sixth column of tab.C.14 informs that the percentage of missing data is on average less than 1%. Only in the case of the index of social trust the percentage of missingness raises to 1.4%. However, such a small percentage does not raise any particular worry for the reliability of our estimates (Allison, 2001). Data missingness is further analysed across waves in tab.C.15. Figures inform that also in this case percentages of missingness are negligible and, according to the literature on data missingness, they are not likely to affect estimates (Schafer, 1997, 1999; Allison, 2001).

Table C.14: Descriptive statistics for variables in the ESS data-set

variable	mean	sd	min	max	obs	missing
How happy are you	7.231	2.007	0	10	167190	0.00663
How satisfied with life as a whole	6.875	2.319	0	10	167209	0.00652
Most people try to take advantage of you, or try t	5.567	2.378	0	10	166676	0.00968
Most people can be trusted or you can't be too car	4.982	2.493	0	10	167571	0.00437
Most of the time people helpful or mostly looking	4.801	2.385	0	10	167283	0.00608
index of social trust	-4.38e-10	1	-2.553	2.424	165760	0.0151
log GDP per capita	9.673	0.819	6.613	10.93	168306	0

Table C.15: Percentage of data missingness across waves in the ESS data-set.

variable	wave 1	wave 2	wave 3	wave 4	total
How happy are you	0.00515	0.00600	0.00752	0.00781	167190
How satisfied with life as a whole	0.00626	0.00490	0.00608	0.00874	167209
Most people try to take advantage of you, or try t	0.00959	0.0101	0.0108	0.00839	166676
Most people can be trusted or you can't be too car	0.00454	0.00441	0.00568	0.00305	167571
Most of the time people helpful or mostly looking	0.00613	0.00638	0.00676	0.00516	167283
index of social trust	0.0152	0.0160	0.0168	0.0127	165760
log GDP per capita	0	0	0	0	168306

Appendix D. Factor analysis for trust questions in the ESS

Tab. D.16 informs that in the pooled sample, factor loadings range from .80 to .85 thus suggesting that the three variables contribute equally to the definition of a latent concept that we call "social trust". When observing results across waves (see tab.D.17), we notice that discrepancies arise mainly in the first and third wave where factor loadings range from about .79 for the helpfulness variable to .84 for the fairness variable. The slight variability among factor loadings both in the pooled sample and within waves convinced us of the opportunity to build an aggregated index of social trust resulting from the standardized weighted average of the three items.

Table D.16: Factor loading and unique variances for the pooled sample

	*Factor*1	*Psi*
Most people try to take advantage of you	.850	.276
Most people can be trusted	.840	.293
Most of the time people helpful	.804	.352

Table D.17: Factor loading and unique variances across waves

wave 1	$Factor1$	Psi
Most people try to take advantage of you	.849	.278
Most people can be trusted	.836	.299
Most of the time people helpful	.794	.368
wave 2	$Factor1$	Psi
Most people try to take advantage of you	.844	.287
Most people can be trusted	.835	.301
Most of the time people helpful	.804	.353
wave 3	$Factor1$	Psi
Most people try to take advantage of you	.844	.286
Most people can be trusted	.834	.304
Most of the time people helpful	.797	.364
wave 4	$Factor1$	Psi
Most people try to take advantage of you	.861	.257
Most people can be trusted	.852	.272
Most of the time people helpful	.818	.330

Appendix E. Long-term relationships

Table E.18: Bivariate correlations among long-term trends of happiness with SC and GDP respectively (standardized variables).

	happiness	happiness
membership in group or association	0.616^{**}	
	(3.00)	
log GDP		-0.243^{**}
		(-2.53)
Constant	-0.691^{***}	-0.476^{**}
	(-4.20)	(-3.40)
Observations	27	27

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$

Table E.19: Bivariate correlations among long-term trends of life satisfaction with SC and GDP respectively (standardized variables).

	life satisfaction	life satisfaction
membership in group or association	0.302**	
	(3.13)	
log GDP		−0.0554
		(−0.39)
Constant	−0.630***	−0.509***
	(−7.25)	(−4.34)
Observations	27	27

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$

Appendix F. Medium-term relationships

Table F.20: Bivariate correlations among medium-term trends of subjective well-being and changes of the index of social trust (standardized variables).

	(1)	(2)	(3)	(4)
	happiness	happiness	life satisfaction	life satisfaction
index of social trust	0.810***		0.747***	
	(4.13)		(7.54)	
trend of log GDP		0.307*		0.360
		(2.01)		(1.70)
Constant	$-2.25e-09$	$-1.57e-09$	$-1.21e-09$	$-1.52e-10$
	(−0.00)	(−0.00)	(−0.00)	(−0.00)
Observations	24	24	24	24

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$

Appendix G. Medium-term relationships deleting Turkey

Table G.21: Bivariate correlations among medium-term trends of subjective well-being and changes of the index of social trust excluding Turkey (standardized variables).

	(1) happiness	(2) happiness	(3) life satisfaction	(4) life satisfaction
index of social trust	0.541**		0.725***	
	(2.81)		(4.24)	
trend of log GDP		0.390**		0.420**
		(3.47)		(2.23)
Constant	0.0783	0.164	0.00652	0.119
	(0.67)	(1.44)	(0.05)	(0.74)
Observations	23	23	23	23

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$

Table G.22: Trivariate regressions of medium-term trends of subjective well-being over changes of the index of social trust and trends of GDP excluding Turkey (standardized variables).

	(1)	(2)
	happiness	life satisfaction
index of social trust	0.461***	0.643***
	(5.80)	(4.21)
trend of log GDP	0.333***	0.341**
	(5.09)	(2.14)
Constant	0.0968	0.0255
	(1.10)	(0.20)
Observations	23	23
Adjusted R^2	0.572	0.487

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$

Appendix H. Short-term relationships

Table H.23: Bivariate correlations among short-term trends of subjective well-being and changes of the index of social trust (standardized variables).

	(1) happiness	(2) happiness	(3) life satisfaction	(4) life satisfaction
index of social trust	0.308**		0.263*	
	(2.33)		(1.80)	
changes in log GDP (2yrs)		0.591***		0.545***
		(4.65)		(4.66)
Constant	$-2.54e-09$	$-4.92e-09$	$2.42e-09$	$3.71e-10$
	(−0.00)	(−0.00)	(0.00)	(0.00)
Observations	58	58	58	58

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$

Appendix I. Estimates excluding countries with sampling problems

Table I.24: Bivariate correlations among long-term trends of happiness with SC and GDP respectively (standardized variables).

	happiness	happiness
membership in group or association	0.756**	
	(3.06)	
log GDP		−0.160
		(−0.80)
Constant	−0.697**	−0.386**
	(−3.58)	(−2.13)
Observations	23	23

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$

Table I.25: Bivariate correlations among long-term trends of life satisfaction with SC and GDP respectively (standardized variables).

	life satisfaction	life satisfaction
membership in group or association	0.353^{***}	
	(4.35)	
log GDP		0.0738
		(0.64)
Constant	-0.723^{***}	-0.544^{***}
	(-8.11)	(-4.63)
Observations	23	23

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$

Table I.26: Trivariate regressions of long-term trends of happiness over trends of SC and GDP (standardized variables).

	happiness
membership in group or association	0.755**
	(2.98)
log GDP	−0.00176
	(−0.01)
Constant	−0.697**
	(−3.49)
Observations	23
Adjusted R^2	0.309

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$

Table I.27: Trivariate regressions of long-term trends of life satisfaction over trends of SC and GDP (standardized variables).

	life satisfaction
membership in group or association	0.362***
	(4.13)
log GDP	0.0908
	(1.25)
Constant	−0.711***
	(−7.77)
Observations	23
Adjusted R^2	0.214

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$

Appendix J. List of groups and associations mentioned in the WVS/EVS questionnaire

Respondents were asked to mention whether they belonged or were performing unpaid voluntary work for any of the following list of associations:

- social welfare service for elderly;
- religious organization;
- education, arts, music or cultural activities;
- labour unions;
- political parties;
- local political actions;
- human rights;
- conservation, the environment, ecology, animal rights;
- conservation, the environment, ecology;
- animal rights;
- professional associations;
- youth work;
- sports or recreation;

- women's group;
- peace movement;
- organization concerned with health;
- consumer groups;
- other groups.

Appendix K. Country acronyms in the ESS

AT: Austria

BE: Belgium

CH: Switzerland

CZ: Czech Republic

DE: Germany

DK: Denmark

EE: Estonia

ES: Spain

FI: Finland

FR: France

GB: Great Britain

GR: Greece

HU: Hungary

IE: Ireland

IL: Israel

NL: Netherlands

NO: Norway

PL: Poland

PT: Portugal

SE: Sweden

SI: Slovenia

SK: Slovakia

TR: Turkey

UA: Ukraina

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