



FACOLTÀ DI ECONOMIA
UNIVERSITÀ DI BOLOGNA
SEDE DI FORLÌ

**Corso di Laurea in Economia
delle Imprese Cooperative
e delle Organizzazioni Nonprofit**

Sociability and Happiness

Leonardo Becchetti Alessandra Perroni Fiammetta Rossetti

Working Paper n. 44

giugno 2007

in collaborazione con



Leonardo Becchetti¹

Alessandra Perroni

Fiammetta Rossetti

Facoltà di Economia, Università di Roma Tor Vergata

Informazioni :

Facoltà di Economia di Forlì - Corso di Laurea in Economia delle Imprese Cooperative e delle ONP

Tel. 0543-374620 – Fax 0543-374618 e-mail: nonprofit@spfo.unibo.it website: www.ecofo.unibo.it

¹ becchetti@economia.uniroma2.it

Abstract

The standard specification of utility functions in economic models usually neglects the effect of sociability on happiness. Our level and first difference panel estimates show that relational goods have significant and positive effects on self declared life satisfaction, net of the impact of standard controls included in these kinds of estimates. The estimation of a panel GMM VAR system shows that such effects remain significant when the inverse causality nexus is taken into account.

1. Introduction

Man is a knot into which relationships are tied.
Antoine de Saint-Exupéry, *Flight to Arras*, 1942.

Shared joy is a double joy; shared sorrow is half a sorrow,
Swedish Proverb.

Someone to tell it to is one of the fundamental needs of
human beings, Miles Franklin.

For the most part of its history economic literature has funded its theoretical analyses on the basis of untested assumptions on individual preferences. Such preferences crucially oriented the selection of arguments to be included in the utility functions of “stylised” economic agents which were at the basis of economic models.

The result of a progressively established consensus on this crucial point was an oversimplification of such function in which consumption goods and leisure became the arguments which parsimoniously summarised all different factors affecting individual wellbeing.

In its well known criticism to the standard approach Sen (1976) argued that two fundamental drivers such as *sympathy* and *commitment* were excluded by the *homo oeconomicus*² and that the richness of factors (such as those) affecting individual happiness could only partially be

² In an interesting consideration on this point Sen argues that the stylisation of economic agents operating in anonymous or hostile contexts such as those of contracts and war was progressively extended to the models dealing with all other aspects of reality.

incorporated in leisure and consumable goods.³ In this paper we want to push further the reflection on this point by arguing that relationships are a fundamental part of individual identity. As a consequence, various measures of human sociability crucially affect utility functions. We further argue that our claim may be tested empirically by using information from a dataset which includes measures of self declared life satisfaction and sociability.

We are supported on this point by the recent upsurge of empirical studies on the determinants of self declared happiness which has partially confuted the well known Einstein's say (according to whom "what really matters in life cannot be measured") enlarging the set of what is measurable to "things that matters" and giving the possibility of testing the validity of Sen's critique.

Empirical happiness studies have recently boomed overcoming the scepticism on their reliability from at least five points of view: i) they have a longstanding tradition in psychology and sociology and have therefore passed a process of "cultural Darwinian selection" in these disciplines (Alesina, Di Tella and MacCulloch, 2004); ii) significant and positive links have been found between self declared happiness and healthy physical reactions such as smiling attitudes (Pavot 1991, Eckman et al., 1990) and heart rate and blood pressure responses to stress (Shedler, Mayman and Manis, 1993); iii) neurosciences have identified a nexus between positive feelings and physical measures of brain activity (higher alpha power in the left prefrontal cortex) while, at the same time, measures of hedonic well being, such as self declared life satisfaction, have been shown to be related with the same activity (Clark et al., 2006); iv) individuals choose to discontinue activities associated with low levels of well-being (Frijters, 2000; and Shiv and Huber, 2000) and v) happiness scores of respondent's friends and family members are significantly correlated with the respondent's own report (see Sandvik et al., 1993; Diener and Lucas, 1999).

In spite of the impressive growth of empirical contributions and of the many achievements in this literature many issues still remain open also due to the limits of data collected by available databases. On the one side, the main one allowing comparisons between high income and

³ Not all the enjoyment we get from relationships can be incorporated into a consumption good (i.e. a family car instead of a Smart), nor it can be adequately modelled in an undistinguished (relational and non relational) leisure.

developing countries (the World Value Survey) is not a panel and presents serious limits in the measurement of some crucial variables (such as personal income). On the other side, the few panel databases available which contain information on self declared happiness (British Household Survey Panel, German Socioeconomic Panel and Russia Monitoring Survey) have it for a single country.⁴

Information repeated in time for each individual is crucial since, from the methodological point of view one of the best ways to tackle problems of interpersonal comparability and endogeneity in empirical studies has been that of the development of first differenced models. Such models partially address causality issues in the relationship between self declared happiness and its determinants by eliminating the effects of time invariant personality traits inherited from childhood or birth (Ferrer-i-Carbonell and Frijters, 2004).

So far, most of the research has been concentrated on the role of income and unemployment⁵ even though Clark et al. 2006, in a recent comprehensive survey on the issue acknowledge that the problem of missing variables may eventually cloud the same above mentioned role determining spurious relationship and endogeneity. In this paper we want to focus on one of these neglected variables, that is, investment in relational activities which is a fundamental dimension of human being rarely considered by economists but with strong and significant consequences on economic activity. Neglect of this dimension has serious consequences. It may lead i) to paradoxical results of standard welfare policies on happiness with undesirable consequences on political consensus⁶ or ii) to the incapacity of fully exploiting the relational resources which can trigger productivity in a

⁴ The European Community Household Panel is an exception providing data from many countries but measures income and not life satisfaction.

⁵ On the nexus between happiness and income see, among others, Winkelmann and Winkelmann (1998), Ravallion and Lokshin (2001), Ferrer-i-Carbonell and Frijters (2004), Senik (2004), Ferrer-i-Carbonell (2005) and Clark et al. (2005), who provide empirical evidence on the relationship between changes in income and changes in happiness, and Gardner and Oswald, 2006b and Frijters et al. (2004a, 2004 and 2006), who document the effect of exogenous changes in income on happiness. On the relationship between income and employment status see, among others, Di Tella et al. (2001 and 2003) and Winkelmann and Winkelmann (1998).

⁶ A recent research on the GSOEP shows that, on all cases of yearly increases in real household income in the last twenty years on a sample of more than 60,000 observations, a parallel reduction in life satisfaction is registered for one third of them with almost 60 percent of cases explained by a deterioration of relational life (Becchetti-Rossetti, 2007).

corporate environment in which team working is always more important when complex tasks need to be developed (Thompson and Wallace, 1996).

The paper is divided into five sections (introduction and conclusions included) In the next section we provide a definition of relational goods and a short discussion of it. In the third and fourth section we illustrate descriptive evidence and our econometric findings. The fifth section concludes.

2. Relational goods: why do they matter in general and for the economic discipline

While the standard economic discipline obviously deals in great length with (consequences of) interactions among productive units (especially when markets are thin) individuals as consumers are generally considered in isolation. Alternatively, the relationships among them are taken into account under the form of negative and positive externalities, hence in terms of unintended consequences of individual's utility maximizing actions on the utility functions of other economic agents.

With extremely rare exceptions, relationships do not appear directly in the homo oeconomicus utility function.⁷ An objection to this may be that concern for other individuals is nonetheless, even though indirectly, present in individual choices by being incorporated into the amount of chosen leisure or in the purchase of consumption goods (e.g. strong relational preferences may increase the demand for family cars with respect to single place cars, etc.). The problem with it is that this indirect consideration of the role of relational ties is extremely imprecise for several reasons: i) sympathy (and the expression of it) may well affect individual well being even though not being incorporated in any consumption good (ie. in a walk with a friend); ii) leisure includes many heterogeneous activities which can be relational or utterly non relational (hours spent alone on the

⁷ Among the few exceptions consider those utility functions including fairness, inequity aversion or (strategic or pure) altruism (Fehr-Schmidt, 1999; Fehr and Schmidt, 2001 and Sobel, 2002). Empirical evidence from experimental studies on trust and ultimatum games do not reject these extensions of the standard models (Fehr and Falk, 2002). Finally, growing sales of socially responsible products are a revealed preference argument in favour of them (Becchetti-Rosati, 2007).

TV or on the web); iii) relational goods may also be produced and consumed in the worked hours in proportion to the niceness of the social working environment.

For all these reasons it is important to test empirically the standard restriction in the utility function by evaluating whether the time spent for relational goods may be considered an argument of individual utility function per se, even though it is not incorporated in any consumed good.

In order to do so, a clear definition of relational goods is needed. According to a recent literature (Gui, 2000; Ulhaner, 1989) relational goods are *a specific kind of local public goods which are simultaneously consumed when produced*. Examples of relational goods are, on small scale, love or family relationships and, on large scale, many kinds of social events (club or association meetings, live sport events, etc.). Relational goods are *local public goods* since nonexcludability and non rivalry are limited to participants. They are simultaneously consumed and produced since participating to them is both an act of production (my presence increases the value of the good) and consumption (I enjoy it while being present).

They also are a special kind of public goods since they should be better defined as antirival than non rival. This is because their very same nature is based on intertemporal sharing of them. As a consequence, participation to their production and consumption actually creates a positive externality on partners and contributes to the quality of the public good itself. For the same reasons partners do not see nonrivalry and nonexcludability as a negative element which prevent them from exploiting all private benefits of the good, but as a positive element which implements its value (my pleasure is actually increased, or even crucially determined, by the fact that the other is also participating and taking pleasure).

A general laughter during a comic movie, supporters' enthusiasm at the stadium after one's own team goal and applause at a theatre are also examples of relational goods. I can see the movie, the football match and the performance alone on TV but, in that case, the absence of other close co-participants will deprive myself of the above mentioned public goods incorporated in such events.

Given this definition, it appears clear that relational goods are a different way of including “others” in the utility function with respect to the well established relative income approach in happiness studies (Ferrer-i-Carbonell, 2005).

Such different ways may be related to the heterogeneity of philosophical views on human relationships. Oversimplifying, in the history of literature and philosophy we go from the extreme perspective of Camus, for which “hell is others”, to that of a recent branch of philosophical thought which includes Mounier, Levinas, Rosenzweig who consider the inner nature of the individual as intrinsically relational (or men as “knots into which relationships are tied”) and therefore argument that human flourishing is impossible without a good relational life.

The relative income effect is somewhat in accordance with the Camus perspective as it stresses the negative side of relational life. The existence of other individuals inevitably leads to comparisons and therefore their activity (when they perform better or are richer than us) is highly likely to generate negative externalities. In the relational good perspective documented above the role of others is mainly positive since they are the unavoidable partners whose cooperation and participation we require in order to generate the relational goods we need for our life.

It would not be correct to argue that the above described conception of relational goods is completely excluded from standard happiness estimates. Marital status controls are in fact important proxies which measure, in some way, the accumulated stock of a specific kind of small scale relational good (love affection) where we may imagine a given threshold of such stock which delimits success from failure in the provision of the relational good itself (or marriage and/or stable partnerships from separation or divorce).

What is however completely neglected in standard happiness estimates is the focus on the actual production of relational goods and, more specifically, of large scale relational goods. Our empirical analysis in the sections which follow is explicitly addressed to evaluate the relevance of such goods on individual happiness.

3. Database and variables construction

In the original GSOEP dataset we find the following five indicators of time dedicated to the production of relational goods: i) “*attend social gatherings*”; ii) “*attend cultural events*”; iii) “*participate in sports*”; iv) “*perform volunteer work*”; v) “*attend church or religious events*”. Each of these variables can take values from 1 to 4, depending on how much time is devoted to each particular relational activity (1=Never, 2=Less Frequently, 3=Every Month and 4=Every Week).

Do all these relational activities “produce relational goods” in the way we defined them in the previous section ? Social gatherings are produced and consumed by participants. They are local public goods since any individual who decides to participate creates a positive externality for other participants (the point is well expressed by the above explained anti-rivalrous attribute of relational goods). Cultural events have similar features even though the “production” activity on behalf of participants is much weaker (the event is produced anyway, even with very few participants, but high participation may increase the value of the good and some of its peculiar aspects (ie. an applause or a laughter in a theatre)). Active (athletes) and passive (bystanders) participants to sport events produce and consume local public goods not just in case of team but also individual sports, as far as they are framed into an agonistic event in which the presence of other competitors is essential. The community dimension is essential in church or religious events which are partially produced and consumed by community members and generate the so called “fellow feelings” which, according to Adam Smith (1759), strengthen ties among participants.⁸

Voluntary work is generally performed in groups and participation has also the effect of reinforcing ties among participants (i.e. a working camp, a social service performed by members of an association). The “fellow feeling” argument applies also here.

⁸ Smith arguably notes that fellow feelings may be equally fuelled by pleasant and unpleasant joint experiences and that non physically painful, but emotionally unpleasant, joint experiences have a strong impact on the formation of a common consent among people.

We build a “*Relational Time Index*” (from now on *RTI*) by just averaging values of these five variables for each respondent. We decided to built the RTI index in this way for two main reasons.

First, we want a synthetic indicator on the relational time of individuals which goes beyond the information given by a single variable.

Second, the synthetic indicator helps us to solve in part the problem of missing data. In fact, none of the five variables above is in the dataset in all of the 21 waves. By construction we calculate the RTI index on the basis of non missing relational variables for each individual-year in order to reduce the missing variable problem. However, for the sake of completeness, we present results of the selected specifications either when using the aggregate RTI index or its individual components as separate regressors.

Another variable we introduce, which is typically used in the empirical literature, is relative income.

Several papers argue that positional status and the ratio between one’s own and reference group income significantly affect life satisfaction (see, among others, Dusenberry, 1949; Frank, 2005 and Layard, 2005). On the empirical point of view the problem is obviously in the definition of the reference group income. A benchmark paper on this issue is Ferrer-i-Carbonell (2005), who, working on the same database, calculates relative income as the average income of individuals being part of the same age, education and (West and East Germany) regional subgroups. In a similar way, we divide observations into classes according to gender, age, region and education. For age and education we consider 3 year classes. Since age in our sample goes from 19 to 99 years we have 27 classes, while classes of education (ranging from 7 to 18 years in our sample) are 4. All this considered, the combination of these criteria leads to the definition of $2*2*27*9$ classes. We therefore build the reference household income of each individual by just taking the mean of the real household income group to which he belongs.⁹

Other determinants of happiness we include in our estimates (age, gender, education, marital and employment status, health) are more standard in the literature. To describe marital condition of the

⁹ For example, the reference household income of A men of the first class of age and the first class of education in West Germany is just the mean of the individual which responds to these “class characteristics”.

interviewed individuals we jointly consider status variables (married, single, separated, divorced, widowed) and shocks identifying transition from one status to another (marriage, separation). For employment condition we follow the same approach and consider as status variables full time, regular part time and marginal irregular part time employment, while we also measure shocks related to losing one's job or getting a new one.

4. Descriptive findings

Table 1 illustrates transition probabilities in self declared life satisfaction, a variable which can take discrete values from 1 to 10. It shows that year to year persistence in the same happiness level is weaker at low levels (below 20 percent when previous year self declared happiness is below 5), raises at 5 (36.68 percent) and peaks at 8 (48.16 percent), which therefore seems to be a sort of focal point in individual responses. In Table 2 we provide summary descriptive statistics for variables which will be used in the empirical analysis. From this Table we learn that 62 percent year-observations correspond to married individuals against 23 percent to singles and 5.5 percent to divorced. Episodes of marriage and separation cover respectively 1.9 and 1.4 percent of our observations. Loss of employment accounts for 3.2 percent of total observations while unemployment status for 6.6 percent of them. This implies that unemployment length in the sample is very short (not higher than 2 years on average). Among job conditions we observe that full time employed accounts for 47 percent of total year observations, while regular part-time and marginal irregular part-time for 6.9 and 2 percent of them respectively. Families are small since the average number of household members is 3.26. The average number of visits to doctor is 10.4 per year. Table 3 calculates the average values of the selected variables in correspondence of the 11 levels of declared life satisfaction. A first observation is that age, German nationality, education and gender are untrended across life satisfaction levels.

On the contrary, other variables exhibit well defined trends. The share of married respondents is 51 percent at (life satisfaction) level 1 and grows up to 65 percent at level 10. Separated (divorced) are 6 percent (11 percent) among the least satisfied (level 0) and fall to 2 percent (4 percent) among the most satisfied (level 10). 5 percent of the least satisfied have episodes of separation in the year of the interview against only 1 percent of the most satisfied.

All relational activity indicators appear positively associated with self declared happiness. The index of attendance of cultural gatherings varies from 2.58 to 3.26 (that is, from less to more than monthly frequency) when moving from the lowest to the highest life satisfaction value, that of cultural events from 1.28 to 1.69, participation to sports from 1.49 to 2.03, performance of volunteer work from 1.21 to 2.03 and attendance of church or religious events from 1.45 to 1.99.

Always based on information from Table III, the association between life satisfaction and job status variables seems very strong. The “unemployment rate” among those declaring the lowest life satisfaction is far above sample average (26 percent) while the same number among those with the highest level of life satisfaction is just 3 percent. 11 percent of those declaring a level of life satisfaction equal to zero have lost their job in the survey year, while this occurs only for 2 percent of the most satisfied. It is interesting to note that the employment shock is asymmetric since finding a job seems to matter much less.

Full time employment also appears very significant but U-shaped. Only 24 percent of the least satisfied are full time employed, against 52 percent of those declaring a level of satisfaction equal to 7. The share however falls to 41 percent for the most satisfied.

As expected, health is another crucial variable affecting life satisfaction. The proxy we use is the number of visits to the doctor per year. The least satisfied have an average number of around 23 visits against 8.5 of the most satisfied.

Finally, monthly real household income in 1982 DMs appears positively correlated with our dependent variable. The average income difference between those declaring lowest and highest life satisfaction is more than 800 Dmarks. Furthermore, income tends to be higher (lower) than that of

the reference group for the happier (the less happy) confirming the hypothesis of the significant effect of relative income on life satisfaction.

In Table 4 we repeat the exercise in correspondence of yearly changes in life satisfaction (which range from minus to plus ten). Consider that the two extreme changes in both positive and negative direction are not always reliable given the limited number of observations (around 50).

With regard to marital status we observe that marriage seems to stabilize happiness levels since the share of married people is higher for small variations in happiness and lower for large variations on both sides.¹⁰

When we consider our aggregate index of relational goods we observe that its value is always higher for positive changes in happiness than for the corresponding negative change of the same amount (i.e. 1.76 (1.63) for those with an increase (decrease) of happiness of seven points). If we look at index components we observe that this finding is generally confirmed when we consider attendance of social gatherings and cultural events but not attendance of church or religious events.

If we look at loss of job episodes we find that they are much higher (as a share of total observations) in correspondence of negative with respect to positive happiness changes. The pattern is the opposite for those finding a job (i.e. newly employed account for 15 (2) percent of those with an increase (decrease) of happiness of seven points). A strong difference in the same direction may be observed when we consider the share of individuals with full time employment.

5. Econometric findings

Descriptive statistics seem to identify some clear cut patterns in the relationship between self declared life satisfaction and part of its potential determinants (health, marital status and shocks,

¹⁰ Additional evidence on this point shows that marriage generates an average .088 yearly change in the self declared life satisfaction index with a 3.399 variance, while separation an average -.314 change with a higher variance 5.589 (demonstrating higher heterogeneity in individual reaction to such event).

employment status and shocks, relational goods). However, as it is well known, they cannot ascertain the statistical significance of such relationship and the magnitude of the effect (economic significance) of each variable, net of the impact of other controls. To check whether the nexus suggested by descriptive evidence is robust to composition effects, across years and after controlling for time invariant individual traits we need to perform econometric estimates.

In order to select the proper estimation method consider that our dependent variable is discrete qualitative and takes values from 0 to 10. The most suitable approach is therefore an ordered probit estimate, even though, given the extended range of our life satisfaction measure, the same dependent variable has been sometimes approximated in the literature to a continuous one so that OLS and panel fixed effect models have also been estimated (Frey and Stutzer, 2005). We therefore introduce as a robustness check also these two additional approaches and select two different specifications. In the first we use the aggregate relational good variable RTI and dispose of around 80,000 observations. In the second we replace this composite index with all its individual components. Such choice forces us to work only on those waves in which all individual components are non missing and therefore reduces the sample to around 30,000 observations. In terms of sample periods the first specification includes observations from the eighties, while the second only those from the nineties.

By taking this into account we may observe at first that signs and significance are quite stable across different estimation methods (hence the assumption of continuity of the dependent variable does not seem to alter significantly our results). With regard to the impact of regressors we find that effects of the marital status variable are not quite robust across years and to fixed effects, while findings on full time employment, real household income, relative income, health and relational activities are much more robust (Table 5).

Marriage is positively related to happiness when we include the eighties in the sample (specification with the RTI variable) but not when our observations start from the nineties. The status of separated

is negative and significant when we do not include the eighties and slightly less so when we include them. The divorced status seems always negative and significant with the exception of the estimate in which we correct for fixed effects. This seems to suggest that divorced individuals are less happy because of their negative time invariant psychological traits and not for the divorced status.

The effect of full time employment is more robust and positive across all estimates. This implies that it is robust across years and independent from individual fixed effects. The same story can be told for the positive effect of real household income and the negative effect of relative income.

the effect of our health proxy is strong and robust.

As additional interesting finding we observe that age becomes strongly negative when we introduce fixed effects. This may indicate the existence of a significant cohort effect for which the impact of ageing on life satisfaction is negative once we single out this effect from the fact that older generations have inherited fixed traits which lead them to appreciate life more.

To evaluate the economic significance of these effects, and to compare them across variables with heterogeneous scales, we calculate the impact of one standard deviation change of the regressor in terms of percent of a standard deviation change of the dependent variable (see Table 6).

To make an example, the standard deviation of Age is 17.155. Hence, if we increase Age by one standard deviation, the predicted effect on happiness is $(17.155) * (-0.003) = -0.052$. The standard deviation of *Satisfaction With Life Today* is 1.850, thus, an increase of one standard deviation in Age causes a decrease of $-0.052 / 1.850 = -0.028$ of a standard deviation in happiness.

Following this approach we may observe that the most relevant variables according to the study of magnitude seem to be again the relational index (*RTI*), the log of real household income and the number of annual doctor visits. An increase in *RTI* of one of its own standard deviations would increase the standard deviations of happiness of 0.195. An increase in *In Real Household Income* of one of its own standard deviations would increase the standard deviations of happiness of 0.164. An increase in *Nr. of Annual Doctor Visits* of one of its own standard deviations would decrease the standard deviations of happiness of -0.131.

5.1 First difference and panel VAR estimates

The problem of endogeneity in happiness estimates is a serious one. As it is well known improved health status may positively contribute to happiness but higher life satisfaction positively affects individual health. In the same way, even though we expect that a job and a higher income may increase life satisfaction, we also know that happier people are more likely to find jobs, to earn more, etc. (Clark et al., 2006).

Frey and Stutzer (2002a) correctly argue that panel data eliminate heterogeneity caused by those individual traits which are time invariant and inherited from childhood or birth. Clark, Frijters and Shields (2006) object however that part of the endogeneity in the happiness-income nexus may be generated by time varying factors, such as changes in health, which may lead to both higher happiness and income.

In some papers of the literature the problem has been partially solved by exploiting “quasi-natural experiments” or events which have been considered as determining exogenous changes in income (lottery wins, aggregate changes in real income after transition or reunification in Russia and Germany respectively) (Gardner and Oswald, 2006b; Frijters et al., 2004a, 2004 and 2006).

To control for endogeneity we follow two approaches. First, we reestimate the model in first differences and, second, we estimate a VAR system in which instrumental variables can be used and direct and reverse causality can be jointly taken into account.

The first approach is only a partial response to the problem. We may rely on it if we believe that changes in happiness may slowly affect changes in our regressors while changes in our regressors instantaneously affect changes in happiness. To make an example is much easier to believe that an increase in real household income generates an increase in happiness in the same year than that an (exogenous) increase in happiness of an interviewed individual has an immediate positive effect on his household earning capacity.

The advantage of this approach is also that of dropping out individual time invariant fixed effects on dependent variable levels.

Table 6 shows that variables which gave the most robust findings in level estimates also pass this test. Changes in relational activities, household income, relative income and health are significantly correlated in the expected direction with changes in self declared happiness. Such findings are invariant to the three estimation approaches followed (pooled OLS, panel fixed effects, ordered probit).

If we are strongly concerned about biunivocal causality and endogeneity, and not fully convinced by first differenced estimates, the panel VAR approach is the most suitable one under the assumption that our 0-10 variable can be approximated to a continuous one. With such approach we can estimate a system in which we jointly test whether production of relational goods causes happiness and viceversa.

Our VAR GMM system has the following specification

$$h_{it} = \sum_{j=1}^m \alpha_{1j} h_{it-j} + \sum_{j=1}^m \beta_{1j} S_{it-j} + \nu_{1i} + \varepsilon_{1it}$$

$$S_{it} = \sum_{j=1}^m \alpha_{2j} S_{it-j} + \sum_{j=1}^m \beta_{2j} y_{it-j} + \nu_{2i} + \varepsilon_{2it}$$

where h_{it} is the level of self declared life satisfaction of the i -th individual in the period t , ν is an individual fixed effect and ε is a random disturbance.

Our specification implies that the following orthogonality conditions are respected

$$E[h_{is} \varepsilon_{it}] = E[S_{is} \varepsilon_{it}] = E[\eta_i \varepsilon_{it}] = 0 \quad (s < t)$$

As it is well known the problem of this kind of estimates is that fixed effects are correlated with the regressors due to the presence of lagged dependent variables. The solution of expressing each variable as a difference from its time mean (Lundberg, 1985) has been shown to produce inconsistent estimates, even when the parameters are stationary, just because of the presence of lagged endogenous variables (see, Nickell, 1981). An additional problem of the model is the correlation between the lagged dependent variables and the disturbances. To avoid it, following

Arellano and Bond (1991) and Arellano and Bover (1995), we use lagged levels of the dependent variables as instruments and we then estimate the model with the generalized method of moments technique developed by Arellano and Bond (1991).

Table 7 tells us that when we estimate the system on the overall sample, production of relational goods Granger causes happiness and viceversa. The result is robust in several (age, education, gender, nationality) subsample splits of the two variable model and also to the introduction of additional variables (health and income) in a three (four) equation system in which the impact of relational goods on happiness is evaluated net of the direct and reverse causality links between the two variables, health and the two added regressors.

6. Conclusions

Even though many recent approaches in social sciences emphasize the paramount importance of relational aspects of human identity, economics surprisingly lags behind and maintains its microfoundations substantially unrelated to such aspects. These recent approaches argue that individual satisfaction depends so much on the success/failure of love relationships and on the capacity of developing good social life that we cannot even divide self interest from relational ties since long sighted and enlightened self interest should incorporate these dimensions and acknowledge that individual self fulfilment significantly depends on them.

Surprisingly enough, economic literature remains almost silent on these issues. In the large majority of economic models economic agents act and take their decisions in isolation. In just a few models (including arguments such as fairness and inequity aversion in utility functions) relationships appear in their negative dimensions in terms of negative externalities among consumers. Alternatively, they appear just indirectly when they are incorporated in more or less prone to social life consumption goods.

The controversial effects of this methodological perspective are that, if relationships are not fully considered in model premises, cannot be properly taken into account in policy suggestions stemming from economic models.

The common justification for a reductionist approach is that economists cannot become “all round experts” and must limit their analysis to the economic aspects of human life. Such justification does not stand since all individual dimensions (psychological, sociological, economic) are interrelated and all economic actions have non economic consequences with feedbacks on individual lives. This implies, on the negative side, that a political recipe which increases efficiency or economic prosperity may generate adverse effects on the neglected social dimensions up to the paradoxical effect of reducing, instead of increasing, individual’s utility and life satisfaction. Or, on the positive side, that unexplored resources of human ties and interactions may seriously limit our capacity of fostering effort, team working and productivity at firm level, thereby leading to suboptimal effects in terms of economic development.

Empirical studies on the determinants of life satisfaction give us a unique opportunity for testing the proposition of the relevance of relational aspects of human life. Our findings do not reject the hypothesis that the social dimension is highly significant in at least two respects. On the one side side, relative affluence of our “reference group” (those we consider our peers) is shown to have significant and negative effects on happiness. On the other side, time investment in social life is demonstrated to generate significant and positive effects on life satisfaction.

In our work we pay particular attention to control for endogeneity and reverse causality. If good relational life can positively affect individual happiness it is also reasonable to assume that life satisfaction may affect people’s decisions to invest in relationships. Beyond looking at the relationships not just in levels but also in first differences, we explicitly try to disentangle the two causality directions in a GMM panel VAR system in which both of them are jointly tested and estimated.

The robustness of the relationship-happiness nexus evidenced by our results seems to confirm that anthropological assumptions in standard economic models should be broadened to take into account this dimension.

References

- Alesina A., Di Tella R., MacCulloch R., 2004. "Inequality and happiness: are Europeans and Americans different?". *Journal of Public Economics*, 88, pp. 2009– 2042.
- Arellano, M., Bond, S., 1991. "Some tests of specification for panel data: Monte Carlo evidence and an application to employment fluctuations". *Review of Economic Studies* 58, 277-297.
- Arellano, M. and Bover O., 1995. "Another Look at the Instrumental Variable Estimation of Error Component Models," *Journal of Econometrics* 68, pp. 29-51.
- Bartolini, S., Bonatti L. 2002, Environmental and social degradation as the engine of economic growth, *Ecological Economics*, 41, pp. 1-16.
- Becchetti, L., Londoño Bedoya D. A., Trovato G., "Income, Relational Goods and Happiness". Tor Vergata University, CEIS, Departmental Working Papers No. 227.
- Becchetti, L., Santoro, M., 2007, The wealth-unhappiness paradox: a relational goods/Baumol disease explanation, *Handbook on the economics of happiness*, Bruni, L., La Porta L., (eds.), Elgar, 239-262.
- Clark, A.E. (1999), Income and happiness: Evidence, explanations and economic implications, Paris-Jourdan Sciences Economiques, Working Paper N° 2006 – 24.
- Clark, A.E. (1999). Are Wages Habit-Forming? Evidence from Micro Data. *Journal of Economic Behavior and Organization*, vol. 39, pp. 179-200.
- Clark, A.E., Frijters, P., Shields, M.A., 2006, Income and Happiness: Evidence, Explanations and Economic Implications, *Paris Jourdan Sciences Economiques*, working paper 2006-24.
- Clark, A.E., Etilé, F., Postel-Vinay, F., Senik, C., and Van der Straeten, K. (2005). Heterogeneity in reported well-being: Evidence from twelve European countries. *Economic Journal*, vol. 115, pp. C118-C132.
- De Neve K.M and Cooper H., 1999, The happy personality: a meta-analysis of 137 personality traits of subjective wellbeing, *Psychological Bulletin* 125, 197-229
- Diener E., Lucas R. E., 1999. "Explaining Differences in Societal Levels of Happiness: Relative Standards, Need Fulfillment, Culture, and Evaluation Theory". *Journal of Happiness Studies*, Vol. 1, pp. 41-78.
- Diener, E., Suh, E., Lucas, R., and Smith, H. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin*, vol. 125, pp. 276-302.
- Di Tella, R. and MacCulloch, R. (2003). "The Macroeconomics of Happiness", *Review of Economics and Statistics*. November 2003, 85(4): 809–827, MIT Press.
- Di Tella, R., MacCulloch, R. and Haisken-DeNew, J.P. (2005). Happiness adaptation to income and to status in an individual panel. *Harvard Business School Working Paper*.
- Di Tella, R., MacCulloch, R. and Oswald, A. (2001). "Preferences over Inflation and Unemployment: Evidence from Surveys of Happiness". *American Economic Review*, 91(1): 335-341.
- Ekman, P. Davidson, R. and Friesen W., 1990, The Duchenne smile: emotional expression and brain physiology II, *Journal of Personality and Social Psychology*, 58, 342-353.
- Fehr E., Falk A., (2002) "Psychological Foundations of Incentives", in *European Economic Review* 46, 687- 24.

- Fehr E., Schmidt K. (1999), “ A theory of fairness, competition and cooperation”, *Quarterly Journal of Economics* 114: 817-868.
- Fehr, E., K. M. Schmidt, (2002), “The Economics of Fairness and Reciprocity”, in: M. Dewatripont et.al. (eds.) *Advances in Economic Theory, Eight World Congress of the Econometric Society*, Cambridge: *Cambridge University Press*, Vol. 1, 208-257.
- Ferrer-i-Carbonell, A. (2005). “Income and well-being: An empirical analysis of the comparison income effect”. *Journal of Public Economics*, vol. 89, pp. 997-1019.
- Ferrer-i-Carbonell, A. and Frijters, P. (2004). “How important is methodology for the estimates of the determinants of happiness?”. *Economic Journal*, vol. 114, pp. 641-659.
- Frijters P. , 2000. “Do Individuals Try To Maximize General Satisfaction?”
- Frijters, P., Shields, M.A., and Haisken-DeNew, J.P. (2004a). “Money does matter! Evidence from increasing real incomes in East Germany following reunification”. *American Economic Review*, vol. 94, pp. 730-741.
- Frijters, P., Shields, M.A., and Haisken-DeNew, J.P. (2004b). “Changes in the pattern and determinants of life satisfaction in Germany following reunification”. *Journal of Human Resources*, vol. 39, pp. 649-674.
- Frijters, P., Geishecker, I., Shields, M.A. and Haisken-DeNew, J.P. (2006). “Can the large swings in Russian life satisfaction be explained by ups and downs in real incomes? *Scandinavian Journal of Economics*, forthcoming.
- Graham, C. and Pettinato, S. (2002). “Happiness and Hardship: Opportunity and Insecurity in New Market Economies”. Washington, D.C.: *The Brookings Institution Press*.
- Gui, B., (2000) Beyond transaction: on the interpersonal dimension of economic reality, *Annals of Public and Cooperative Economics*, 71, 2, pp. 139-169.
- Kahneman, D., Krueger, A.B., Schkade, D.A., Schwartz, D.N. and Stone, A.A. (2004) “A survey method for characterizing daily life experience; the day reconstruction method”. *Science*. 306 (5702), 1776-1780.
- Layard, R. (2005). *Happiness. Lessons from a New Science*, London: Allen Lane.
- Lucas, R., Clark, A.E., Georgellis, Y. and Diener, E. (2003). Re-examining adaptation and the setpoint model of happiness: Reaction to changes in marital status. *Journal of Personality and Social Psychology*, vol. 84, pp. 527-539.
- Lucas, R., Clark, A.E., Georgellis, Y. and Diener, E. (2004). Unemployment alters the set-point for life satisfaction. *Psychological Science*, vol. 15, pp. 8-13.
- Lundberg, S., 1985. “Tied Wage-Hours Offers and the Endogeneity of Wages”, *Review of Economics and Statistics*, 67, 405-410.
- Nettle, D. (2005). *Happiness: The Science Behind Your Smile*. Oxford: *Oxford University Press*.
- Nickell, S, 1981. “Bias in Dynamic Models with Fixed Effects”, *Econometrica*, 49, pp.1417-1426.
- Oswald, A.J. and Powdthavee, N. (2005). Does happiness adapt? A longitudinal study of disability with implications for economists and judges. *University of Warwick Working Paper*, Department of Economics.
- Pavot, W., 1991, Further validation of the satisfaction with life scale: evidence for the convergence of well-being measures, *Journal of Personality assessment*, 57, 149-161.
- Ravallion, M. and Lokshin, M., (2001). Identifying welfare effects from subjective questions. *Economica*, Vol 68, pp. 335-357.
- Ravallion, M. and Lokshin, M., (2002). “Self-rated economic welfare in Russia”. *European-Economic Review*, vol. 46, pp. 1453-1473.
- Rayo, L. and Becker, G.S. (2004). Evolutionary efficiency and happiness. *University of Chicago*, Mimeo.
- Riis, J., Loewenstein, G., Baron, J. Jepson, C., Fagerlin, A. and Ubel, P. (2005). Ignorance of hedonic adaptation to Hemodialysis: A study using ecological momentary assessment. *Journal of Experimental Psychology: General*, vol. 134, pp. 3–9.

- Scitowsky, T. (1976). *The Joyless Economy: An Enquiry into Human Satisfaction and Consumer Dissatisfaction*. New York, *Oxford University Press*
- Sen A. K., 1977. "Rational Fools: A Critique of the Behavioral Foundations of Economic Theory". *Philosophy and Public Affairs*, Vol. 6, No. 4, pp. 317-344.
- Sandvik, E., Diener, E., and Seidlitz, L. (1993). Subjective well-being: the convergence and stability of self and non self report measures. *Journal of Personality*, vol. 61, pp. 317-342.
- Shedler, J., Mayman, M., & Manis, M. (1993). The illusion of mental health. *American Psychologist*, 48 (11), 1117–1131.
- Senik, C. (2004). When information dominates comparison: A panel data analysis using Russian subjective data. *Journal of Public Economics*, vol. 88, pp. 2099-2123.
- Shiv B., Huber J., 2000. "The Impact of Anticipating Satisfaction on Consumer Choice". *Journal of Consumer Research*, Vol. 27, pp. 202–216.
- Smith, A., 1984, *The theory of moral sentiments*, *London* (ed. Or. 1759).
- Stutzer, A. (2004). The role of income aspirations in individual happiness. *Journal of Economic Behavior and Organization*, vol. 54, pp. 89-109.
- Thompson, P. and T. Wallace, (1996), "Redesigning production through teamwork", *International Journal of Operations and Production Management*, Vol.16, pp.103-18.
- Uhlener C. J. (1989), Relational goods and participation: Incorporating sociability into a theory of rational action, *Public Choice*, Vol. 62, pp.253-285.
- Van Praag, B.M.S. (1991). Ordinal and cardinal utility: An integration of the two dimensions of the welfare concept. *Journal of Econometrics*, vol. 50, pp. 69-89.
- Winkelmann, L. and Winkelmann, R. (1998). Why are the unemployed so unhappy? Evidence from panel data. *Economica*, vol. 65, pp. 1-15.
- Wu, S. (2001). Adapting to heart conditions: A test of the hedonic treadmill. *Journal of Health Economics*, vol. 20, pp. 495-507.

Table 1. Transition matrix for one year changes in self declared happiness

	0	1	2	3	4	5	6	7	8	9	10	Total
0	19.80	12.87	11.39	14.36	7.92	18.32	3.96	7.92	1.98	0.99	0.50	100
1	10.05	16.44	18.72	14.16	6.39	13.70	8.22	7.31	1.37	3.20	0.46	100
2	3.47	5.52	17.67	20.50	11.51	15.93	8.83	6.78	7.26	1.42	1.10	100
3	1.91	2.52	8.71	17.70	18.86	22.87	9.87	10.35	6.13	0.82	0.27	100
4	1.10	1.47	4.18	11.67	19.48	26.14	14.79	12.77	7.21	0.73	0.46	100
5	0.42	0.44	1.58	5.19	8.64	36.68	18.29	16.33	10.08	1.44	0.90	100
6	0.21	0.22	0.94	2.45	5.31	19.27	25.90	28.55	14.38	2.14	0.63	100
7	0.04	0.07	0.50	1.31	2.37	9.31	15.96	38.12	27.82	3.54	0.96	100
8	0.09	0.07	0.25	0.66	0.93	4.84	7.11	24.82	48.16	10.62	2.45	100
9	0.08	0.10	0.16	0.43	0.64	2.41	3.09	10.59	40.18	34.54	7.77	100
10	0.26	0.05	0.26	0.63	0.78	3.96	3.44	7.45	24.18	21.37	37.62	100
Total	0.38	0.43	1.25	2.81	4.16	13.13	13.02	24.45	28.98	8.26	3.15	100

Table cells illustrate the probability of moving from the t-1 period self declared happiness level (in column) to the t period happiness level (in row). Sample size: 294,863 individual-year observations from 1984 to 2004.

2. Description of variables used in descriptive and econometric analysis

<i>Variable</i>	<i>Obs.</i>	<i>Time interval availability</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>Max</i>
<i>Satisfaction with Life Today</i>	294,863	21 waves	7.016947	1.850032	0	10
Demographics						
<i>Age</i>	295,898	21 waves	44.28411	17.1553	16	99
<i>Germany</i>	433,020	21 waves	0.7380698	0.4396853	0	1
<i>Male</i>	863,793	21 waves	0.490628	0.4999124	0	1
<i>Education In Years</i>	693,410	21 waves	11.46329	2.612631	7	18
<i>Number Of Persons In Household</i>	395,661		3.264593	1.467399	1	17
<i>Number Of Children In Household</i>	395,661		0.9731462	1.155288	0	10
Marital status						
<i>Married</i>	270,758	21 waves	0.6258689	0.4838986	0	1
<i>Separated</i>	270,758	21 waves	0.0236854	0.1520672	0	1
<i>Single</i>	270,758	21 waves	0.2301022	0.4208988	0	1
<i>Divorced</i>	270,758	21 waves	0.0552781	0.2285228	0	1
<i>Widowed</i>	270,758	21 waves	0.0650655	0.2466418	0	1
<i>Marriage</i>	225,900	21 waves	0.0195573	0.1384735	0	1
<i>Separation</i>	225,900	21 waves	0.0140947	0.1178819	0	1
Relational goods						
<i>Attend Social Gatherings</i>	79,432	8 waves	3.179185	0.8496427	1	4
<i>Attend Cultural Events</i>	161,780	13 waves	1.715249	0.7706925	1	4
<i>Participate In Sports</i>	148,205	12 waves	2.069923	1.256503	1	4
<i>Perform Volunteer Work</i>	148,357	12 waves	1.446255	0.9062111	1	4
<i>Attend Church Or Religious Events</i>	128,425	10 waves	1.788686	0.993874	1	4
<i>RTI</i>	183,530	15 waves	1.905942	0.6337488	1	4
Employment status						
<i>Unemployed</i>	281,168		0.0664549	0.2490761	0	1
<i>Loss of job</i>	235,387		0.0327163	0.1778935	0	1
<i>Finding a job</i>	235,387		0.0308853	0.1730073	0	1
<i>Full Time Employment</i>	157,763	14 waves	0.4714033	0.4991831	0	1
<i>Regular Part Time Employment</i>	157,763	14 waves	0.0693635	0.2540721	0	1
<i>Marginal Irregular Part Time</i>	157,763	21 waves	0.0202519	0.1408612	0	1
Income variables						
<i>ln Real Household Incombe</i>	396,084	21 waves	7.871241	0.5482463	2.601319	11.29319
<i>ln Reference Household Income</i>	869,498	21 waves	8.013692	0.1229281	6.385509	8.414179
<i>ln Equivalised Real Household Income</i>	321,005		7.08307	0.4922984	1.536931	10.60005
Health						
<i>Number Of Annual Doctor Visits</i>	273,048		10.454	17.79104	0	396

Table 3. Average values of potential determinants in correspondence of different levels of self declared life satisfaction

	<i>Satisfaction with Life Today</i>										
	0	1	2	3	4	5	6	7	8	9	10
Demographics											
Age	48.68	48.32	47.55	46.07	45.44	46.58	44.99	43.15	43.71	41.54	46.76
Germany	0.76	0.76	0.80	0.81	0.79	0.79	0.78	0.79	0.80	0.77	0.74
Male	0.48	0.48	0.48	0.48	0.47	0.46	0.49	0.50	0.50	0.48	0.45
Education In Years	10.40	10.82	11.04	11.14	11.14	10.89	11.21	11.48	11.55	11.66	10.88
Number Of Persons In Household	2.83	2.78	2.79	2.85	2.92	2.88	2.96	3.01	3.00	3.08	2.93
Number Of Children In Household	0.61	0.55	0.58	0.61	0.65	0.63	0.66	0.68	0.67	0.71	0.63
Marital status											
Married	0.54	0.51	0.52	0.56	0.59	0.61	0.62	0.63	0.64	0.63	0.65
Separated	0.06	0.05	0.05	0.05	0.03	0.03	0.02	0.02	0.02	0.02	0.02
Single	0.18	0.21	0.22	0.22	0.22	0.20	0.22	0.25	0.23	0.26	0.20
Divorced	0.11	0.11	0.10	0.09	0.08	0.08	0.06	0.05	0.05	0.04	0.04
Widowed	0.12	0.12	0.11	0.08	0.07	0.09	0.07	0.05	0.06	0.05	0.09
Marriage	0.03	0.01	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.03	0.03
Separation	0.05	0.05	0.05	0.03	0.02	0.02	0.02	0.01	0.01	0.01	0.01
Relational goods											
Attend Social Gatherings	2.58	2.77	2.84	2.96	2.98	3.02	3.12	3.21	3.26	3.32	3.26
Attend Cultural Events	1.28	1.40	1.49	1.52	1.59	1.55	1.67	1.75	1.80	1.83	1.69
Participate In Sports	1.49	1.62	1.65	1.79	1.83	1.77	1.95	2.13	2.21	2.34	2.03
Perform Volunteer Work	1.21	1.17	1.30	1.30	1.33	1.34	1.40	1.45	1.51	1.54	1.46
Attend Church Or Religious Events	1.45	1.44	1.53	1.55	1.60	1.66	1.73	1.77	1.86	1.93	1.99
RTI	1.50	1.56	1.64	1.69	1.73	1.73	1.83	1.92	1.99	2.06	1.99
Employment status											
Unemployed	0.26	0.22	0.21	0.18	0.15	0.12	0.09	0.05	0.04	0.03	0.03
Loss of job	0.11	0.09	0.10	0.08	0.07	0.05	0.04	0.03	0.02	0.02	0.02
Finding a new job	0.05	0.05	0.04	0.05	0.04	0.04	0.04	0.03	0.03	0.02	0.02
Full Time Employment	0.24	0.29	0.31	0.37	0.41	0.43	0.48	0.52	0.50	0.48	0.41
Regular Part Time Employment	0.05	0.03	0.05	0.05	0.06	0.07	0.07	0.07	0.07	0.07	0.06
Marginal Irregular Part Time	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Income variables											
Real Household Income	2325,14	2382,91	2446,69	2528,67	2622,55	2584,77	2815,94	3052,60	3231,18	3422,64	3151,09
Reference Household Income	2870,09	2919,50	2945,38	2992,79	3000,56	2940,18	3001,54	3056,56	3050,98	3094,76	2905,88
Equivalised Real Household Income	1051,46	1080,19	1116,11	1146,84	1181,08	1164,60	1256,45	1357,85	1433,38	1504,74	1404,20
Health											
Number Of Annual Doctor Visits	23.42	23.64	20.38	17.50	15.73	13.30	11.29	9.71	8.78	7.82	8.50
Obs.	1,649	1,298	3,586	7,583	10,391	37,157	32,732	62,223	85,659	32,605	19,980

Table 4. Average values of potential determinants in correspondence of yearly changes of self declared life satisfaction

	<i>Yearly changes in life satisfaction</i>										
	<i>0</i>	<i>+1</i>	<i>+2</i>	<i>+3</i>	<i>+4</i>	<i>+5</i>	<i>+6</i>	<i>+7</i>	<i>+8</i>	<i>+9</i>	<i>+10</i>
Demographics											
<i>Age</i>	45.57	44.68	45.23	45.06	43.60	44.82	42.80	42.52	46.28	39.26	45.50
<i>Germany</i>	0.81	0.80	0.77	0.76	0.75	0.76	0.78	0.77	0.67	0.68	0.72
<i>Male</i>	0.49	0.49	0.47	0.46	0.47	0.45	0.45	0.49	0.45	0.55	0.33
<i>Education In Years</i>	11.50	11.42	11.05	10.92	10.90	10.75	10.86	10.64	10.48	10.44	10.07
<i>Number Of Persons In Household</i>	2.93	2.97	2.94	2.91	3.00	2.95	2.84	2.91	2.98	3.07	3.12
<i>Number Of Children In Household</i>	0.63	0.65	0.63	0.63	0.70	0.64	0.67	0.64	0.69	0.69	0.79
Marital status											
<i>Married</i>	0.66	0.65	0.62	0.59	0.57	0.54	0.51	0.44	0.53	0.55	0.33
<i>Separated</i>	0.02	0.02	0.03	0.03	0.05	0.04	0.04	0.05	0.02	0.12	0.15
<i>Single</i>	0.20	0.21	0.22	0.22	0.23	0.23	0.27	0.29	0.25	0.15	0.12
<i>Divorced</i>	0.05	0.05	0.06	0.07	0.07	0.08	0.08	0.12	0.05	0.15	0.12
<i>Widowed</i>	0.06	0.06	0.08	0.08	0.07	0.10	0.10	0.09	0.14	0.03	0.27
<i>Marriage</i>	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.05	0.02	0.03	0.03
<i>Separation</i>	0.01	0.01	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.06
Relational goods											
<i>Attend Social Gatherings</i>	3.17	3.18	3.18	3.13	3.14	3.13	3.12	3.14	2.86	3.10	3.05
<i>Attend Cultural Events</i>	1.76	1.74	1.65	1.61	1.59	1.53	1.58	1.53	1.46	1.33	1.41
<i>Participate In Sports</i>	2.14	2.11	1.98	1.91	1.95	1.81	1.91	1.88	1.75	1.64	1.62
<i>Perform Volunteer Work</i>	1.49	1.46	1.40	1.35	1.35	1.30	1.31	1.35	1.31	1.59	1.22
<i>Attend Church Or Religious Events</i>	1.82	1.81	1.76	1.72	1.69	1.64	1.66	1.61	1.63	1.42	1.71
<i>RTI</i>	1.93	1.91	1.84	1.81	1.81	1.77	1.81	1.76	1.74	1.77	1.80
Employment status											
<i>Unemployed</i>	0.05	0.06	0.07	0.08	0.09	0.11	0.08	0.13	0.08	0.07	0.20
<i>Loss of job</i>	0.02	0.03	0.03	0.03	0.03	0.04	0.04	0.05	0.04	0.03	0.11
<i>Finding a new job</i>	0.02	0.03	0.05	0.07	0.09	0.10	0.13	0.15	0.10	0.29	0.03
<i>Full Time Employment</i>	0.49	0.49	0.47	0.45	0.44	0.41	0.42	0.45	0.38	0.47	0.42
<i>Regular Part Time Employment</i>	0.07	0.08	0.07	0.07	0.07	0.07	0.04	0.05	0.05	0.12	0.03
<i>Marginal Irregular Part Time</i>	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.06	0.03	0.06	0.00
Income variables											
<i>Real Household Income</i>	3097.30	3104.19	2944.97	2836.87	2922.65	2824.36	2797.41	2676.64	2670.36	2854.50	3025.58
<i>Reference Household Income</i>	3023.45	3027.80	2969.31	2966.76	2994.38	2958.55	3003.32	2983.07	2900.72	3091.91	2899.22
<i>Equivalised Real Household Income</i>	1384.36	1381.60	1315.38	1276.78	1303.59	1250.71	1285.18	1201.12	1185.18	1248.53	1262.10
Health											
<i>Number Of Annual Doctor Visits</i>	9.80	9.93	10.97	11.76	11.37	12.43	12.87	11.33	12.94	7.66	12.94
<i>Obs.</i>	85,484	43,400	19,282	8,613	3,200	1,785	583	264	158	42	42

Table 4. Average values of potential determinants in correspondence of yearly changes of self declared life satisfaction (follows)

	<i>Yearly changes in life satisfaction</i>									
	<i>-1</i>	<i>-2</i>	<i>-3</i>	<i>-4</i>	<i>-5</i>	<i>-6</i>	<i>-7</i>	<i>-8</i>	<i>-9</i>	<i>-10</i>
Demographics										
<i>Age</i>	44.43	45.41	45.42	44.73	45.78	44.66	46.79	46.02	44.37	49.11
<i>Germany</i>	0.80	0.77	0.76	0.77	0.75	0.76	0.76	0.73	0.59	0.65
<i>Male</i>	0.49	0.47	0.46	0.47	0.45	0.47	0.44	0.47	0.50	0.52
<i>Education In Years</i>	11.41	11.09	10.91	10.93	10.64	10.88	10.74	10.46	10.16	9.68
<i>Number Of Persons In Household</i>	2.99	2.94	2.96	2.96	2.98	2.89	2.89	2.88	3.33	3.04
<i>Number Of Children In Household</i>	0.66	0.64	0.64	0.67	0.68	0.59	0.65	0.63	0.94	0.74
Marital status										
<i>Married</i>	0.65	0.63	0.61	0.58	0.57	0.53	0.49	0.52	0.56	0.36
<i>Separated</i>	0.02	0.03	0.03	0.04	0.05	0.05	0.08	0.08	0.05	0.02
<i>Single</i>	0.22	0.21	0.21	0.22	0.22	0.25	0.23	0.21	0.16	0.20
<i>Divorced</i>	0.05	0.06	0.06	0.07	0.06	0.07	0.07	0.07	0.07	0.07
<i>Widowed</i>	0.06	0.07	0.08	0.08	0.10	0.09	0.13	0.12	0.16	0.34
<i>Marriage</i>	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.01	0.00	0.03
<i>Separation</i>	0.01	0.02	0.03	0.03	0.04	0.06	0.07	0.08	0.05	0.05
Relational goods										
<i>Attend Social Gatherings</i>	3.17	3.15	3.08	3.06	2.97	2.97	2.99	2.99	2.76	2.89
<i>Attend Cultural Events</i>	1.74	1.64	1.58	1.55	1.47	1.55	1.37	1.41	1.26	1.42
<i>Participate In Sports</i>	2.11	1.92	1.85	1.88	1.72	1.87	1.70	1.61	1.82	1.63
<i>Perform Volunteer Work</i>	1.46	1.41	1.35	1.34	1.29	1.31	1.15	1.28	1.38	1.16
<i>Attend Church Or Religious Events</i>	1.80	1.78	1.73	1.69	1.64	1.77	1.52	1.69	1.63	1.90
<i>RTI</i>	1.91	1.85	1.78	1.78	1.71	1.78	1.63	1.66	1.70	1.70
Employment status										
<i>Unemployed</i>	0.06	0.09	0.11	0.14	0.15	0.16	0.14	0.15	0.23	0.17
<i>Loss of job</i>	0.03	0.05	0.07	0.09	0.10	0.10	0.08	0.09	0.19	0.09
<i>Finding a new job</i>	0.02	0.02	0.03	0.03	0.03	0.03	0.02	0.03	0.02	0.09
<i>Full Time Employment</i>	0.49	0.44	0.42	0.39	0.35	0.34	0.31	0.25	0.26	0.37
<i>Regular Part Time Employment</i>	0.08	0.07	0.07	0.06	0.06	0.05	0.06	0.04	0.08	0.00
<i>Marginal Irregular Part Time</i>	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.04	0.00	0.00
Income variables										
<i>Real Household Income</i>	3067.25	2873.49	2765.86	2754.08	2621.16	2691.58	2748.40	2596.00	2502.68	2701.09
<i>Reference Household Income</i>	3028.88	2969.96	2956.42	2977.12	2913.30	2984.86	2895.81	2903.25	2876.99	2807.13
<i>Equivalised Real Household Income</i>	1361.32	1279.71	1229.06	1231.29	1165.11	1206.12	1243.81	1182.45	1103.87	1165.36
Health										
<i>Number Of Annual Doctor Visits</i>	10.39	12.20	14.01	16.27	17.12	17.86	20.85	27.30	14.67	14.04
<i>Obs.</i>	47,563	21,664	9,840	3,734	2,273	678	351	184	54	54

Table 5. Level estimates

Satisfaction with Life Today

	<i>Ordered Probit</i>		<i>Panel Fixed Effect</i>		<i>Pooled OLS</i>	
	<i>(1)</i>	<i>(2)</i>	<i>(1')</i>	<i>(2')</i>	<i>(1'')</i>	<i>(2'')</i>
<i>Age</i>	-.0082099 (-12.08)	-.005364 (-7.27)	-.0486731 (-28.00)	-.0491793 (-22.42)	-.003031 (-4.38)	.0004247 (0.51)
<i>Male</i>	-.0742618 (-4.45)	-.050767 (-2.99)			-.0794254 (-5.51)	-.0670668 (-3.92)
<i>Germany</i>	-.0157107 (-0.67)	-.0060228 (-0.25)			-.0563322 (-2.41)	.0145828 (0.50)
<i>Education In Years</i>	.0030372 (0.77)	-.0011958 (-0.29)			.0067253 (1.88)	-.0013318 (-0.32)
<i>Married</i>	.1279337 (4.97)	.101978 (3.64)	.1470837 (3.49)	.0889567 (1.82)	.1601917 (5.31)	.1670287 (4.68)
<i>Separated</i>	-.0119011 (-0.34)	-.0179361 (-0.47)	-.1722956 (-3.06)	-.2560426 (-3.90)	-.0486036 (-1.06)	-.0093205 (-0.18)
<i>Single</i>	-.0306501 (-0.97)	-.0489647 (-1.42)	-.1198606 (-2.22)	-.193485 (-3.04)	-.0070969 (-0.20)	-.0290003 (-0.67)
<i>Divorced</i>	-.0628349 (-1.75)	-.1043127 (-2.61)	.1808719 (3.05)	.1833829 (2.59)	-.3602499 (-8.62)	-.3897354 (-7.70)
<i>RTI</i>	.2767364 (30.44)		.1757108 (12.16)		.5706189 (51.05)	
<i>Attend Social Gatherings</i>		.1330564 (19.74)		.1324353 (12.25)		.2620832 (27.29)
<i>Attend Cultural Events</i>		.0740654 (9.55)		.0694874 (5.49)		.1336296 (12.36)
<i>Participate In Sports</i>		.0443019 (8.53)		.0191046 (2.19)		.0963627 (13.91)
<i>Perform Volunteer Work</i>		.0306984 (4.75)		.0028116 (0.26)		.0812342 (9.51)
<i>Full Time Employment</i>	.1192021 (9.53)	.0940776 (6.70)	.2338616 (11.65)	.2113023 (8.46)	.1236513 (7.88)	.1238522 (6.73)
<i>Regular Part Time Employment</i>	.0101188 (0.51)	.0033178 (0.15)	.0886033 (3.00)	.0569937 (1.56)	.0668276 (2.52)	.0682207 (2.17)
<i>Ln (Real Household Income)</i>	.2576236 (21.02)	.2746641 (20.18)	.3736655 (17.63)	.367516 (14.24)	.5549356 (37.02)	.5473114 (31.09)
<i>ln (Reference Household Income)</i>	-.825184 (-12.87)	-.7793684 (-10.98)	-.9700689 (-8.35)	-.9853911 (-6.73)	-1.353804 (-19.22)	-1.158222 (-13.87)
<i>Nr. of Persons In the Household</i>	-.0207908 (-4.13)	-.0263397 (-4.76)	-.0102269 (-1.16)	-.0137487 (-1.27)	-.0709537 (-12.08)	-.0621835 (-8.96)
<i>Nr. of Annual Doctor Visits</i>	-.0062617 (-25.19)	-.0066131 (-22.52)	-.0067393 (-18.79)	-.0069159 (-15.16)	-.0136337 (-37.36)	-.013725 (-31.35)
<i>cut 1</i>	-7.769597 (-15.40)	-6.983671 (-12.49)				
<i>cut 2</i>	-7.510991 (-14.89)	-6.729653 (-12.04)				
<i>cut 3</i>	-7.085222 (-14.05)	-6.329293 (-11.32)				
<i>cut 4</i>	-6.627219 (-13.15)	-5.895283 (-10.55)				
<i>cut 5</i>	-6.245178 (-12.39)	-5.531938 (-9.90)				
<i>cut 6</i>	-5.437747 (-10.79)	-4.747882 (-8.50)				
<i>cut 7</i>	-4.965586 (-9.85)	-4.299678 (-7.70)				
<i>cut 8</i>	-4.223691 (-8.38)	-3.598629 (-6.44)				
<i>cut 9</i>	-3.11754 (-6.19)	-2.539512 (-4.55)				
<i>cut 10</i>	-2.435351	-1.885107				

	(-4.83)	(-3.38)				
<i>Constant Term</i>			13.51832 (14.14)	13.61963 (11.31)	12.64717 (23.06)	10.83076 (16.57)
<i>Observations</i>	79,846	59,550	79,846	59,550	79,846	59,550
<i>F-Test / Log Likelihood</i>	-144337.47	-109733.43	175.61	90.05	474.79	274.74
<i>F-Test fixed effects</i>			4.10	3.14		

Table 6 Magnitude of the effects of regressors in the OLS estimates

(Effect a one standard deviation change on the Std. Dev. of Satisfaction)

	OLS coefficients	Effect a one standard deviation change on the Std. Dev. of Satisfaction
<i>Satisfaction With Life Today</i>		
<i>Age</i>	-0.003*	-0.028
<i>Germany</i>	-0.056*	-0.013
<i>Male</i>	-0.079*	-0.021
<i>Education In Years</i>	0.007*	0.009
<i>Married</i>	0.160*	0.042
<i>Separated</i>	-0.049	-0.004
<i>Single</i>	-0.007	-0.002
<i>Divorced</i>	-0.360*	-0.044
<i>RTI</i>	0.571*	0.195
<i>Full Time Employment</i>	0.124*	0.033
<i>Regular Part Time Employment</i>	0.067*	0.009
<i>In Real Household Income</i>	0.555*	0.164
<i>In Reference Household Income</i>	-1.354*	-0.090
<i>Nr. of Persons In the Household</i>	-0.071*	-0.056
<i>Nr. of Annual Doctor Visits</i>	-0.014*	-0.131

Table 7 Differenced estimates

Δ Satisfaction with Life Today

	<i>Ordered Probit</i>		<i>Panel Fixed Effect</i>		<i>Pooled OLS</i>	
	<i>(3)</i>	<i>(4)</i>	<i>(3')</i>	<i>(4')</i>	<i>(3'')</i>	<i>(4'')</i>
<i>Age</i>	-0.001046 (-0.22)	.0010165 (1.26)	.0034899 (1.23)	.2693532 (4.75)	.0009396 (1.26)	.0025107 (1.77)
<i>Male</i>	-.030353 (-2.44)	-.037324 (-1.68)			-.032455 (-1.68)	-.0319914 (-0.82)
<i>Germany</i>	.0309345 (-2.44)	.0199319 (0.68)			.0902446 (3.39)	.1134073 (2.18)
<i>Education In Years</i>	.0011825 (0.48)	-.0050873 (-1.13)			.0011856 (0.32)	-.0122582 (-1.57)
<i>Married</i>	-.0618929 (-2.30)	-.186419 (-3.22)	-.1286386 (-1.56)	-.0935353 (-0.55)	-.0779097 (-1.86)	-.1932899 (-1.89)
<i>Separated</i>	-.0529475 (-1.40)	-.146505 (-2.16)	-.1256333 (-1.12)	-.2327274 (-0.72)	-.097411 (-1.66)	-.1024202 (-0.86)
<i>Single</i>	-.0719355 (-2.20)	-.1297473 (-1.87)	-.1202097 (-1.06)	-.5046593 (-1.51)	-.0383666 (-0.76)	-.0119747 (-0.10)
<i>Divorced</i>	-.0229012 (-0.62)	-.0569277 (-0.62)	-.1639654 (-1.37)	-.1969353 (-0.72)	.0356187 (0.62)	.1625396 (1.00)
<i>Δ RTI</i>	.0633553 (5.71)		.127543 (6.20)		.1322955 (7.71)	
<i>Δ Attend Social Gatherings</i>		.0466646 (4.41)		.1319116 (4.42)		.0996065 (5.34)
<i>Δ Attend Cultural Events</i>		.0205453 (1.72)		.0437027 (1.23)		.0345733 (1.65)
<i>Δ Participate In Sports</i>		.0119283 (1.27)		.0317303 (1.20)		.0194359 (1.18)
<i>Δ Perform Volunteer Work</i>		.0054432 (0.45)		.0330521 (0.99)		.0190428 (0.91)
<i>Full Time Employment</i>	.0696362 (5.18)	.107597 (4.59)	.2722887 (6.51)	.9292362 (5.40)	.094086 (4.54)	.1419436 (3.46)
<i>Regular Part Time Employment</i>	.0503946 (2.24)	.0540213 (1.30)	.2183611 (3.57)	.4935163 (2.38)	.0527413 (1.52)	.0391304 (0.54)
<i>d ln (Real Household Income)</i>	.1727155 (9.57)	.1946466 (7.15)	.3268785 (9.19)	.3216647 (3.97)	.3359263 (11.96)	.3753111 (7.78)
<i>d ln (Reference Household Income)</i>	-.4080166 (-2.03)	-.2494713 (-0.66)	-.5759809 (-1.44)	-.896148 (-0.76)	-.711424 (-2.29)	-.1131446 (-1.71)
<i>Nr. of Persons In the Household</i>	-.0085035 (-1.78)	-.0179112 (-2.37)	-.009143 (-0.51)	-.0432543 (-0.52)	-.0061567 (-0.83)	-.0198651 (-1.49)
<i>Nr. of Annual Doctor Visits</i>	-.00224 (-7.26)	-.0025321 (-4.21)	-.0044701 (-6.00)	-.0059421 (-2.19)	-.0033475 (-6.91)	-.003909 (-3.63)
<i>cut 1</i>	-2.360052 (-43.00)	-2.562068 (-24.91)				
<i>cut 2</i>	-1.114439 (-21.26)	-1.317403 (-13.43)				
<i>cut 3</i>	1.054152 (20.14)	.9593173 (9.86)				
<i>cut 4</i>	2.306944 (41.97)	2.168813 (21.41)				
<i>Constant Term</i>			-.1831214 (-1.00)	-11.87145 (-4.70)	-.1283955 (-1.60)	-.0160892 (-0.09)
<i>Observations</i>	43,614	14,568	43,614	14,568	43,614	14,568
<i>F-Test / Log Likelihood</i>	-38540.974	-13229.803	18.84	7.66	21.57	9.04
<i>F-Test fixed effects</i>			0.63	0.62		

Table 8 VAR results

		<i>Satisfaction with Life Today</i>	<i>RTI</i>
	<i>Lag Satisfaction with Life Today</i>	.38605905 (89.581688)	.03009644 (21.865379)
	<i>Lag RTI</i>	.55254358 (38.875839)	.15692721 (33.008894)
Male	<i>Lag Satisfaction with Life Today</i>	.37458558 (62.875121)	.04595226 (23.329557)
	<i>Lag RTI</i>	.45976493 (25.640882)	.20316637 (32.614902)
Female	<i>Lag Satisfaction with Life Today</i>	.40041472 (63.458609)	.01403438 (7.1788242)
	<i>Lag RTI</i>	.66924681 (29.208925)	.09758887 (13.25587)
Germany	<i>Lag Satisfaction with Life Today</i>	.3919761 (72.900716)	.02941701 (17.489012)
	<i>Lag RTI</i>	.57311072 (32.751309)	.17566149 (30.030403)
Not Germany	<i>Lag Satisfaction with Life Today</i>	.35703301 (38.438398)	.02529833 (9.1174669)
	<i>Lag RTI</i>	.4831103 (14.678202)	.13136489 (12.920927)
West Germany	<i>Lag Satisfaction with Life Today</i>	.40162708 (71.181594)	.0293656 (16.701499)
	<i>Lag RTI</i>	.55990575 (30.02094)	.19539457 (31.406755)
East Germany	<i>Lag Satisfaction with Life Today</i>	.36027799 (21.416275)	.02175805 (4.1472104)
	<i>Lag RTI</i>	.66384943 (11.521298)	.06191846 (3.330196)
Education In Years ≤ 12	<i>Lag Satisfaction with Life Today</i>	.38699602 (82.023444)	.02609413 (18.109867)
	<i>Lag RTI</i>	.60773449 (37.423372)	.139125 (26.452581)
Education In Years > 12	<i>Lag Satisfaction with Life Today</i>	.37404803 (34.889082)	.05532204 (12.812705)
	<i>Lag RTI</i>	.35797948 (12.063037)	.21801633 (19.740609)
Age ≤ 43	<i>Lag Satisfaction with Life Today</i>	.36761874 (60.58281)	.04334638 (21.351781)
	<i>Lag RTI</i>	.4651148 (24.457177)	.21268428 (32.868309)
Age > 43	<i>Lag Satisfaction with Life Today</i>	.41283886 (64.395003)	.01642385 (8.4533826)
	<i>Lag RTI</i>	.68867847 (30.707171)	.08310848 (11.363753)
Overall sample VAR with RTI and Real Household Income	<i>Lag Satisfaction with Life Today</i>	.34266884 (82.490583)	.02241408 (18.185127)
	<i>Lag RTI</i>	.43756944 (33.918277)	.13640207 (31.426811)
Overall sample VAR with RTI, Health and Real Household Income	<i>Lag Satisfaction with Life Today</i>	.32334111 (72.60402)	.02187094 (16.683978)
	<i>Lag RTI</i>	.40619386 (30.696106)	.1359001 (30.549503)
Overall sample VAR with RTI, Health and Reference Real Household Income	<i>Lag Satisfaction with Life Today</i>	.26673444 (78.379657)	.00852603 (8.565187)
	<i>Lag RTI</i>	.14911696 (15.203703)	.07703475 (21.764922)
Overall sample VAR with RTI and Reference Real Household Income	<i>Lag Satisfaction with Life Today</i>	.27372243 (86.125497)	.00804442 (8.719612)
	<i>Lag RTI</i>	.14192259 (15.178368)	.07632241 (22.687124)