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Sociability and Happiness

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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. These assumptions crucially oriented the selection

of variables 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 led to an oversimplification

of such function in which consumption goods and leisure became the ingredients 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 *symphaty* and *commitment* were excluded by the *homo oeconomicus*[2] and that the

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[2] In an interesting reflection on this point Sen (1976) argues that the stylisation of economic agents operating in anonymous or hostile contexts such as those of contracts and war by Edgeworth (1881) was progressively extended to the models dealing with all other aspects of reality. Very relevant to this point is his quote of Edgeworth (1881 p.52) where he rhetorically wonder" admitting that there exists in the higher parts of human nature a tendency towards and feeling after utilitarian institutions…could we seriously suppose that these moral considerations were relevant to war

richness of factors (such as those) affecting individual happiness could only partially be incorporated in leisure and consumable goods.[3] In this paper we want to push further the reflection on this point by arguing that human relationships are a fundamental part of individual identity and therefore of life satisfaction.[4] As a consequence, various measures of human sociability shouldcrucially affect utility functions. We further argue that our claim can be tested empirically by using information from a dataset which includes measures of self declared life satisfaction and sociability.

We are encouraged in this direction by the recent upsurge of empirical studies on the determinants of self declared life satisfaction 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 parefrontal 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

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and trade; could eradicate the controlles core of human selfishness, or exercise an appreciable force in comparison with the impulse of self-interest"

[3] Not all the enjoyment we get from relationships can be incorporated into differences between more or less relational friendly consumption goods (i.e. a family car instead of a Smart), nor it can be adequately modelled in an undistinguished leisure component which does not discriminate between relational and non relational leisure.

[4] The question goes beyond the controversy between self-interest and altruism since once individuals realise the importance of relationships in their life it can be their enlightened self interest which pushes them to invest in them.

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 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.[5]

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 estimating first differenced models. Such models partially address the issue of causality 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). A further refinement in this direction is represented by "quasi-natural experiments" in which authors identify significant historical exogenous shocks in happiness determinants that may rule out the inverse causality nexus in presence of a significant relationship between the latter variables and self declared life satisfaction (Gardner and Oswald, 2006b; Frijters et al., 2004a, 2004 and 2006).

So far, most of the research has been concentrated on the role of income, institutions and unemployment (Frey, 2002a and b, Clark et al. (2006))[6] even though the same authors of the most

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[5] The European Community Household Panel is an exception providing panel data from many countries but it measures income and not life satisfaction.
[6] On the nexus between happiness and income see, among others, Frey (2002b), 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 document and discuss empirical evidence on the relationship between changes in income and

important surveys on the economics of happiness acknowledge that the problem of missing variables may eventually cloud the same above mentioned role determining spurious relationship and endogeneity.

In our paper we want to focus on one of these neglected variables, that is, investment in relational goods (see the definition in the next section) which is a fundamental dimension of human beings with strong and significant consequences on economic activity but is rarely considered by economists,. 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 consensus[7] or ii) to the incapacity of fully exploiting the relational resources which can trigger productivity in a corporate environment in which team working is always more important when complex tasks need to be developed (Thompson and Wallace, 1996; Becchetti and Pace, 2007).

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

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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).

[7] A recent research on the GSOEP shows that, on all cases of yearly increases in real household income in the last twenty years in 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 these "frustrated achievement" anomalies explained by a deterioration of relational life (Becchetti and Rossetti, 2007).

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.[8] 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 wellbeing even when it is not incorporated in any consumption good (ie. in a walk with a friend); ii) leisure includes many heterogeneous activities which can be relational, pseudo-relational (second life in internet) or utterly non relational (hours spent alone on the 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 has significant effects on life satisfaction.

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 nonexcludabilty and non rivalry are limited to participants. They are simultaneously consumed and produced since

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[8] Among the few exceptions consider those utility functions including fairness, inequity aversion or (strategic or pure) altruism (Fehr and Schmidt, 1999 and 2001 and Sobel, 2002). Empirical evidence from experimental studies on trust, dictatorship and ultimatum games do not reject these extensions of the standard models (Fehr and Falk, 2002) even though being subject to the well known limits of lab experiments (above all that of consistency with real lifes situations). Finally, growing sales of socially responsible products are a revealed preference argument in favour of them (Becchetti and Rosati, 2007).

participating to them is both an act of production (my presence contributes to increase 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 interpersonal 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 negative elements which prevent them from exploiting all private benefits of the good, but as positive elements which implement its value (my satisfaction 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 when their team scores a goal and applauses 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 argue 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 where other's success is a threat to our status. In the relational good

perspective documented above the role of others is mainly positive since they are necessary partners whose cooperation and participation is required 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 them on individual happiness.

3. Database and variables construction

In the original GSOEP dataset we find the following five indicators measuring 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 because any individual who decides to participate creates a positive externality for other participants: being more gives a feeling of power and provide a confirmation which reinforces the decision to participate to the gatherings and increases its enjoyment (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.[9]

Voluntary work is generally performed in groups and participation has also the effect of reinforcing ties not only among volunteers (i.e. a working camp, a social service performed by members of an association) but also between the volunteers and the beneficiaries of their unpaid job. The "fellow feeling" argument therefore applies also here.

We build a "*Relational Time Index*" (from now on *RTI*) by just averaging values of these five variables for each respondent.[10] 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 have

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[9] 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 (i.e. attending a funeral of a beloved person with other friends) have a strong impact on the formation of a common consent among people.

[10] We do this since survey answers do not allow us to infer exactly a per month of per week frequency in presence of the "less frequently" response. Given the more than proportional increase in intensity between "each month" and "each week" our unweighted average flattens high intensity responses and may be conceived as a sort of log transform of the real unmeasurable frequency of relational activity. A robustness check in which we impute presumed actual frequencies on the basis of qualitative responses (and, more specifically, one every two months to the "less frequently answer) has been performed. Results are substantially unchanged and available from the authors upon request.

a higher number of observations and cover more years. However, for the sake of completeness, we present results of the selected specifications with both the aggregate RTI index or its individual components as separate regressors.

Another variable we introduce, 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. 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*4 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.[11]

Other determinants of happiness we include in our estimates (age, gender, education, marital and employment status, health) are standard in the literature. To describe marital condition of the 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 loosing one's job or getting a new one.

4. Descriptive findings

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[11] For example, the reference household income of a male member of the first class of age and first class of education in West Germany is just the average household income of individuals sharing these four "class characteristics".

Table 1 illustrates transition probabilities in self declared life satisfaction, a variable which can take discrete values from 0 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 level 5 (36.68 percent) and peaks at level 8 (48.16 percent), which therefore seems to represent 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. Among job conditions we observe that full time employed account 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 the 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 and fall to 2 percent (4 percent) among the most satisfied. 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, attendance

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 3, the association between life satisfaction and job status variables seems very strong. The "unemployment rate" among those declaring the lowest level of 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 the share of those finding a job is closer among those declaring low and high satisfaction levels.

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) consistently with the hypothesis of the significant effect of relative income on life satisfaction.

In Table 4 we move from levels to first differences of our target variable and repeat the exercise in correspondence of yearly changes in life satisfaction (which range from minus to plus ten).[12]

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.[13]

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[12] Consider that the two extreme changes in both positive and negative direction are not always reliable given the limited number of observations for such drastic changes.

When we consider our aggregate index of relational goods we find that its value is always higher for positive changes in happiness than for the corresponding negative changes 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 than 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 similar pattern 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 findings in the relationship between self declared life satisfaction and part of its potential determinants (health, marital status and shocks, 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 perform econometric estimates.

Since our dependent variable is discrete qualitative and takes values from 0 to 10, the most suitable approach is 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

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[13] 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 variance of 5.589 (demonstrating higher heterogeneity in individual reaction to such event).

literature to a continuous one so that OLS and panel fixed effect models have both been estimated (Frey and Stutzer, 2006). 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. The latter choice constrains 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 would suggest, at least in the case of our sample, 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 also strong and robust.

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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 variable, in terms of economic significance (magnitude of the effect), seem to be the relational index (*RTI*), followed by 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 happiness by 0.195 of its standard deviation. Such number falls to 0.164 and -0.131 for one standard deviation increase in the log of Real Household Income and in the number of Annual Doctor Visits respectively.

5.1 First difference and panel VAR estimates

The problem of endogeneity in happiness estimates is a serious one. As it is well known marriage may positively contribute to happiness but higher life satisfaction positively affects individual propensity to get married (Frey and Stutzer, 2006).[14] 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).

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[14] This is the reason why we prefer to use a more objective measure (the number of annual visits to the doctor) with the entirely subjective measure of self declared health status.

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 in 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).

In absence of such opportunity we follow two approaches to control for endogeneity. 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 other 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

$$LS_{it} = \sum_{j=1}^{m} \alpha_j LS_{i,t-j} + \sum_{j=1}^{m} \beta_j RTI_{i,t-j} + \upsilon_{1i} + \varepsilon_{1it} \qquad (1.1)$$

$$RTI_{it} = \sum_{j=1}^{m} \gamma_j RTI_{i,t-j} + \sum_{j=1}^{m} \delta_j LS_{i,t-j} + \upsilon_{1i} + \varepsilon_{1it} \qquad (1.2)$$

where LS_{it} is the level of self declared life satisfaction of the i-th individual in the period t, RTI_{it} is our index of investment in relational good for the same individual and the same period, υ is an individual fixed effect and ε is a random disturbance.

Our specification implies that the following orthogonality conditions are respected

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

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[15] 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, economic science surprisingly lags behind and maintains its microfundations substantially unrelated to such aspects. These recent approaches argue that individual satisfaction (and also his productivity in economic life) 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 longsighted 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 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 social life oriented consumption goods.

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[15] In our case time invested in relational goods is said to Granger-cause life satisfaction system if the null hypothesis of $\sum_{j=1}^{m} \beta_j = 0$ is rejected. Granger causality also work in the opposite direction (from life satisfaction to relational goods) if we reject $\sum_{j=1}^{m} \delta_j = 0$.

The controversial effects of this methodological perspective are that, if relationships are not fully considered in model premises, they 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 (and non economic dimensions have strong 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. The risk of this omission is that, while focusing on the problem of economic development and its environmental sustainability, we concentrate our attention on global warming but forget the "local freezing" problem of the deterioration of relational goods in high income countries.

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 spent for producing and consuming relational goods 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 relational goods-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 and policymakers should pay attention to potential unintended effects of policy measures on the quality of relational goods in contemporary societies.

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Table 1. Transition matrix of 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. Source:German Socio-Economic Panel

Table 2. Summary statistics for variables used in descriptive and econometric analysis

Variable	Obs.	Time availability	Mean	Std. Dev.	Min	Max
Satisfaction with Life Today	294,863	21 waves	7.016947	1.850032	0	10
Demographics						
Age	295,898	21 waves	44.28411	17.1553	16	99
Germany	433,020	21 waves	0.7380698	0.4396853	0	1
Male	863,793	21 waves	0.490628	0.4999124	0	1
Education In Years	693,410	21 waves	11.46329	2.612631	7	18
Number Of Persons In Household	395,661		3.264593	1.467399	1	17
Number Of Children In Household	395,661		0.9731462	1.155288	0	10
Marital status						
Married	270,758	21 waves	0.6258689	0.4838986	0	1
Separated	270,758	21 waves	0.0236854	0.1520672	0	1
Single	270,758	21 waves	0.2301022	0.4208988	0	1
Divorced	270,758	21 waves	0.0552781	0.2285228	0	1
Widowed	270758	21 waves	0.0650655	0.2466418	0	1
Marriage	225,900	21 waves	0.0195573	0.1384735	0	1
Separation	225,900	21 waves	0.0140947	0.1178819	0	1
Relational goods						
Attend Social Gatherings	79,432	8 waves	3.179185	0.8496427	1	4
Attend Cultural Events	161,780	13 waves	1.715249	0.7706925	1	4
Participate In Sports	148,205	12 waves	2.069923	1.256503	1	4
Perform Volunteer Work	148,357	12 waves	1.446255	0.9062111	1	4
Attend Church Or Religious Events	128,425	10 waves	1.788686	0.993874	1	4
RTI	183,530	15 waves	1.905942	0.6337488	1	4
Employment status						
Unemployed	281,168		0.0664549	0.2490761	0	1
Loss of job	235,387		0.0327163	0.1778935	0	1
Finding a job	235,387		0.0308853	0.1730073	0	1
Full Time Employment	157,763	14 waves	0.4714033	0.4991831	0	1
Regular Part Time Employment	157,763	14 waves	0.0693635	0.2540721	0	1
Marginal Irregular Part Time	157,763	21 waves	0.0202519	0.1408612	0	1
Income variables						
ln Real Household Income	396,084	21 waves	7.871241	0.5482463	2.601319	11.29319
ln Reference Household Income	869,498	21 waves	8.013692	0.1229281	6.385509	8.414179
Health						
Number Of Annual Doctor Visits	273,048		10.454	17.79104	0	396

Table 3. Average values of selected variables in correspondence of different levels of self declared life satisfaction

Satisfaction with Life Today

	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
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 selected variables in correspondence of yearly changes of self declared life satisfaction

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

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

Yearly changes in life satisfaction

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

Table 5. Level estimates

Satisfaction with Life Today

	Ordered Probit		Panel Fixed Effect		Pooled OLS	
	(1)	*(2)*	*(1')*	*(2')*	*(1'')*	*(2'')*
Age	-.0082099	-.005364	-.0486731	-.0491793	-.003031	.0004247
	(-12.08)	(-7.27)	(-28.00)	(-22.42)	(-4.38)	(0.51)
Male	-.0742618	-.050767			-.0794254	-.0670668
	(-4.45)	(-2.99)			(-5.51)	(-3.92)
Germany	-.0157107	-.0060228			-.0563322	.0145828
	(-0.67)	(-0.25)			(-2.41)	(0.50)
Education In Years	.0030372	-.0011958			.0067253	-.0013318
	(0.77)	(-0.29)			(1.88)	(-0.32)
Married	.1279337	.101978	.1470837	.0889567	.1601917	.1670287
	(4.97)	(3.64)	(3.49)	(1.82)	(5.31)	(4.68)
Separated	-.0119011	-.0179361	-.1722956	-.2560426	-.0486036	-.0093205
	(-0.34)	(-0.47)	(-3.06)	(-3.90)	(-1.06)	(-0.18)
Single	-.0306501	-.0489647	-.1198606	-.193485	-.0070969	-.0290003
	(-0.97)	(-1.42)	(-2.22)	(-3.04)	(-0.20)	(-0.67)
Divorced	-.0628349	-.1043127	.1808719	.1833829	-.3602499	-.3897354
	(-1.75)	(-2.61)	(3.05)	(2.59)	(-8.62)	(-7.70)
RTI	.2767364		.1757108		.5706189	
	(30.44)		(12.16)		(51.05)	
Attend Social Gatherings		.1330564		.1324353		.2620832
		(19.74)		(12.25)		(27.29)
Attend Cultural Events		.0740654		.0694874		.1336296
		(9.55)		(5.49)		(12.36)
Participate In Sports		.0443019		.0191046		.0963627
		(8.53)		(2.19)		(13.91)
Perform Volunteer Work		.0306984		.0028116		.0812342
		(4.75)		(0.26)		(9.51)
Full Time Employment	.1192021	.0940776	.2338616	.2113023	.1236513	.1238522
	(9.53)	(6.70)	(11.65)	(8.46)	(7.88)	(6.73)
Regular Part Time Employment	.0101188	.0033178	.0886033	.0569937	.0668276	.0682207
	(0.51)	(0.15)	(3.00)	(1.56)	(2.52)	(2.17)
Ln (Real Household Income)	.2576236	.2746641	.3736655	.367516	.5549356	.5473114
	(21.02)	(20.18)	(17.63)	(14.24)	(37.02)	(31.09)
ln (Reference Household Income)	-.825184	-.7793684	-.9700689	-.9853911	-1.353804	-1.158222
	(-12.87)	(-10.98)	(-8.35)	(-6.73)	(-19.22)	(-13.87)
Nr. of Persons In the Household	-.0207908	-.0263397	-.0102269	-.0137487	-.0709537	-.0621835
	(-4.13)	(-4.76)	(-1.16)	(-1.27)	(-12.08)	(-8.96)
Nr. of Annual Doctor Visits	-.0062617	-.0066131	-.0067393	-.0069159	-.0136337	-.013725
	(-25.19)	(-22.52)	(-18.79)	(-15.16)	(-37.36)	(-31.35)
cut 1	-7.769597	-6.983671				
	(-15.40)	(-12.49)				
cut 2	-7.510991	-6.729653				
	(-14.89)	(-12.04)				
cut 3	-7.085222	-6.329293				
	(-14.05)	(-11.32)				
cut 4	-6.627219	-5.895283				
	(-13.15)	(-10.55)				
cut 5	-6.245178	-5.531938				
	(-12.39)	(-9.90)				
cut 6	-5.437747	-4.747882				
	(-10.79)	(-8.50)				
cut 7	-4.965586	-4.299678				
	(-9.85)	(-7.70)				
cut 8	-4.223691	-3.598629				
	(-8.38)	(-6.44)				
cut 9	-3.11754	-2.539512				
	(-6.19)	(-4.55)				
cut 10	-2.435351	-1.885107				
	(-4.83)	(-3.38)				
Constant Term			13.51832	13.61963	12.64717	10.83076
			(14.14)	(11.31)	(23.06)	(16.57)
Observations	79,846	59,550	79,846	59,550	79,846	59,550
F-Test / Log Likelihood	-144337.47	-109733.43	175.61	90.05	474.79	274.74

F-Test fixed effects	4.10	3.14

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

(Effect a one standard deviation change in the selected variables in terms of fractions of one standard deviation of self declared life Satisfaction)

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

Table 7 Differenced estimates

Δ Satisfaction with Life Today

	Ordered Probit		Panel Fixed Effect		Pooled OLS	
	(3)	*(4)*	*(3')*	*(4')*	*(3'')*	*(4'')*
Age	-.0001046 (-0.22)	.0010165 (1.26)	.0034899 (1.23)	.2693532 (4.75)	.0009396 (1.26)	.0025107 (1.77)
Male	-.030353 (-2.44)	-.037324 (-1.68)			-.032455 (-1.68)	-.0319914 (-0.82)
Germany	.0309345 (-2.44)	.0199319 (0.68)			.0902446 (3.39)	.1134073 (2.18)
Education In Years	.0011825 (0.48)	-.0050873 (-1.13)			.0011856 (0.32)	-.0122582 (-1.57)
Married	-.0618929 (-2.30)	-.186419 (-3.22)	-.1286386 (-1.56)	-.0935353 (-0.55)	-.0779097 (-1.86)	-.1932899 (-1.89)
Separated	-.0529475 (-1.40)	-.146505 (-2.16)	-.1256333 (-1.12)	-.2327274 (-0.72)	-.097411 (-1.66)	-.1024202 (-0.86)
Single	-.0719355 (-2.20)	-.1297473 (-1.87)	-.1202097 (-1.06)	-.5046593 (-1.51)	-.0383666 (-0.76)	-.0119747 (-0.10)
Divorced	-.0229012 (-0.62)	-.0569277 (-0.62)	-.1639654 (-1.37)	-.1969353 (-0.72)	.0356187 (0.62)	.1625396 (1.00)
Δ RTI	.0633553 (5.71)		.127543 (6.20)		.1322955 (7.71)	
Δ Attend Social Gatherings		.0466646 (4.41)		.1319116 (4.42)		.0996065 (5.34)
Δ Attend Cultural Events		.0205453 (1.72)		.0437027 (1.23)		.0345733 (1.65)
Δ Participate In Sports		.0119283 (1.27)		.0317303 (1.20)		.0194359 (1.18)
Δ Perform Volunteer Work		.0054432 (0.45)		.0330521 (0.99)		.0190428 (0.91)
Full Time Employment	.0696362 (5.18)	.107597 (4.59)	.2722887 (6.51)	.9292362 (5.40)	.094086 (4.54)	.1419436 (3.46)
Regular Part Time Employment	.0503946 (2.24)	.0540213 (1.30)	.2183611 (3.57)	.4935163 (2.38)	.0527413 (1.52)	.0391304 (0.54)
d ln (Real Household Income)	.1727155 (9.57)	.1946466 (7.15)	.3268785 (9.19)	.3216647 (3.97)	.3359263 (11.96)	.3753111 (7.78)
d ln (Reference Household Income)	-.4080166 (-2.03)	-.2494713 (-0.66)	-.5759809 (-1.44)	-.896148 (-0.76)	-.711424 (-2.29)	-1.131446 (-1.71)
Nr. of Persons In the Household	-.0085035 (-1.78)	-.0179112 (-2.37)	-.009143 (-0.51)	-.0432543 (-0.52)	-.0061567 (-0.83)	-.0198651 (-1.49)
Nr. of Annual Doctor Visits	-.00224 (-7.26)	-.0025321 (-4.21)	-.0044701 (-6.00)	-.0059421 (-2.19)	-.0033475 (-6.91)	-.003909 (-3.63)
cut 1	-2.360052 (-43.00)	-2.562068 (-24.91)				
cut 2	-1.114439 (-21.26)	-1.317403 (-13.43)				
cut 3	1.054152 (20.14)	.9593173 (9.86)				
cut 4	2.306944 (41.97)	2.168813 (21.41)				
Constant Term			-.1831214 (-1.00)	-11.87145 (-4.70)	-.1283955 (-1.60)	-.0160892 (-0.09)
Observations	43,614	14,568	43,614	14,568	43,614	14,568
F-Test / Log Likelihood	-38540.974	-13229.803	18.84	7.66	21.57	9.04
F-Test fixed effects			0.63	0.62		

Table 8 GMM Panel VAR results

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

Legend: coefficient and t-stats (in parenthesis) relative to the effect of (row) regressors on (third and fourth column) dependent variables in GMM panel VAR system. The system includes two equation and is the one described in section 5 (equations 1.1 and 1.2) except for results in the last rows in which other variables are added as explicitly stated in the first column.