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**Relational goods, sociability, and happiness.**

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## Relational Goods, Sociability, and happiness

Leonardo Becchetti, Alessandra Pelloni and Fiammetta Rossetti\*

### Summary

The role of sociability and relational goods has generally been neglected in the formulation of standard economics textbook preferences. Our findings show that relational goods have significant and positive effects on self declared life satisfaction, net of the impact of other concurring factors. We also document that such effects persist when the equally significant inverse causality nexus is taken into account. This implies that a more intense relational life enhances life satisfaction and, at the same time, happier people have a more lively social life. Finally, we show that gender, age and education matter by showing that the effects of sociability on happiness are stronger for women, older and less educated individuals.

JEL: H41, Z13.

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## I. 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.

This paper empirically investigates the impact of relational goods on individual life satisfaction. By relational goods we indicate the affective/expressive, non instrumental, side of interpersonal relationships. Psychologists have long recognized relatedness as a key dimension of what it means to be humans.<sup>1</sup> However, in mainstream economics agents are mostly considered in isolation as they impersonally interact through markets, and consumption goods and leisure are assumed to be a ‘sufficient statistics’ of their utility. This solipsistic view of human nature has kept its predominance in the profession in spite of its many critics.<sup>2</sup> Today it is further questioned by the recent upsurge of empirical studies on the determinants of self declared

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<sup>1</sup> According to Carr (2004): ‘people with large social support networks and stronger social bonds with members of their networks have better physical and mental health, fewer illnesses and less depression, recover more rapidly from physical illness and psychological problems, and have a lower risk of death.’ Developmental psychology research, on its turn, shows that interpersonal relations are established at the very onset of our life, even before a self-conscious subject of experience is constituted, see Stern (1985). The biological grounding of our social tendencies is confirmed by the recent discovery of mirror neurons which provide a direct internal experience, and therefore understanding, of another person’s act, intention or emotion. When people use the expression ‘I feel your pain’ they may not realize how literally it could be true (Rizzolatti, Fogassi and Gallese, 2006).

<sup>2</sup> Drawing casually from a very long list we can quote Sen (1977) who stresses sympathy and commitment as fundamental human drivers, Hirschleifer (1978) who contrasts the excessive emphasis in economics on ‘man-thing’ activities as opposed to ‘man-man’ activities and Akerlof and Kranton (2000) who propose to insert identity (self-image) in the utility function of agents.

happiness, which show that an increasing income does not always lead to more subjective well being (the famous Easterlin's (1974) 'paradox of happiness').

The happiness research has studied the effects of a wide range of both economic and socio-demographic factors, from income to age and gender, from inflation and unemployment to health (Frey and Stutzer 2002 a and b; Clark et al. 2006). However, among the personal relationships only marriage has been extensively considered (and found of paramount importance: see Stutzer and Frey 2006). Here we offer evidence on the impact on life satisfaction of a wider set of non instrumental social activities from volunteering, to spending time with friends, attending social gatherings and cultural and sports events.

Investigating the empirical nexus between these relational goods and happiness can have important policy implications. In traditional economics, we simply assume that someone's current utility depends on his current choice-set. The larger the choice-set, the better off the person. But this conclusion completely ignores the impact of one person's behaviour on the welfare of others when the interaction does not occur through markets. Such interdependencies are a basic part of human experience and we should expand our framework to take them into account when formulating and evaluating policies: the neglect of relatedness as a fundamental aspect of human life may severely limit economic analysis and curtail the validity of its policy prescriptions. For instance, if economic growth is obtained at the expense of the quality of the relational environment, the final outcome can be negative for happiness and this may reduce the political consensus for growth oriented policies.<sup>3</sup> While obviously relational goods cannot be directly produced by the state, public action can avoid the growth-unhappiness paradox and promote personal interactions in

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<sup>3</sup> This argument of course is not new. In 1944, Polanyi, in the *Great Transformation*, argued that market economies tended to destroy the net of social relationships that kept society together. The market for labor induced people to move to where they could earn the most – creating strangers in strange lands. Human status rankings became the product of market forces rather than the result of social norms about justice. This had to be counterbalanced by strong public intervention.

many important ways, for instance by providing meeting places, by regulating shopping hours, by fixing the maximum work week, by supporting the arts and sports, by urban planning aimed at reducing commuting time etc.<sup>4</sup>

Based on these premises, the paper provides an explicit empirical test on the importance of relational goods for individual happiness by testing jointly for the direct (intense human relationships increase happiness) and indirect (happier individuals have more intense relational life) causality link and by considering the impact of age, gender and education on this relationship. It is divided into five sections (introduction and conclusions included). In the next section we discuss some recent theoretical and empirical economic analysis of relational goods. In the third and fourth section we illustrate our descriptive evidence and econometric findings. The fifth section concludes.

## **II. RELATIONAL GOODS: THEORETICAL BACKGROUND**

If the economy consisted in a complete set of perfect markets, personalised interaction among agents would be irrelevant for resource allocation. However in the real world agents have to meet to negotiate, exchange information, coordinate their actions inside organizations: much economic activity takes place not through market exchanges but through ‘encounters’ (Gui 2000). This interpersonal dimension of economic reality is still largely unexplored in economics

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<sup>4</sup> Frey et al. (2005) discuss the life satisfaction approach as a way to learn about people’s preferences for public goods by correlating the degree of public goods or ‘bads’ with individuals’ reported subjective well-being and evaluating them directly in terms of life satisfaction, as well as relative to the effect of income. This novel approach is compared to revealed preference methods based on hedonic pricing and to stated preference methods based on contingent evaluation. What we are offering in this paper is in fact an application of the life satisfaction approach to the evaluation of a particular kind of public goods: our econometric method is particularly suited to minimize the problem of spurious correlations, while given the nature of our exercise, we don’t have to make a choice as to which units are affected by the externality.

notwithstanding the burgeoning literature on positional goods, social preferences, peer effects, social capital, etc.(see Gui and Sugden 2005 for a survey).

Here we contribute to this literature focusing our analysis on relational goods. Relational goods include companionship, emotional support, social approval, solidarity, a sense of belonging and of experiencing one's history, the desire to be loved or recognized by others etc.. These goods are, on a smaller scale, produced by family relationships or friendships and, on a larger scale, in many kinds of social events (club or association meetings, live sport events, etc.). A general laughter during a comic movie, supporters' enthusiasm at the stadium when their team scores a goal and applause at a theatre are examples of relational goods produced on this larger scale.

To our knowledge, the economic analysis of relational goods was first proposed by Gui (1987) in studying the structures of a communitarian economy and by Ulhaner (1989) in explaining participation in political elections- an anomaly for rational choice models. These authors argue that relational goods are a specific kind of local public goods. They are public because, unlike conventional goods, they cannot be enjoyed by an isolated individual, but only jointly with some others. We 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 ourselves of the public good aspect incorporated in such events.

They are local public goods because the collective entity consuming them is represented by a specific subset of agents in the economy. They are a specific kind of public goods, which should be better defined as anti-rival than as non rival, because their very same nature is based on the interpersonal sharing of them. As a consequence, participation to their consumption actually creates a positive externality on partners and contributes to the quality of the public good itself. On other terms, partners do not see nonrivalry and nonexcludability (which may or may not be present) as negative elements which prevent them from exploiting all private benefits from the

good, but as positive elements which augment its value (my satisfaction can be actually increased, or even crucially determined, by the fact that the other is also participating and taking pleasure to the extreme that congestion can increase utility! ).

Another distinctive characteristics of relational goods is that they acquire value through sincerity or genuineness – which is impossible to buy, so they can be generated as a by product of some instrumental activity but not by making contracts for their supply. Friendship has to be its own reward and sympathy cannot be bought and sold without being transformed into something totally different.<sup>5</sup>

Gui and Sugden (2005) stress that relational goods can have important universal public benefits. For example, institutions which encourage people to trust others are classic examples of public goods. Such trustful atmosphere may depend not only on law but also on norms<sup>6</sup> which are fostered by interpersonal relations ( Putnam 2000).<sup>7</sup>

As typically happens with public goods which cannot be exchanged through markets, there are reasons to expect that relational goods will be underproduced and underconsumed.

People have to coordinate to produce a social event. The behaviour necessary for such coordination contributes to an interaction from which others also benefit, thereby generating an

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<sup>5</sup> This does not mean that the opportunity of consuming relational goods cannot be bundled with other goods. For example, in selling packaged holidays for affinity groups, travel agents are in a sense selling the companionship of fellow-customers, while clubs are selling the companionship of fellow members. However this is possible because the non instrumentality of the companionship is guaranteed by the fact that the actual producers of the relational goods are not their sellers. There's of course no guarantee that such bundling will induce the welfare maximizing consumption of relational goods.

<sup>6</sup> Habermas' (1990) and Apel's (1990) discourse ethics is based on the idea that normative validity cannot be understood as separate from the argumentative procedures used in everyday practice to validate the norms that regulate social interactions. Moral principles are extracted from the necessary preliminary conditions of communication on validity claims (e.g. the condition that no force except that of the better argument is used).

<sup>7</sup> We notice however that the econometric techniques we use are unable to capture these more universal benefits of relational goods.



externality, a well known source of market failure. This creates the possibility of prisoner's dilemma-like traps of 'relational poverty', ensuing from individuals allocating too much time to the production of private goods.

Frey and Stutzer (2005) indicate additional relevant causes of under consumption of relational goods unrelated to the prisoner's dilemma in their production and to the difficulty of making contracts for their production. They stress that when people make decisions, they overvalue characteristics relating to consumption satisfying extrinsic desires (income and status) and underestimate the utility relating to consumption satisfying intrinsic needs (time spent with family and friends and on hobbies). Relational goods clearly fall in this second category of consumption.

The authors list many sources leading individuals to underestimate future utility from intrinsic attributes, compared to extrinsic attributes of goods and activities. First, there is evidence of little or no adaptation for goods and activities characterized by intrinsic attributes, and of strong adaptation for those characterized by extrinsic attributes. Since there is evidence that people tend to underestimate adaptation we can deduce that people underestimate benefits from extrinsic attributes with respect to benefits from intrinsic ones. Moreover when individuals choose what goods to consume they have to resort to their experiences from the past. What counts as 'more memorable' tends to be the most intense moment (peak) and the most recent moment (end) of an emotional occurrence (Kahneman 2003). Frey and Stutzer (2005) propose that while extrinsic attributes create mostly peak emotions, intrinsic attributes give rise to longer-term positive experiences. Underconsumption of intrinsic attributes follows by this route.

Other possible causes of underconsumption of intrinsic attributes are grounded in our culture. Individuals have a strong urge to justify their decisions, both to themselves and to other persons. But in western societies it is much easier to provide rational justifications for extrinsic rather than

for intrinsic characteristics. Finally, relatively higher misprediction in intrinsic than in extrinsic aspects is also induced by market practices such as advertising, which of course are mainly directed towards marketed goods

Summing up, the analyses of relational goods converge in predicting that in general consumption of relational goods will be inefficiently low. The hypothesis we test empirically is that those individuals who consume more relational goods, i.e. who are have been more successful in solving the problems related to the reduced incentives and the cognitive problems hindering their production, will be on average better off than those who have been less successful in doing so.<sup>8</sup>

Moreover our work can be useful in studying the ‘distributional’ consequences of policies producing changes in patterns of relational goods consumption. If there were a decrease in the frequency and intensity of consumption of relational goods would some people be systematically lose out? Are relational goods particularly important for some groups?

To provide an idea of how our contribution relates (and is original with respect) to past work in this field, consider Gui and Sugden (2005) when they argue that the essence of the debate on the role of relational goods in economics revolves around two main questions: are relationships an important input of (or output affected by) economic activity which is neglected in traditional analyses?<sup>9</sup> Do human relationships (outside the economic sphere) directly affect individual wellbeing beyond their impact on economic outcomes? Our paper essentially aims to provide an

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<sup>8</sup> Independent evidence corroborating this analysis is that people with material or extrinsic life goals report lower self-esteem and life satisfaction than people with intrinsic life goals (e.g. Kasser 2002; Sirgy 1997).

<sup>9</sup> Gui and Sugden (2005) divide this question into the following subtopics providing evidence on each of them: i) Economic choices can affect interpersonal relations outside the economic sphere; ii) Interpersonal relations outside the economic sphere can affect economic performance; iii) Interpersonal relations inside the economic sphere can affect economic performance; iv) Interpersonal relations inside the economic sphere can affect well-being.

answer to the second question. More specifically, given the features of some of our relational variables described in more detail in the next section (attendance at social gathering, attendance at cultural events), the aspect of relational goods we are going to test is the hypothesis that interpersonal relations can enhance life satisfaction even though subjects are quite passive and do not device any particular coordinated joint action beyond the decision of attending the same event.

In this perspective we are close to the ‘fellow feeling’ hypothesis of Adam Smith, rediscovered by Sugden’s (2002), according to which individuals’ mutual awareness of a common sentiment is in itself a source of pleasure for them.

Other papers close to our approach are those of Schiff (2002) showing that, even though migrant workers often earn greater income than those who stay behind, their quality of life suffers from poor interpersonal relations, and of Diwan (2000) illustrating that the characteristics of the networks of personal relations in which people are involved have significant welfare effects. Bruni and Stanca (2006) offers cross-sectional evidence of a positive effect of indicators of relational goods on life satisfaction. Another related paper is Meier and Stutzer (2004) who work on the same data set we use ( the GSOEP) but limit their analysis to volunteering: they find robust evidence that volunteers are more satisfied with their life than non-volunteers, and consider this result as supporting the view that altruism promotes the wellbeing of altruists.

A problem with this evidence is that of the endogeneity of regressors and inverse causality, issues for which it is easier to find a solution working with panel data as we do and adopting an estimation approach which jointly tests for direct and inverse causality between happiness and relational goods.

### III. CONSTRUCTION OF DATABASE AND VARIABLES

In order to test the importance of human relationships on individual happiness we work on one of the richest databases available (German Socio Economic Panel GSOEP) which contains both cross-sectional and longitudinal information (extracted from 21 waves going from 1984 to 2004) on many variables (including self declared happiness and indicators of relational life) for a large sample of individuals.

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 the specific relational activity (1=Never, 2=Less Frequently, 3=Every Month and 4=Every Week).

Do all these activities produce relational goods as we defined them in the previous section? Social gatherings are expected to generate strong 'fellow feelings' which strengthen ties among participants. Any individual who decides to participate creates a positive externality for the other participants: being in a larger number gives a feeling of community and empowerment, provides a confirmation which reinforces the decision to participate to the gatherings and increases their enjoyment. Cultural events have similar features even though the activity by the participants is much weaker (the event is produced regardless, and even with very few participants. However, high participation may increase the value of the good). With regard to the third relational variable, active (athletes) and passive (bystanders) participants in sporting events produce and consume local public goods not just in the case of teams but also of individual sports, at least to the extent in which they take place in a normally competitive environment in which the presence

of other competitors is required.<sup>10</sup> The communal dimension is essential in church or religious events.

Voluntary work is generally performed in groups and participation has also the effect of reinforcing motivation and create solidarity not only among volunteers (i.e. a work camp or social service performed by members of an association), but also between the volunteers and the beneficiaries of the work undertaken. The ‘fellow feeling’ argument therefore applies also here.

We build a *Relational Time Index*’ (from now on *RTI*) by averaging values for these five variables for each respondent.<sup>11</sup> We 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 above five variables features in all of the 21 waves of our dataset. We calculate the RTI index on the basis of non missing relational variables for each individual-year in order to have a higher number of observations and to cover more years. However, for the sake of completeness, we present results for the selected specifications with both the aggregate RTI index and its individual components as separate regressors.

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<sup>10</sup> In the case of soccer it has frequently happened that organised fans have used (i.e., by enacting or threatening to enact a supporter ‘strike’) their capacity to coordinate and produce the very public good, which contributes to the success of their team, in order to increase their bargaining power in the division of team net sales

<sup>11</sup> We do this since survey answers do not allow us to infer exactly a *per month* or *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 activities. A robustness check in which we compute 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.

Another variable related to human relationships and one traditionally considered in the empirical literature is relative income. Several papers argue that positional status and the ratio between one's own and the reference group income significantly affect life satisfaction (see, among others, Duesenberry 1949, Frank 2005 and Layard 2005). From the empirical point of view the problem is obviously 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, whilst there are 4 classes of education (ranging from 7 to 18 years in our sample). All this considered, the combination of our 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. The other regressors included in our estimates (age, gender, education, marital and employment status, health) are standard in the literature. In order to describe the marital status 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 and partner's death). For the employment condition we follow the same approach and consider as status variables full time, regular part-time and marginal irregular part-time employment, while also measuring shocks related to losing employment or getting new jobs.

#### **IV DESCRIPTIVE FINDINGS**

Life satisfaction is typically a measure of limited variation across years for the same individual. A preliminary inspection of our data shows that the 0-10 self declared life satisfaction variable exhibits year to year persistence in the same happiness level which is weaker at low levels (below 20 percent when the previous year self declared happiness is below 5) and highest at level 8 (48.16 percent).<sup>12</sup>

All relational activity indicators appear positively associated with self declared happiness. The index of attendance at social gatherings varies between 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 at cultural events from 1.28 to 1.69, participation in sports from 1.49 to 2.03, undertaking volunteer work from 1.21 to 2.03 and attendance at church or religious events from 1.45 to 1.99.

With regard to the marital status relational variables we observe that 62 percent year-observations correspond to married individuals (singles status equals 23 percent and divorced 5.5 percent). Episodes of marriage and separation cover respectively 1.9 and 1.4 percent of our observations. These variables exhibit well defined variations across different levels of life satisfaction. The share of married respondents is 51 percent at (life satisfaction) level 1 and increases to 65 percent at level 10. Separated (divorced) are represented by 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 experienced episodes of separation in the interview year against only 1 percent of the most satisfied.

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<sup>12</sup> Tables on descriptive findings are omitted for reasons of space and available from the authors upon request.

With regard to our aggregate index of relational goods we find that its value is always higher for positive changes in happiness than for 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 at social gatherings and cultural events, but not attendance at church or religious events.

## **V ECONOMETRIC FINDINGS**

Since our dependent variable is discrete qualitative and takes values from 0 to 10, the standard approach is an ordered probit estimate. However, given the extended range of our life satisfaction measure, the same dependent variable has sometimes been approximated in the literature to a continuous variable so that OLS and panel fixed effect models have both been estimated (Stutzer and Frey 2006). We opt for the OLS approach which allows easier interpretation of magnitude effects after checking that our results are substantially analogous under the two alternative methods.<sup>13</sup> We select two different specifications. In the first we use the aggregate relational good variable and dispose of approximately 80,000 observations. In the second we replace this composite index with all its individual components. This last choice necessitates that we work only with those waves in which all individual components are non missing and therefore reduces the sample to around 30,000 observations. More specifically, in terms of sample periods, the first specification includes also observations from the 1980s, while the second only those from the 1990s.

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<sup>13</sup> Results are omitted for reasons of space and available from the authors upon request.



The index of relational goods has positive and significant coefficients both in the level and in the first difference equation (column 1, Tables 1 and 2). We therefore do not reject the hypothesis that relational goods affect happiness.

The level equation tells us that higher intensity of relational life is positively related to higher level of self declared happiness, net of the effects of the other variables (Table 1). In addition, the first difference equation adds that positive (negative) changes in relational life are significantly associated to positive (negative) changes in life satisfaction (Table 2).

When we disaggregate the index into its different components in the second specification we observe that all components remain significant in level estimates (column 2, Tables 1 and 2). In terms of coefficient magnitude attendance at social gatherings has double the weight with respect to participation in cultural events and more than that with respect to the other two indicators (sport activities and voluntary work). Attendance at social gatherings is also the only strongly significant variable in the equation in first differences and its coefficient is here three times larger than that of participation to cultural events. Notice that of all the activities we include in our index, social gathering is the most purely relational so it is not surprising that it turns out to be the most efficient generator of pleasurable ‘correspondence of sentiments’.

The negative sign of the reference group income in both level and first difference estimates confirms that a higher wage of our peers is associated with lower happiness levels and a positive change in peer’s wage levels is significantly related to a reduction of our own life satisfaction. The significance of the relative income effect confirms the ambivalence of human relationships. In our life with others we enjoy the positive effects of sociability, whilst simultaneously suffering from interpersonal comparisons when they are unfavourable.

When we consider marital status variables, traditionally capturing other dimensions of our relational life, we observe that marriage is positively related to happiness while the ‘separated’

status

attracts a negative and significant coefficient when we omit data from the 1980s and slightly less so when they are included. The divorced status coefficient is always negative and significant consistently with what is traditionally found in the empirical literature.

The effect of full time employment is more stable and positive across all estimates. This implies that it is robust across years and independent of 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.

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.

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 (coefficient magnitudes of column 1 in Table 1) 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 observe that the most relevant variable, in terms of economic significance (magnitude of its effect), is 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. This 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.

### *1. First difference and panel vector autoregression (VAR) estimates*

There is however a serious problem of endogeneity in happiness estimates. As is well known, marriage may positively contribute to happiness but higher life satisfaction positively affects the probability of getting married (Stutzer and Frey 2006). 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 and earn more amongst other effects (Clark et al. 2006).

Frey and Stutzer (2002a) correctly argue that panel data eliminate heterogeneity caused by those time invariant individual traits inherited from childhood or birth. Clark et al. (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 the problem has been partially solved by exploiting ‘quasi-natural experiments’ or external events which have been considered as determining exogenous changes in income (lottery wins, aggregate changes in real income after transition in Russia or reunification in Germany respectively, see Gardner and Oswald 2004, Frijters et al. 2004a, 2004b and 2006, Meier and Stutzer 2004).

Here we follow two different 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 where 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 will slowly affect changes in our regressors, while changes in our regressors instantaneously affect changes in happiness. For example, it 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.

Our first differenced estimate in Table 2 shows that the 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).<sup>14</sup>

However, if we are strongly concerned about biunivocal causality and endogeneity, and not fully convinced by first differenced estimates, the Generalised Method of Moments (GMM) panel vector autoregression (VAR) approach<sup>15</sup> is the most suitable one under the assumption that our 0-10 variable can be approximated by a continuous one. The advantage with such an approach is that we can estimate a system in which we jointly test whether production of relational goods causes happiness and viceversa.

The base GMM VAR model has two equations. In the first the current level of life satisfaction is regressed on lagged levels of life satisfaction and lagged levels of the index of relational goods. In the second equation the current level of the relational good index is regressed on its lagged values and on the lagged values of life satisfaction. Fixed effects are also included as regressors in both equations.

Given the model it is possible to test the following hypotheses:

*H<sub>0A</sub>: the time invested in relational goods does not Granger-cause life satisfaction.*

This occurs if the sum of the coefficients of the lagged relational good index is not significantly different from zero in the first equation. That is, if (lagged values of) the relational good index do not significantly affect life satisfaction, net of the impact of the lagged values of the latter.

*H<sub>0B</sub>: life satisfaction does not Granger-cause the time invested in relational goods.*

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<sup>14</sup> Fixed effects and ordered probit estimates are omitted for reasons of space and available upon request.

<sup>15</sup> For details on this approach see Arellano and Bond (1991) and Arellano and Bover (1995).

This occurs if the sum of the coefficients of lagged life satisfaction is not significantly different from zero in the second equation. That is, if (lagged values of) life satisfaction do not significantly affect investment in relational goods, net of the impact of the lagged values of the latter.

The crucial point of this approach is that the two hypotheses (direct and inverse causality between the two variables) are jointly tested.

After testing the two hypotheses on the overall sample we do the same on splits based on sample period, gender, education, nationality and age. Our goal is to check when, where and for whom the nexus between relational goods and life satisfaction is stronger.

Table 3 tells us that, when we estimate the system on the overall sample, both null hypotheses are rejected since the time invested in relational goods Granger causes happiness and viceversa. The result is robust to several (age, education, gender and nationality) subsample splits<sup>16</sup> 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 i) the reverse causality links between the two variables, ii) the impact of health and iii) the two added regressors.<sup>17</sup>

Evidence from subsample splits, confirmed under standard augmented model specifications, shows that the relational good-happiness nexus (net of the reverse causality phenomenon) is stronger for females (the coefficient of the lagged RTI index on life satisfaction is .67 against .46), for older (.69 against .46) and less educated people (.61 against .36) and for East than for West Germans (.66 against .56). The gender result appears in accordance with the generally

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<sup>16</sup> We also divided the sample in two equal time periods but we do not find significant differences in the effect of relational goods on happiness between such periods. Results are omitted for reasons of space and available from the authors upon request.

<sup>17</sup> These findings are omitted for reasons of space and available from the authors upon request.

accepted idea that women tend to be more empathetic<sup>18</sup> and are ‘more avid social capitalists’, to borrow Putnam’s expression.<sup>19</sup> Age and education findings may be interpreted in the light of the reduced opportunities for other activities contributing to happiness in the lives of the old and the less educated.<sup>20</sup> This means human relationships will play a bigger role in their lives. Indeed the association between social relationships and lower mortality has been well documented.<sup>21</sup> The stronger coefficient in the East German sample may depend from the shock related to the fall of the old system of relational ties and the transition to a more competitive environment. Such result is however weaker and not always robust in the augmented model specifications.<sup>22</sup>

## VI. CONCLUSIONS

Many recent approaches in the social sciences emphasize the importance of relational aspects in human identity.

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<sup>18</sup> Stronger magnetoencephalographic responses related to the mirror neuron system have been recorded in women compared to men (see Cheng et al. 2006).

<sup>19</sup> Nelson (1996) argues that economists’ overwhelming reliance on models of individual choice reflect masculinist biases rooted in Cartesian divisions between rationality and embodiment and that the discipline should not be concerned merely with goods and services traded in the market but with all the necessities and conveniences that sustain life. She writes ‘The central model of economics views people as individuals, and each individual as self-interested, autonomous, rational, and free to choose among different actions. Logically, the converse of this would be a view of people as linked to others and concerned about their welfare--people who are dependent, emotional, and subject to decisions made by others or influences from the social or natural environment. Not just coincidentally, all the characteristics in the first list have been, in modern Western and English-speaking cultures, associated with stereotypical masculinity, while all those in the latter list are associated with stereotypical femininity.’

<sup>20</sup> This finding of the lower importance of the relationships for the more educated would have not surprised Aristotle who judges the contemplative life the most self-sufficient among the human activities which can be included in the plan for the good life (see Nussbaum 2001, chap 12).

<sup>21</sup> Rasulo, Christensen and Tomassini (2005) show that the frequency of interactions with children, relatives, and friends significantly lowers the risk of dying in late life. This should explain why elder people care more about relationships.

<sup>22</sup> These findings are confirmed when we estimate in sample splits the equation in differences of Table 3. Results are omitted for reasons of space and available upon request.

Empirical studies on the determinants of life satisfaction give us a unique opportunity for testing the proposition of the relevance of the social dimension in human life. Our findings do not reject the hypothesis that this dimension is highly significant in at least two respects. On the one 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 in producing and consuming relational goods is shown to generate significant and positive effects on life satisfaction. We also show that relational goods have a bigger impact on the subjective wellbeing of women, the older and the less educated. This finding can be useful in designing and evaluating public policies with a direct or indirect effect on the quality and quantity of relational goods.

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.

We show that the two null hypotheses of the insignificance of the effects of time invested in relational life on happiness and of happiness on time invested in relational life are rejected. Granger causality in both directions is supported by our findings in both the overall sample and in gender, age, education and nationality splits.

The robustness of the relational goods-happiness nexus evidenced by our results seems to confirm that the anthropological assumptions in standard economic models should be broadened to take into better account the social domain and that policymakers should pay attention to potential unintended effects of policy measures on the social fabric of contemporary societies.

Extending the framework of economic analysis to interpersonal relations is ridden with problems of conceptualization and measurement. However we hope we have contributed to prove that it is worthwhile trying to solve these problems: an economic culture ignoring the hidden costs and benefits of our choices for the social environment can mislead both individual and collective actions.

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**Table 1. Level estimates**

|   | <i>Pooled OLS</i>    |                      |
|---|----------------------|----------------------|
| <i>Age</i>                                    | -0.003<br>(-4.38)**  | 0.000<br>(0.51)      |
| <i>Male</i>                                   | -0.079<br>(-5.51)**  | -0.067<br>(-3.92)**  |
| <i>Germany</i>                                | -0.056<br>(-2.41)**  | 0.015<br>(0.50)      |
| <i>Education In Years</i>                     | 0.007<br>(1.88)*     | -0.001<br>(-0.32)    |
| <i>Married</i>                                | 0.160<br>(5.31)**    | 0.167<br>(4.68)**    |
| <i>Separated</i>                              | -0.049<br>(-1.06)    | -0.009<br>(-0.18)    |
| <i>Single</i>                                 | -0.007<br>(-0.20)    | -0.029<br>(-0.67)    |
| <i>Divorced</i>                               | -0.360<br>(-8.62)**  | -0.390<br>(-7.70)**  |
| <i>RTI (aggregate relational time index)*</i> | 0.571<br>(51.05)**   |                      |
| <i>Attend Social Gatherings</i>               |                      | 0.262<br>(27.29)**   |
| <i>Attend Cultural Events</i>                 |                      | 0.134<br>(12.36)**   |
| <i>Participate In Sports</i>                  |                      | 0.096<br>(13.91)**   |
| <i>Perform Volunteer Work</i>                 |                      | 0.081<br>(9.51)**    |
| <i>Full Time Employment</i>                   | 0.124<br>(7.88)**    | 0.124<br>(6.73)**    |
| <i>Regular Part Time Employment</i>           | 0.067<br>(2.52)**    | 0.068<br>(2.17)*     |
| <i>Ln (Real Household Income)</i>             | 0.555<br>(37.02)**   | 0.547<br>(31.09)**   |
| <i>ln (Reference Household Income)</i>        | -1.354<br>(-19.22)** | -1.158<br>(-13.87)** |
| <i>Nr. of Persons In the Household</i>        | -0.071<br>(-12.08)** | -0.062<br>(-8.96)**  |
| <i>Nr. of Annual Doctor Visits</i>            | -0.014<br>(-37.36)** | -0.014<br>(-31.35)** |
| <i>Constant Term</i>                          | 12.647<br>(23.06)**  | 10.831<br>(16.57)**  |
| <i>Observations</i>                           | 79,846               | 59,550               |
| <i>F-Test / Log Likelihood</i>                | 474.79               | 274.74               |
| <i>F-Test fixed effects</i>                   |                      |                      |

Note: The Table presents in column 1 coefficients and T-statistics (in round brackets) of the following estimate:

$$\text{Happiness}_i = \alpha_0 + \alpha_1 \text{Age} + \alpha_2 \text{Male} + \alpha_3 \text{Germany} + \alpha_4 \text{Education in Years} + \alpha_5 \text{Married} + \alpha_6 \text{Separated} + \alpha_7 \text{Single} + \alpha_8 \text{Divorced} + \alpha_9 \text{RTI} + \alpha_{10} \text{Full time employment} + \alpha_{11} \text{Regular part time employment} + \alpha_{12} \text{Ln(Real household income)} + \alpha_{13} \text{Ln(Reference household income)} + \alpha_{14} \text{Nr. of person in the household} + \alpha_{15} \text{Nr. of annual doctor visits} + \varepsilon.$$

where *Happiness* is a 0-10 response on individual's overall life satisfaction, *Age* is respondent's age, *Male* is a gender (0/1) dummy, *Germany* is a dummy for German residents, *Education in Years* is the number of education years, *Married*, *Separated*, *Single* and *Divorced* are marital status (0/1) dummies, *Full time employment* and *Regular part time employment* are employment status (0/1) dummies, *Ln(Real Household income)* is the log of the Real household income, *Ln(Reference household income)* is the log of our measure of the respondent's reference group income, where the reference group is the average household income of the respondent's gender, age, region and education specific class calculated as explained in section III. *Nr. of persons in the household* and *Nr. of annual doctor visits* are respectively the number of people living in the respondent's household and the number of respondent's visit to the doctor in the last year. The RTI index is calculated as an unweighted average of the answers to the following questions asking respondents whether in the last year they attended 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 the specific relational activity (1=Never, 2=Less Frequently, 3=Every Month and 4=Every Week) (for further details see section III). In the estimate presented in column 2 the aggregate RTI index is replaced by its individual components.

**Table 2 Differenced estimates**

|  | <i>Pooled OLS</i>    |                      |
|--|----------------------|----------------------|
| <i>Age</i>                               | 0.001<br>(1.26)      | 0.006<br>(1.77)*     |
| <i>Male</i>                              | -0.032<br>(-1.68)*   | -0.032<br>(-0.82)    |
| <i>Germany</i>                           | 0.090<br>(3.39) **   | 0.113<br>(2.18)*     |
| <i>Education In Years</i>                | 0.001<br>(0.32)      | -0.012<br>(-1.57)    |
| <i>Married</i>                           | -0.078<br>(-1.86)*   | -0.193<br>(-1.89)*   |
| <i>Separated</i>                         | -0.097<br>(-1.66)*   | -0.102<br>(-0.86)    |
| <i>Single</i>                            | -0.039<br>(-0.76)    | -0.012<br>(-0.10)    |
| <i>Divorced</i>                          | 0.036<br>(0.62)      | 0.163<br>(1.00)      |
| $\Delta$ <i>RTI</i>                      | 0.132<br>(7.71) **   |                      |
| $\Delta$ <i>Attend Social Gatherings</i> |                      | 0.100<br>(5.34) **   |
| $\Delta$ <i>Attend Cultural Events</i>   |                      | 0.035<br>(1.65)*     |
| $\Delta$ <i>Participate In Sports</i>    |                      | 0.019<br>(1.18)      |
| $\Delta$ <i>Perform Volunteer Work</i>   |                      | 0.019<br>(0.91)      |
| <i>Full Time Employment</i>              | 0.094<br>(4.54) **   | 0.142<br>(3.46) **   |
| <i>Regular Part Time Employment</i>      | 0.053<br>(1.52)      | 0.039<br>(0.54)      |
| <i>d ln (Real Household Income)</i>      | 0.336<br>(11.96) **  | 0.375<br>(7.78) **   |
| <i>d ln (Reference Household Income)</i> | -0.711<br>(-2.29) ** | -1.131<br>(-1.71)*   |
| <i>Nr. of Persons In the Household</i>   | -0.006<br>(-0.83)    | -0.020<br>(-1.49)    |
| <i>Nr. of Annual Doctor Visits</i>       | -0.003<br>(-6.91) ** | -0.004<br>(-3.63) ** |
| <i>Constant Term</i>                     | -0.128<br>(-1.60)    | -0.016<br>(-0.09)    |
| <i>Observations</i>                      | 43,614               | 14,568               |
| <i>F-Test / Log Likelihood</i>           | 21.57                | 9.04                 |
| <i>F-Test fixed effects</i>              |                      |                      |

Note: The Table presents in column 1 coefficients and T-statistics (in round brackets) of the following estimate:

$\Delta\text{Happiness}_i = \alpha_0 + \alpha_1 \text{Age} + \alpha_2 \text{Male} + \alpha_3 \text{Germany} + \alpha_4 \text{Education in Years} + \alpha_5 \text{Married} + \alpha_6 \text{Separated} + \alpha_7 \text{Single}$   
 $+ \alpha_8 \text{Divorced} + \alpha_9 \Delta\text{RTI} + \alpha_{10} \text{Full time employment} + \alpha_{11} \text{Regular part time employment} + \alpha_{12} \Delta\text{Ln}(\text{Real household income})$   
 $+ \alpha_{13} \Delta\text{Ln}(\text{Reference household income}) + \alpha_{14} \text{Nr. of person in the household} + \alpha_{15} \text{Nr. of annual doctor visits} + \varepsilon,$

where  $\Delta\text{Happiness}$  is the one year difference in the 0-10 response on individual's overall life satisfaction,  $s$ ,  $\Delta\text{Ln}(\text{Real Household income})$  is the one year difference in the log of the Real household income,  $\Delta\text{Ln}(\text{Reference household income})$  is the one year difference in the log of our measure of the respondent's reference group income  $\Delta\text{RTI}$  is the one year difference in the RTI index, while the other variables are described in the note to table 2. In the estimate presented in column 2  $\Delta\text{RTI}$  is replaced by the one year changes of its individual components.

**Table 3 GMM Panel VAR with sample splits**

| <i>Sample split</i>               |   | <i>Satisfaction with Life Today</i> | <i>RTI</i> |
|-----------------------------------|---|-------------------------------------|------------|
|                                   | <i>Lag Satisfaction with Life Today</i> | 0.386                               | 0.030      |
| <i>Overall sample</i>             |   | (89.58)**                           | (21.87)**  |
|                                   | <i>Lag RTI</i>                          | 0.553                               | 0.157      |
|                                   |   | (38.88)**                           | (33.01)**  |
|                                   |   |                                     |            |
| <i>Male</i>                       | <i>Lag Satisfaction with Life Today</i> | 0.375                               | 0.046      |
|                                   |   | (62.88)**                           | (23.33)**  |
|                                   | <i>Lag RTI</i>                          | 0.460                               | 0.203      |
|                                   |   | (25.64)**                           | (32.61)**  |
| <i>Female</i>                     | <i>Lag Satisfaction with Life Today</i> | 0.400                               | 0.014      |
|                                   |   | (63.46)**                           | (7.18)**   |
|                                   | <i>Lag RTI</i>                          | 0.669                               | 0.098      |
|                                   |   | (29.21)**                           | (13.26)**  |
| <i>Germany</i>                    | <i>Lag Satisfaction with Life Today</i> | 0.392                               | 0.029      |
|                                   |   | (72.90)**                           | (17.49)**  |
|                                   | <i>Lag RTI</i>                          | 0.573                               | 0.176      |
|                                   |   | (32.75)**                           | (30.03)**  |
| <i>Not Germany</i>                | <i>Lag Satisfaction with Life Today</i> | 0.357                               | 0.025      |
|                                   |   | (38.44)**                           | (9.12)**   |
|                                   | <i>Lag RTI</i>                          | 0.483                               | 0.131      |
|                                   |   | (14.68)**                           | (12.92)**  |
| <i>West Germany</i>               | <i>Lag Satisfaction with Life Today</i> | 0.402                               | 0.029      |
|                                   |   | (71.18)**                           | (16.70)**  |
|                                   | <i>Lag RTI</i>                          | 0.560                               | 0.195      |
|                                   |   | (30.02)**                           | (31.41)**  |
| <i>East Germany</i>               | <i>Lag Satisfaction with Life Today</i> | 0.360                               | 0.022      |
|                                   |   | (21.42)**                           | (4.15)**   |
|                                   | <i>Lag RTI</i>                          | 0.664                               | 0.062      |
|                                   |   | (11.52)**                           | (3.33)**   |
| <i>Education In Years ≤ 12</i>    | <i>Lag Satisfaction with Life Today</i> | 0.387                               | 0.026      |
|                                   |   | (82.02)**                           | (18.11)**  |
|                                   | <i>Lag RTI</i>                          | 0.608                               | 0.139      |
|                                   |   | (37.42)**                           | (26.45)**  |
| <i>Education In Years &gt; 12</i> | <i>Lag Satisfaction with Life Today</i> | 0.374                               | 0.055      |
|                                   |   | (34.89)**                           | (12.81)**  |
|                                   | <i>Lag RTI</i>                          | 0.358                               | 0.218      |
|                                   |   | (12.06)**                           | (19.74)**  |
| <i>Age ≤ 43</i>                   | <i>Lag Satisfaction with Life Today</i> | 0.368                               | 0.043      |
|                                   |   | (60.58)**                           | (21.35)**  |
|                                   | <i>Lag RTI</i>                          | 0.465                               | 0.213      |
|                                   |   | (24.46)**                           | (32.87)**  |
| <i>Age &gt; 43</i>                | <i>Lag Satisfaction with Life Today</i> | 0.413                               | 0.016      |
|                                   |   | (64.40)**                           | (8.45)**   |
|                                   | <i>Lag RTI</i>                          | 0.689                               | 0.083      |
|                                   |   | (30.71)**                           | (11.36)**  |

Legend: coefficients 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 (described in section 5) includes the following two equations:

$$LS_{it} = \sum_{j=1}^m \alpha_j LS_{i,t-j} + \sum_{j=1}^m \beta_j RTI_{i,t-j} + \nu_{1i} + \varepsilon_{1it}$$

$$RTI_{it} = \sum_{j=1}^m \gamma_j RTI_{i,t-j} + \sum_{j=1}^m \delta_j LS_{i,t-j} + \nu_{2i} + \varepsilon_{2it}$$

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,  $\nu$  is an individual fixed effect and  $\varepsilon$  is a random disturbance.