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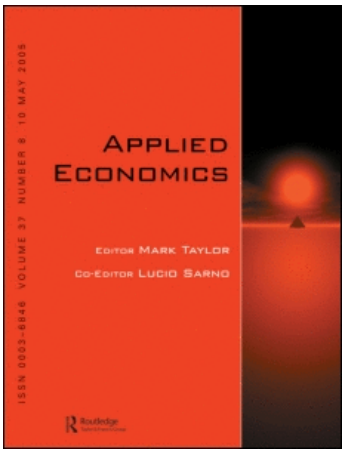

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Income, relational goods and happiness

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Income, relational goods and happiness

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Our empirical analysis on the determinants of self-declared happiness on more than 100 000 individuals from representative samples in 82 world countries does not reject the hypothesis that the time spent for relationships has a significant and positive impact on happiness. This basic nexus helps to understand new unexplored paths in the so-called 'happiness-income paradox'. To illustrate them we show that personal income has two main effects on happiness. The first is a positive effect which depends on individual's ranking within domestic income quintiles. The second is determined by the relationship between income and relational goods. In principle, more productive individuals may substitute (if the income effect prevails over the substitution effect) worked hours with the nonworking time made free for enjoying relationships, when they have strong preferences for them. The problem is that these individuals tend to have ties with their income class peers who share with them a high opportunity cost for the time spent for relationships. Hence, a coordination failure may reduce the joint investment in relational goods (local public goods which need to be co-produced in order to be enjoyed together) and, through this effect, individuals in the highest income quintiles may end up with poorer relational goods. The indirect impact of personal income on happiness through this channel is therefore expected to be negative.

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I. Introduction

Economic policy prescriptions always imply an explicit or implicit ranking of priorities incorporated into a specific welfare function, which has to be maximized under given resource constraints.

The ultimate criteria to define such priorities should be based on the knowledge of factors determining human happiness (or life satisfaction), since the latter ought to be the ultimate goal of national and international policymakers' action.

The 2003 World Bank Development Report clearly outlines a broad framework for human well-being which could inspire policymaker's prescriptions along this line (Fig. 1). In such framework it is acknowledged that (in addition to income enabled consumption) human, environmental and social resources are factors which, beyond their role as production inputs, have in themselves, through their direct fruition, a positive impact on individual happiness.

If the World Bank welfare conception is a good description of the reality of the human well-being, we expect education and quality of social ties to have significant and positive effects on happiness, independently from their expected contribution to individual productivity and income. While the impact of education on individual well-being has been thoroughly explored in the empirical literature

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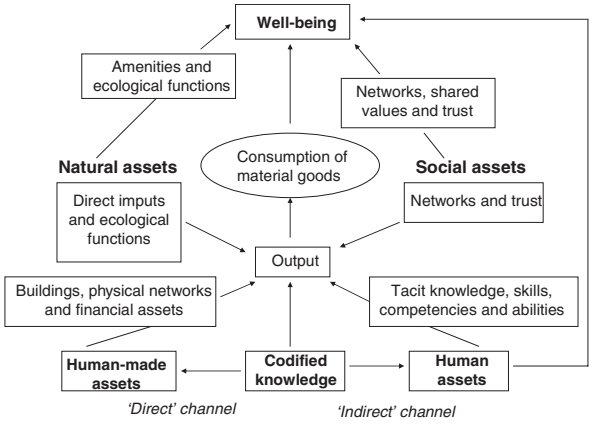

Fig. 1. A broader World Bank framework of individual well-being
Source: World Bank, World Development Report 2003: Sustainable Development in a Dynamic World.

(Becker and Becker 1997), evidence on the impact of relational goods[1] is, to our knowledge, very scarce (for related findings, see Becchetti *et al*., 2008).

Several other reasons of interest exist, beyond the lack of empirical work, to focus our research effort on the nexus between relational goods and happiness.

First, the exploration of nonmonetary causes of happiness is not to be considered outside the realm of economic analysis, as it may be of great importance in understanding the deeper motivation of human economic behaviour including consumption, productivity and entrepreneurship.

The acknowledgement of the importance of the investigation on the wealth–happiness nexus goes back to Malthus (1798),[2] Marshall (1890), Veblen (1899), Duesemberry (1949) and Hirsch (1976). In extreme synthesis, these authors remember that the nexus between the mean (wealth) and the end of any human existence (happiness) is the most important field of investigation for a social scientist.

Second, growth oriented policy measures, which do not take into account their eventual unintended consequences on nonmonetary factors affecting individual happiness, may achieve their primary goal (economic growth), but may miss the target of consolidating political consensus if they generate undesirable negative effects on happiness.[3]

The recognition of the relevance for economic policies of the research on the determinants of happiness does not imply a positive judgement on its feasibility.

One of the leading criticisms on this point is set forth by the approach which argues that empirical analyses should be carried out only on revealed preferences. This approach regards subjective utility as nonscientific since it is not objectively measurable (Frey and Stutzer, 2002a).

On this point Frey and Stutzer (2002a) appropriately report Sen's (1986) sentence on the fact that 'the popularity of the positivistic view is due to a mixture of an obsessive concern with observability and a peculiar belief that choice . . . is the only human aspect that can be observed' and provide several examples of nonobjectivist analyses such as theoretical studies on emotions (Elster, 1998), self signalling, goal completion mastery and meaning (Lowenstein, 1999) and status (Frank, 1985).

Another advantage of happiness studies with respect to analyses based on revealed preferences is that the same consumption bundle may lead to completely different levels of satisfaction according to the complex pattern of intrinsic and extrinsic motivations and to the course of action which led to obtain such material outcome. This argument may be resumed by arguing that 'experience utility' is at least as relevant as 'choice utility'. In this sense the empirical research on the determinants of happiness overcomes the 'consequentialist' assumption that selected strategies and experience lived during the course of actions have no effects on individual happiness beyond the realized outcome.

The main arguments in defence of the reliability of data on self-declared happiness are: (i) their capacity of passing cultural Darwinian selection in psychology and sociology (Alesina *et al*., 2001); (ii) the positive link between self-declared happiness and healthy physical reactions such as smiling attitudes (Ekman *et al*., 1990; Pavot, 1991), heart rate and blood pressure responses to stress (Shedler *et al*., 1993); (iii) the link between positive feelings and physical measures of brain activity (higher alpha power in the left prefrontal cortex), with measures of hedonic well

[1] Beyond the detailed evidence on the effects on happiness of marital status (Argyle, 1999; Johnson-Wu, 2002; Blanchflower-Oswald, 2004; Frey and Stutzer, 2002a, b, 2006), which has obviously to do with relational goods, there is no investigation, to our knowledge, on the impact of the time spent with different types of friends (working colleagues, co-members of sport and religious associations, etc.).
[2] An example of it is this appropriate quote from Malthus (1798) on Adam Smith's work: The professed object of Dr Adam Smith's inquiry is the nature and the causes of the wealth of nations. There is another inquiry, however, perhaps still more interesting, which he occasionally mixes with it, I mean an inquiry into the causes which affect the happiness of nations.
[3] An interesting example of the potential paradoxical adverse effects on happiness of growth oriented policies is provided by the identification of 'frustrated achievers' (individuals registering positive changes in income and negative changes in happiness) (see, among others, Graham, 2003; Graham and Pettinato, 2005).

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being such as life satisfaction being also related with the same activity (Sutton and Davidson, 1997); (iv) the prediction capacity of self-declared happiness with individuals choosing to discontinue activities associated with low levels of well-being (Kahneman *et al*., 2000; Frijters, 2000; Shiv and Huber, 2000); (v) the correspondence between happiness scores provided by family and friends on the respondent and the respondent own report (Sandvik *et al*., 1993; Diener and Lucas, 1999).

Our belief on the validity of the above-mentioned arguments, and the importance of extending our knowledge into these new areas, motivates our article.

This article is divided into seven sections (including introduction and conclusions). In Section II we present a short survey on the nexus among income, relational goods and happiness in two steps. First, we explore the direct link between each of the first two variables and happiness. Second, we investigate the complex nexus among the three, which includes an indirect effect of income on happiness, through the impact that the first variable has on relational goods. In this part of the Section II we formulate our hypothesis on direct and indirect effects of income on happiness, and on the direct effect of the intensity and time spent in relational goods on happiness itself. The hypothesis will be tested in the empirical analysis. In Section III we present descriptive evidence on the positive link between income and happiness, time spent for relational goods and happiness, and on the nonpositive relationship between income and time spent for relational goods.

In Section IV we test our hypotheses on the above-mentioned links and test the robustness of our findings to different (gender, geographical area and religious affiliation) subsample splits.

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II. Income, Relational Goods and Happiness: The Theoretical Literature

Income and happiness

The empirical literature on the determinants of happiness, even though at its infant stage, includes many relevant contributions.

A dominant field of inquiry studies the impact of levels and changes in income on perceived happiness. Aspects such as those of the impact of marital relationship, education, health status and dynamic effects of changes of these variables on self-declared happiness, have also been extensively investigated.[4] Finally, the effects of country specific economic variables, such as employment and inflation, have also been explored (Clark and Oswald, 1994; Gallie and Russell, 1998; Di Tella *et al*., 2001; Di Tella and MacCulloch, 2003).

Some of these empirical studies have clearly evidenced the existence of what is sometimes called the *happiness–income puzzle*. The puzzle originates from the famous Easterlin (1974, 2001) contributions in which the dramatic growth in US post-war per capita Gross Domestic Product (GDP) is compared with a stagnating or slightly declining self-declared happiness. It seems confirmed when we compare happiness across countries and observe that the income per capita divide between the developed and developing countries is not reflected into equivalent differences in self-reported happiness. On this point, it is well known that the comparison of levels of happiness across countries is subject to severe methodological problems, such as cultural differences in the way happiness is self-reported and problems arising from cardinal comparisons of happiness levels. It is also valid the remark of Sen (2005) arguing that happiness studies should not fall into the trap of considering subjective happiness as the only value, thereby implicitly legitimating exploitation and poor living conditions in those cases in which they lead to adaptation of the human being to misery. Nonetheless, it is evident that the observation of average happiness levels in less developed countries, which are almost equal to those of rich countries, must lead us to explore more in depth the puzzle of the relationship between income and happiness.

A first tentative partial explanation of this puzzle is based on the conception of income as a positional good (Hirsch, 1976). Under this perspective, the relative income effect dominates the absolute one and the positive impact of income on happiness may be partially offset by the negative externalities arising from an unfavourable position in terms of relative income in one's own reference group.[5] A second

[4] A general problem in this literature is the scarcity of panel data in which self-declared happiness in different years is reported for the same individuals. The most relevant exceptions are the German Socioeconomic Panel (GSOEP) and the British Household Panel Survey (BHPS). Empirical research on panel data generally evidences the presence of biunivocal causality relationships where changes in a given factor (income, health, family or employment status) affects happiness but inherited traits captured by fixed effects are related to individual happiness and, in turn, may significantly affect changes in the above-mentioned variables. For a detailed survey on these issues, see Clark *et al*. (2006).

[5] Support for the relative income hypothesis may be found in several papers starting from the seminal contribution of Duesemberry (1949), up to the more recent contributions of Frank (2005) and Layard (2005).

rationale hinges on the so-called *adaptation theory*. According to it, the achievement of a target (a certain level of income) raises new expectations, thereby creating a gap between increased individual income targets and the achieved level of income, which also reduces the perceived happiness arising from past endeavours (Easterlin, 2001). A more extreme perspective, represented by the so-called *set point theory* (Costa *et al*., 1987),[6] establishes that any positive change in income (as of any other event in life) has no permanent effects on happiness, the latter being uniquely determined by individual temperament. A fourth argument, provided by Scitovsky (1992), is based on the conflict between *comfort* and *stimulation*. Under certain conditions higher income may generate more comfort and dampen stimulation for new endeavours. This may seriously reduce the expected positive effect of income on happiness.

In spite of all these dampening effects which may help to illustrate the puzzle of the decreasing marginal effect of income on happiness and of the reduced happiness gap between high-income and nonhigh-income countries, we must not neglect that the positive relationship between income and happiness seems to be robust and supported in different countries and sample periods (see, among others, Easterlin, 1995, 2000; Frey and Stutzer, 2000; Becchetti and Rossetti, 2009).

Relational goods and happiness: the fellow feelings hypothesis

Our argument is that the overall pattern of the effects of income on happiness may be understood and explored only if we bring into the field the complex link among income, relational goods and happiness. To investigate the nexus among these three variables we first need to analyse the direct relationship between relational goods and happiness.

Standard microeconomic foundations of individual's utility usually neglect the fact that the latter does not depend only on the amount of consumed goods, but also on the relational context in which material goods are consumed (eating a pizza alone is not the same as eating a pizza with friends). Most of the times the effect of the relational context on utility dominates by far that of the consumed material goods. With a good example, Gui (2000) argues that the enjoyment arising from a hairdresser's cut largely depends on the friendly environment of the shop and would be greatly reduced if the cut were to be done by an automatic machine on customers sitting in isolated booths. According to Gui (2002) and Uhlaner (1989), relational goods are local public goods which are co-produced and co-consumed by agents during their economic transactions. Bruni and Stanca (2005) argue that personality and absence of instrumental motivations are key elements affecting the quality of relational goods and that the economic literature on the role of sociality on happiness is paralleled by several contributions from psychologists on the crucial importance of 'relatedness' as a basic human need (Baumeister and Leary, 1995; Deci and Ryan, 2000).

Going back to the history of economic thought, one of the appropriate and insightful interpretations of the link between social ties and happiness is provided by Smith (1984) with his well-known theory of *fellow feelings*. In the *Theory of moral sentiments* Smith argues that the effect of relational goods on happiness is increasing in (i) the amount of time and experiences that two individuals have lived together and have shared in the past and (ii) their common consent, with the former significantly affecting the latter.[7] The related hypothesis stemming from Smith's theory is that there are warmer (family, close friends, members of religious associations for believers) and, presumably, colder (working colleagues, sport companions) relationships, with the former having a higher impact on happiness. This hypothesis will be tested in our empirical analysis.

Relational goods and happiness: the income crowding out hypothesis

An additional important argument on the *relational goods–income–happiness* nexus – set forth by several authors but not empirically tested – is that relatively higher income may crowd out the time spent for relationship, thereby generating an indirect negative effect of income on happiness.

The nexus among the three variables is explained in different ways. According to Easterlin (1974), individuals invest too much in the pursuit of higher income underestimating the negative effects on happiness of factors associated to material goods, such as negative externalities depending on relative income and

[6] Easterlin (2004) correctly argues that, if public policies have the goal of improving individual well being, the set point theory leads to a Nichilist or Laissez faire view since any change in happiness determinants has no permanent effects on individual happiness, the latter being solely determined by individual temperament and genetic endowments.

[7] An acute observation of Smith is that fellow feelings may be equally fuelled by pleasant and unpleasant joint experiences and that nonphysically painful, but emotionally unpleasant, joint experiences have a strong impact on the formation of a common consent among people. A typical example may be the attendance of a funeral which strengthens solidarity and friendship ties among participants.

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hedonic adaptation. Similar explanations are proposed by Pugno (2004) and Bartolini and Bonatti (2002), respectively, focusing on the effects of the rise of materialistic culture, and of an aggregate rise of income, on the gap between desired and realized levels of income which induces individuals to increase working hours, thereby crowding out relational time.

The unpleasant assumption implicit in these rationales is that individuals are not rational and affected by a misperception. An alternative hypothesis which does not abstract from individual rationality is provided by Becchetti and Santoro (2004). The two authors consider that relational goods need to be jointly produced. As far as individuals become more productive, the opportunity cost of their time spent investing in relational goods becomes higher. If they had to simply decide between working time and leisure, substitution and income effects should act in such a way that, if individuals have strong preferences for relational leisure, the latter may actually turn out to be higher and not lower, after an increase in productivity. The problem with relational goods, though, is that they require a joint coordinated investment. To provide two simple examples, a marriage is not successful without the coordinated effort of the two partners, or, a nonprofessional football match cannot be played if 22 individuals do not decide jointly to invest some of their time in playing the game, since the absence of only one (or a few) of them may prevent the 'production' of this relational good.

Hence, even though one of the individuals investing into the relational good may regard it as a noninferior good (or, even though, for him, the income effect may more than compensate the substitution effect), the same individual ends up being less happy, and without relational good, if some of his partners, who must cooperate with him in producing the good, decide differently. The model therefore predicts that coordination failures in the investment on relational goods may lead to the paradox that, as far as productivity grows, fully rational individuals may become richer in income, but poorer in relational goods, with the latter effect having a negative impact on their happiness.

To sketch the theoretical framework behind our reasoning consider the i-th individual with the following 'happiness' function

$$H_i = f\left(\alpha_i \circ (C_i - \bar{C}), \beta_i \circ l_i^r, \sum_{j=1}^{m} \gamma_{ij} \circ X_{ij}\right) \quad (1)$$

whose separable arguments are the deviation of individual consumption from the median consumption of his reference group ($C_i - \bar{C}$), relational leisure (l_i^r) and a series of additional (X_j) factors affecting individual happiness (α_i, β_i and γ_i being the weights of such arguments in individual preferences). The individual faces the following standard time/budget constraint $pC_i = w[T - t_i^{\mathrm{lr}}]$ where w is hourly wage and the opportunity cost of time spent in relational leisure, T is the total endowment of hours in a given time interval and t^{lr} is the time spent for relational leisure (i.e. 'producing' relational goods).[8] Following the literature on relational goods we assume that such goods need to be co-produced according to a production function $l^r = g(t_i^{\mathrm{lr}}, t_{-i}^{\mathrm{lr}})$ in which the time spent on relational goods by the i-th individual and by his groupmate[9] are the two inputs which we assume to be linked by some form of complementarity. By replacing the constraint into the happiness function we get

$$H_i = f\left\{\alpha_i \circ \left[\frac{(T - t_i^{\mathrm{lr}})w_i}{P} - \bar{C}\right], \beta_i \circ l_i^r, \sum_{j=1}^{m} \gamma_{ij} \circ X_{ij}\right\} \quad (2)$$

From (2) it becomes obvious that the optimal choice of time spent in relational leisure is driven by the trade off between working less, and investing nonworking time in the creation of the relational good, and working more to increase individual consumption. Even without explicitly assuming a specific functional form we understand that, in correspondence of the optimal time spent for relational leisure, the marginal cost of diverting resources from consumption via reduced working time must be equal to the marginal benefit generated by the enjoyment of an additional unit of relational good. More formally, if we assume that the weights of the two arguments are multiplicative and the arguments are separable, we get from first order condition (when maximizing with respect to the time invested in relational goods)

$$\frac{\partial H}{\partial t^{lr}} = 0 \Rightarrow \alpha \frac{w}{P} = \beta \frac{\partial l^r}{\partial t^{lr}} \quad (3)$$

The indirect happiness function must therefore be of the form

$$V = y\left\{\alpha_i\left[\frac{(T - (t_i^{\mathrm{lr}})^* w_i}{P} - \bar{C}\right],\ \beta_i l_i^r\left[(t_i^{\mathrm{lr}})^*, (t_{-i}^{\mathrm{lr}})^*\right],\ \sum_{j=1}^{m} \gamma_{ij} X_{ij}\right\} \quad (4)$$

[8] Nonrelational leisure is set equal to zero for simplicity.
[9] We assume for simplicity that only two people are needed to produce the relational good.

Table 1. Happiness in high-income OECD countries and in the complementary sample

	World	High-income OECD	Complementary sample
Very happy	27.05	32.88	24.87
Quite happy	53.29	57.66	51.66
Not very happy	16.45	8.18	19.54
Not at all happy	3.21	1.28	3.93
Observations	112 832	30 691	82 141

Notes: High income OECD countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the UK, the US.
Complementary sample countries: Albania, Algeria, Azerbaijan, Argentina, Armenia, Bangladesh, Bosnia Herzegovina, Brazil, Bulgaria, Belarus, Chile, China, Taiwan, Colombia, Croatia, Czech Republic, Dominican Republic, Egypt, El Salvador, Estonia, Georgia, Hungary, India, Indonesia, Iran, Israel, Jordan, Korea, Latvia, Lithuania, Macedonia, Malta, Mexico, Moldova, Montenegro, Morocco, Nigeria, North Ireland, Pakistan, Peru, Philippines, Poland, Puerto Rico, Romania, Russian Federation, Serbia, Singapore, Slovakia, Slovenia, South Africa, Tanzania, Turkey, Zimbabwe, Uganda, Ukraine, Uruguay, Venezuela, Vietnam, Zimbabwe.

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where starred variables indicate individually optimal choices of the time spent for relationships.

By assuming that richer individuals are also those with higher skills, higher hourly wages and opportunity cost of leisure, we easily find that they choose in equilibrium a lower amount of time spent for relational leisure. More formally, an increase in the hourly wage (and in the opportunity cost of time spent for relational leisure) for both individuals has the following effects on the indirect happiness function

$$\frac{\partial V_i}{\partial w} = y'\left\{\frac{\alpha_i}{P}\left[T - t_i^{\mathrm{lr}} - w\frac{\partial t_i^{\mathrm{lr}}}{\partial w}\right] + \beta_i \frac{\partial l_i^r}{\partial t_i^{\mathrm{lr}}}\frac{\partial t_i^{\mathrm{lr}}}{\partial w_i} + \beta_i \frac{\partial l_i^r}{\partial t_{-i}^{\mathrm{lr}}}\frac{\partial t_{-i}^{\mathrm{lr}}}{\partial w_{-i}}\right\} \tag{5}$$

with $w = w_i = w_{-i}$.

By assuming that the relational good is co-produced with individuals of the same income category, we clearly have the case that an increase in productivity (which should correspond to an increase in income under the hypothesis that productivity, wages and income move together) should affect happiness positively (via higher consumption) and negatively (via reduction of the enjoyed relational goods) if one of them or both decide to reduce the investment in relational goods.[10]

III. Empirical Findings: Descriptive Evidence

Our data source is the World Value Survey database, which includes representative samples from 82 countries in the world.[11] The World Value Survey presents two questions which are directly related to happiness. In the first respondents are asked 'All considered you would say that you are: (i) very happy; (ii) pretty happy; (iii) not too happy; (iv) not at all happy?'

In the second they are asked 'all considered are you satisfied or unsatisfied with your current life?' The answer to this second question can be given on a scale from one (unsatisfied) to 10 (fully satisfied).

The first question has 112 832 non missing observations, with a tiny share of 3.2% of not at all happy people, around 16% who declare to be somewhat happy against 53% quite happy and 27% very happy (Table 1). The second question has 117 264 nonmissing observations with 14% (5%) of respondents indicating the maximum value (minimum value) of life satisfaction (Table 2).

If we split the sample into high-income Organization for Economic Cooperation and Development (OECD) countries and the complementary group, we find that happiness is slightly higher in

[10] Consider that, under the extreme assumption of perfect complements, and when *ex ante* investment levels are equal, the decision to reduce investment of just one of the two players automatically reduces the total amount of relational goods to his chosen level of investment.

[11] The World Values Survey is a worldwide investigation of sociocultural and political change. It has carried out representative national surveys of the basic values and beliefs of publics in more than 80 countries on all six inhabited continents, containing almost 80% of the world's population. It builds on the European Values Surveys, first carried out in 1981. A second wave of surveys, designed for global use, was completed in 1990–1991, a third wave was carried out in 1995–1996 and a fourth wave took place in 1999–2001. The surveys are based on stratified, multistage random samples of adult citizens aged 18 years and older. Each study contains information from interviews conducted with 300–4000 respondents per country.

Table 2. Life satisfaction in high-income OECD countries and in the complementary sample

	World	High-income OECD	Complementary sample
Unsatisfied	5.36	1.34	6.85
2	3.95	0.95	5.06
3	5.61	2.28	6.85
4	5.66	3.13	6.59
5	14.21	7.89	16.56
6	9.64	8.87	9.92
7	13.08	16.60	11.77
8	17.13	26.47	13.67
9	11.24	16.62	9.25
Fully satisfied	14.12	15.84	13.47
Obs.	117 264	31 736	85 528

Note: For country group legend, see Table 1.

Table 3. Happiness and income quintiles

Income quintile	Very happy	Quite happy	Not very happy	Not at all happy
1st	2.90	4.61	8.50	11.15
2nd	7.35	9.38	15.16	17.36
3rd	14.38	19.89	24.75	25.65
4th	30.39	33.54	30.59	27.41
5th	44.99	32.64	21.01	18.43
Obs.	3212	16 234	51 309	26 313

Table 4. Life satisfaction and income quintiles

	Quintiles				
Life satisfaction	1st	2nd	3rd	4th	5th
Unsatisfied	11.13	5.47	3.21	2.46	1.53
2	5.24	4.28	3.31	3.72	2.75
3	7.99	7.24	4.63	3.40	2.69
4	7.10	6.78	5.40	3.95	2.99
5	15.40	16.98	14.96	10.50	7.55
6	9.22	9.84	11.09	8.97	7.27
7	10.25	12.43	14.66	14.77	14.54
8	12.41	14.91	17.61	22.14	24.79
9	7.44	9.14	11.12	15.92	19.17
Satisfied	13.84	12.94	14.02	14.18	16.72
Obs.	101 009				

the first group. Very happy people are in fact around 33% against 25%, quite happy 58% against 52%, somewhat happy 8% against 20% and not at all happy 1% against 4%.

In the same way, the share of respondents to the life satisfaction question indicating the maximum value of 10 in high income OECD countries is around 16% against 13% in the complementary sample and the share of those placed at the lowest value of this scale is 1% against 7%.

Always on a descriptive point of view, we observe that the relationship between happiness and individual position in domestic income deciles is positive as expected. If we move from the lowest to the highest income quintile the share of not at all happy individuals falls from around 18 to 11% and that of very happy ones grows from 3 to 45% (Table 3). If we do the same for the life satisfaction question we find that, when moving from the lowest to the highest income quintile, the number of those indicating the minimum (maximum) level of life satisfaction falls from 11 to 2% (grows from 14 to 17%) (Table 4).

Finally, we investigate the direction of the link between happiness and 'relational time' on a descriptive point of view. In the survey we find a series of questions about the time spent: (i) with friends; (ii) with working colleagues outside the workplace; (iii) with relatives; (iv) in the worship place (parish, mosque, synagogue) with friends sharing the same religious confession; (v) in clubs or volunteering (sport, culture, etc.) association. For each of these questions the answers can be: (i) every week; (ii) once or twice a month; (iii) a few times per year; (iv) never.

The synthesis of this information in a single indicator is problematic. The difference among intensity modes is not continuous and we decide to aggregate the different ways of spending time in relationships.

Our choice is to rank each of the answers on a scale with values which are increasing in the time spent for relationship (i.e. 3 if the answer is every week and 0 if it is never).[12] We then average these answers across all the different types of relational time. As a consequence, we obtain a relational indicator with a maximum value of 3, if the respondent spends time every week in all the possible modalities and, a minimum value of 0, if he never invests time in relational goods.

[12] By looking at the relationship between our indicator and the likely number of times per month spent in relationship which can be inferred from sample answers we figure out that our scale flattens the presumed frequency. A robustness check in which we attribute an approximate per month frequency and use the value of 4, 1.5 and 0.3 for the 'every week', 'once or twice in a month' and 'a few times per year' answers, respectively, shows that our findings are substantially unaltered. Results are omitted for reasons of space and available upon request.

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Table 5. Happiness and time spent for relationship

	Relational time index (RTI)*		
	(0–1)	(1–2)	(2–3)
Very happy	18.65	22.27	28.84
Quite happy	48.72	56.09	53.91
Not very happy	24.56	18.20	14.73
Not at all happy	8.07	3.44	2.52
	100	100	100
Obs.	84 856		

Notes: Relational time index: Average of the responses given to the question on the time spent: (i) with friends; (ii) with working colleagues outside the workplace; (iii) with relatives; (iv) in the worship place (parish, mosque, synagogue) with friends sharing the same religious confession; (v) in clubs or volunteering (sport, culture, etc.) association. For each of these questions the answers can be: (i) every week; (ii) once or twice a month; (iii) a few times per year; (iv) never. We assign a value of 3 to answer (i), 2 to answer (ii); 1 to answer (iii) and 0 to answer (iv).
* Denotes statistical significance at the 5% level.

Table 6. Income and time spent for social relationships

Quintile	$0 < \text{RTI} \leq 1$	$1 < \text{RTI} \leq 2$	$2 < \text{RTI} \leq 3$
1st	19.04	48.88	32.08
2nd	14.37	49.85	35.78
3rd	12.21	50.24	37.54
4th	12.36	50.40	37.23
5th	12.24	52.90	34.86
Obs.	75 111		

Note: For the definition of the RTI index, see Table 5.

By using this variable we find that the share of very happy (not at all happy) people moves from 19% (8%) when the relational time indicator is lower than 1 to 29% (3%) when it is higher than 2 (Table 5).

Descriptive evidence therefore outlines a positive relationship between happiness, on the one side, and both progression across income deciles and intensity of relational life, on the other side. But what is the effect of progression across income deciles on relational life?

Our descriptive findings show that it tends to be inverse U-shaped (Table 6). The share of individuals in the highest income quintiles with a relational time indicator between two and three (dedicating on average more than 'few times in a month' to the different relational activities investigated in the survey) is around 34.8% against that of 37.5% for individuals in the third income quintile.[13] These descriptive findings provide evidence of a U-shaped relationship between income and time spent in social ties whose robustness to composition effects needs to be verified in the econometric analysis which follows.

IV. Empirical Findings: Econometric Evidence

The single equation estimate

Before describing our specification and commenting our results we share the caveats of Guiso *et al*. (2003) on the interpretation of findings from this cross-sectional dataset. We agree with them that what we measure are correlations across variables, without the possibility of establishing the size and the direction (probably biunivocal) of the causal effects.[14] We therefore start from the following single equation specification (which is standard in similar studies) where the direct effects of income and time spent for relational goods on happiness are separately considered.

$$\begin{aligned} Happy_i = {} & \alpha_0 + \alpha_1 Age + \alpha_2 [Age]^2 + \alpha_3 Male \\ & + \alpha_4 Mideduc + \alpha_5 Upeduc + \alpha_6 Timerel \\ & + \alpha_7 Health + \alpha_8 Selfempl + \alpha_9 Unempl \\ & + \sum_{j=1}^{4} \beta_i DIncome_j + \alpha_{10} Eqincome \\ & + \alpha_{11} [Eqincome]^2 + \sum_{i=1}^{n} \gamma_i Famstatus_i \\ & + \alpha_{12} Efw + \sum_{l=1}^{m} \delta_l Dcountry_l + \varepsilon_i \end{aligned} \tag{6}$$

The dependent variable ($Happy_i$) takes discrete values from three (very happy) to zero (not at all happy), *Age* is the respondent age, introduced in levels and in squares to take into account nonlinearities in its relationship with happiness (see, among others, Frey and Stutzer, 2000; Alesina *et al*., 2001), *Male* is a dummy which takes the value of one for men and zero otherwise. To measure the impact of education we include dummies for high school (*Mideduc*) and (*Upeduc*) university educational attainment. The job status is measured by two

[13] More in detail, if we restrict the indicator to the sum of the time spent in family, with 'worship friends' and with working colleagues, we find that the average value of our relational indicator is 1.47 for the lowest, 1.76 for the middle and 1.58 for the highest income quintile. Results are omitted for reasons of space and available upon request.
[14] As a partial solution to the problem we propose an estimate with instrumental variables in Table 9 (Section 'Robustness check and subsample split findings').

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different variables (*Unempl and Selfempl*) recording unemployed and selfemployed individuals respectively. We further introduce five family status variables: *Numsons* (the number of family children), *Single*, *Married*, *Divorced* and *Separated* which are all dummies taking the value of one if the individual has the given status and zero otherwise.[15]

We introduce income in two ways. First, we consider a relative income measure by introducing four dummies measuring individual position in the relevant income quintile (*DIncome*).

Second, we bring in a continuous measure of (income class median) equivalent income expressed in year 2000 US dollar purchasing power parities in levels and in squares (*Eqincome*).[16]

Finally we introduce our measure of time spent in relationship (*Timerel*). The construction of this variable (for which we provided descriptive evidence in Tables 5 and 6) is discussed in Section III.

Among additional controls, we introduce a measure of individual health status.[17] This variable is seldom used in the empirical literature, even though it is highly likely to be one of the main determinants of people well being.

Our final control is a country measure of economic freedom. To this purpose we use the synthetic Economic Freedom indicator (for its detailed description, see Appendix). Country dummies are finally added to the covariates set.

Results from this base standard equation are consistent with that found in previous empirical research (Table 7, column 1). The male coefficient is negative and significant as in almost all empirical studies, such as those of Alesina *et al*. (2001) for the US and Europe and Frey and Stutzer (2000) for Switzerland, but different from that found by Clark and Oswald (1994) in the UK. Age is inverse U-shaped as in Alesina *et al*. (2001) and Frey *et al*. (2000).[18]

Both educational variables are positive and significant, consistently with that found in most of the empirical literature. The significance of education when controlling for measures of income supports the hypothesis that the benefit of education is not just in the contribution of human capital accumulation to income (returns to schooling). Education is also a good which is enjoyed *per se* as it enhances human capabilities and functionalities (Sen, 1993). This finding is therefore consistent with the well-being scheme of the World Bank (2003) poverty report (Fig. 1), in which happiness is related not only to consumption, but also to the direct enjoyment of education.

Results on the marital status are also in line with many literature findings (Argyle, 1999; Frey and Stutzer, 2002a, b, 2006; Blanchflower and Oswald, 2003) which evidence a positive impact of marriage and a negative impact of divorce or separation. The relatively higher magnitude of the separation with respect to the divorce coefficient is consistent with the hypothesis that negative shocks are partially, but not entirely, reabsorbed. Unfortunately, the quality of our data does not allow us to explore more in depth the difference between divorced with and without new relationship and the dynamic of happiness around the marriage event.[19]

Findings on the impact of marital status on happiness are not at odds with the hypothesis that quality of relationships has a strong and significant impact on it.

Another standard control introduced in the equation is the working status. With this respect we find confirmation of the negative and significant impact of the unemployment condition on the

[15] Note that these variables do not sum up to one since the survey reports two additional alternative modalities (unmarried cohabiting partners and widowed).

[16] The World Value Survey database contains two variables which respectively provide the income class and the median household income value (in local currency) for that class for the majority of countries. For a second group of countries – Azerbaijan, Australia, Belarus, Israel, Armenia, Bangladesh, Belgium, Brazil, Colombia, Dominican Republic, Finland, Georgia, Hungary, Indonesia, Iran, Korea, Luxembourg, Nigeria, Pakistan, Philippines, Poland, Puerto Rico, Romania, Tanzania, the UK and Northern Ireland, Vietnam – the missing median income value has been calculated from World Bank Development Indicators or Domestic Account data.

[17] The related question is: 'All in all how would you describe your state of health these days? You would say it is: (a) very good; (b) good; (c) fair; (d) poor'. We create a categorical variable which takes the value of 3 for answer (a), 2 for answer (b), 1 for answer (c) and zero for answer (d). Robustness checks with slightly different indicators (i.e. dichotomous with value of one for answers (a) and (b) and zero otherwise) do not change our main findings.

[18] Unfortunately, we do not dispose of panel data and therefore we cannot say whether our result is due to a cohort or a life-cycle effect. To this point, a recent work of Easterlin (2004) on individual life cycles shows that ageing is associated to rising income (but to decreasing health) satisfaction.

[19] Blanchflower and Oswald (2004) find that those remarried are significantly less happy than those in their first marriage. Evidence from Waite *et al*. (2002) seems to suggest that adaptation to marriage is partial but not complete so that the latter generates permanent effects on welfare. By commenting these and many other results in the literature, Frey and Stutzer (2006) find evidence to a biunivocal nexus between happiness and marriage where education and division of labour within the couple play an important role.

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Table 7. The determinants of happiness (single equation estimate)

	1	2	3	4	5	6	7
Age	−0.057** (0.003)	−0.055** (0.003)	−0.047** (0.004)	−0.049** (0.004)	−0.049** (0.005)	−0.049** (0.005)	−0.048** (0.005)
[Age]^2	0.001** (0.001)	0.001** (0.001)	0.001** (0.001)	0.001** (0.001)	0.001** (0.001)	0.001** (0.001)	0.001** (0.001)
Male	−0.107** (0.014)	−0.168** (0.015)	−0.199** (0.018)	−0.294** (0.021)	−0.313** (0.023)	−0.312** (0.023)	−0.301** (0.026)
Mideduc	0.172** (0.018)	0.15** (0.019)	0.117** (0.023)	0.97** (0.026)	0.057** (0.028)	0.06** (0.028)	0.11** (0.031)
Upeduc	0.212** (0.023)	0.203** (0.025)	0.056 (0.023)	0.063 (0.034)	0.029 (0.036)	0.033 (0.036)	0.077 (0.04)
Timerel		0.26** (0.011)		0.256** (0.018)	0.265** (0.019)	0.266** (0.019)	
Health			0.806** (0.012)	0.79** (0.013)	0.782** (0.014)	0.783** (0.014)	0.81** (0.016)
Selfemp	−0.035 (0.024)	−0.066** (0.026)	−0.013 (0.028)	−0.033 (0.031)	−0.02 (0.032)	−0.02 (0.032)	−0.007 (0.035)
Unempl	−0.362** (0.025)	−0.376** (0.027)	−0.241** (0.031)	−0.236** (0.036)	−0.237** (0.039)	−0.235** (0.039)	−0.251** (0.043)
DIncome1	−0.442** (0.021)	−0.493** (0.023)	−0.306** (0.028)	−0.372** (0.032)	−0.355** (0.034)	−0.357** (0.034)	−0.355** (0.039)
DIncome2	−0.204** (0.019)	−0.215** (0.02)	−0.139** (0.024)	−0.151** (0.028)	−0.144** (0.035)	−0.143** (0.03)	−0.139** (0.033)
DIncome4	0.149** (0.022)	0.165** (0.024)	0.116** (0.029)	0.46** (0.035)	0.146** (0.035)	0.145** (0.035)	0.145** (0.037)
DIncome5	0.293** (0.028)	0.295** (0.03)	0.229** (0.039)	0.234** (0.045)	0.224** (0.049)	0.223** (0.049)	0.262** (0.053)
Eqincome	3.2E−10 (2.8E−10)	6.7E−9 (3.0E−10)	9.4E−09** (3.0E−09)	2.1E−10** (2.0E−10)	8.3E−09** (3.2E−09)		9.9E−09** (3.2E−09)
[Eqincome]^2	−2.1E−17 (−2.0E−17)	−3.7E−17 (−2.9E−17)	−4.1E−17** (−2.9E−17)	−3.9E−17 (−2.0E−17)	−4.3E−17** (−2.0E−17)		−1E−13.97** (−1.8E−17)
Numsons	0.012** (0.005)	0.011 (0.006)	0.003 (0.006)	−0.002 (0.007)	−0.009 (0.008)	−0.004 (0.007)	−0.013 (0.009)
Single	0.033 (0.03)	0.003 (0.034)	−0.109** (0.038)	−0.171** (0.046)	−0.209** (0.05)	−0.179** (0.049)	−0.154** (0.053)
Married	0.566** (0.025)	0.579** (0.029)	0.356** (0.032)	0.307** (0.039)	0.243** (0.043)	0.294** (0.039)	0.236** (0.046)
Divorced	−0.122** (0.04)	−0.12** (0.044)	−0.317** (0.063)	−0.373** (0.076)	−0.363** (0.085)	−0.31** (0.082)	−0.294** (0.092)
Separed	−0.264** (0.056)	−0.288** (0.065)	−0.396** (0.071)	−0.477** (0.092)	−0.477** (0.102)	−0.425** (0.095)	−0.468** (0.192)
Efw					0.216** (0.077)	−0.004 (0.024)	0.296** (0.084)
Time friends							0.054** (0.015)
Time job friends							0.014 (0.011)
Timerelatives							0.054** (0.015)
Timereligious friends							0.114** (0.011)
Timesport friends							0.063** (0.012)
Obs.	86 980	73 766	52 798	39 795	34 364	34 3643	28 235
LR(p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Notes: The dependent variable *Happy* takes discrete values and is based on self-declared happiness (3 if very happy, 2 if quite happy, 1 if a little happy, 0 if not at all happy). The model is estimated with an ordered logit. Regressors legend: see Section 'The single equation estimate' in this article. Country dummies are added to this regressors but omitted from the table for reasons of space.

** Denotes statistical significance at the 1% level.

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dependent variable (Clark and Oswald, 1994; Gallie and Russell, 1998; Di Tella *et al*., 2001; Di Tella and MacCulloch, 2003, Clark *et al*., 2006).

The equivalent income calculated in Purchasing Power Parity (PPP) is significant and with the expected sign, both in levels and in squares, only when we add the health variable. A likely interpretation of this finding is that (given the inevitable limits in accuracy when calculating income in PPP at constant dollar prices across different countries, and the approximation of assigning median income decile values to each individual) relative income and country dummies capture all the impact of relative and absolute income on observed individuals.

The impact of the income quintile dummies strongly supports the significance of the relative income hypothesis since being below (above) the median quintile generates a negative (positive) and significant effect on happiness where the benchmark is represented by the omitted median quintile dummy.

Results on country dummies (omitted for reasons of space and available upon request) are consistent with established empirical findings indicating that transition countries experienced substantial losses in happiness after the end of communism. The three countries having the strongest negative dummy coefficients are Romania, Bulgaria, Russia and Albania. A plausible interpretation of these findings is that the relatively lower level of happiness in these countries is mainly due to the fall in job security and to the rise of income expectations caused by the most frequent and direct comparison with living standards in Western countries.[20] On the other side, countries with the highest positive dummy coefficient are Puerto Rico, Venezuela, Australia, Tanzania and Mexico.[21]

When we introduce health in our specification (Table 7, column 3) we find that the variable is strongly significant. This finding is consistent with that found in many papers in the literature (Argyle, 1999; Frey and Stutzer, 2002a, b; Blanchflower and Oswald, 2004). An important consequence of the introduction of the health variable is that the number of observations drops from around 74 000 to 53 000 (some countries not including the health question in their surveys are no more in the sample) and, among previous regressors, the significance of the higher education variable almost disappears. We therefore re-estimate the specification of the first column of Table 7 only for countries with nonmissing observations for the health variable and find that the previously commented results still hold for this subsample.[22] Hence, the reduction of significance of the education variable seems to be due to the inclusion of health and not to the concurring sample selection bias. The introduction of the average measure of the time spent for relationships is strongly positive and significant in the estimate (Table 7, column 2). The significance persists when we introduce self-declared individual health and quality of institutions at country level as additional controls (Table 7, columns 3–6). A further experiment is done by introducing each of the relational variables, separately taken, to test which of them has stronger impact on self-declared happiness (Table 7, column 7). Our findings show that the time spent with close friends and members of religious associations has stronger impact than (nonworking) time spent with working colleagues and with members of sport associations. Confidence intervals shows that the impact of the second variable (time spent with friend members of religious associations) is significantly higher than all the other relational regressors.[23] This last finding seems consistent with the 'fellow feeling' hypothesis of Smith who argues that the intensity of the relational ties, or of the experience lived with friends, enhances the value of relational goods.

The two equation system

The single equation estimate does not take into account the complex nexus between income, relational goods and happiness. We have shown in the previous sections that some authors (Bartolini and Bonatti, 2002; Bruni and Porta, 2004; Pugno, 2004) argue that higher income may crowd out

[20] A similar interpretation is provided by Stutzer (2005) when he documents the fall in happiness of Eastern Germans after the fall of the Berlin wall.

[21] We are inclined to interpret these country dummy results as a combination of better climatic and environmental conditions and country cultural factors. A closer investigation of the rationales of these country dummy effects is beyond the scope of this article.

[22] Results from this estimate are omitted for reasons of space and are available from the authors upon request.

[23] Subsample split results are presented in Table 11, as expected, that the effect only applies to the subsample of active believers.

relational goods. Our descriptive empirical findings confirm that individuals in the top income deciles spend less time for relationships. In this section, we propose a two equation model which may help to estimate the more complex pattern of relationships among happiness, income and relational goods. More specifically, we consider a bivariate setting in which self-declared happiness depends on a series of factors which include time spent for relationship which is, in turn, endogenous and affected by several individual and country characteristics. To this purpose we perform a mixed response random effect model (Alfó and Trovato, 2004; Cameron and Trivedi, 2005) in which the happy response (in the first equation) follows a ordered logit specification, while relational time (in the second equation) a Gaussian distribution. This kind of model allows to correctly solve the simultaneity effect between measured happy condition and relational time spent. The estimated specification is

$$\begin{aligned} Happy_i = {} & \alpha_0 + \alpha_1 Age + \alpha_2 [Age]^2 + \alpha_3 Male \\ & + \alpha_4 Mideduc + \alpha_5 Upeduc + \alpha_6 Single \\ & + \alpha_7 Married + \alpha_8 Selfempl + \alpha_9 Unempl \\ & + \sum_{j=1}^{9} \gamma_{0i} DIncome_j + \sum_{i=1}^{n} \delta_{0i} Famstatus_i \\ & + \alpha_{10} Eqincome + \alpha_{11} [Eqincome]^2 \\ & + \alpha_{12} Timerel + \alpha_{13} Health \\ & + \alpha_{14} Efw + \sum_{l=1}^{m} \theta_{0i} Dcountry_l \end{aligned} \tag{7}$$

$$\begin{aligned} Timerel_i = {} & \beta_0 + \beta_1 Age + \beta_2 [Age]^2 + \beta_3 Male \\ & + \beta_4 Mideduc + \beta_5 Upeduc + \beta_6 Single \\ & + \beta_7 Married + \beta_8 Unempl \\ & + \sum_{j=1}^{9} \gamma_{1i} DIncome_j + \sum_{i=1}^{n} \delta_{1i} Famstatus_i \\ & + \beta_9 Eqincome + \beta_{10} [Eqincome]^2 + \beta_{11} Health \\ & + \beta_{12} Efw + \sum_{l=1}^{m} \theta_{1i} Dcountry_l \end{aligned} \tag{8}$$

The first equation has the same regressors as the single equation model estimated in Table 7. The difference here is that one of the regressors (*Timerel*) is the dependent variable of the second equation.

Results from the two equation system show that sign and significance of regressors in the happiness equation of the system do not change with respect to the single equation estimate. This is an important finding because it shows that the problem of the endogeneity of the relational time variables does not affect the substance of the single equation estimate results. The added value of the two equation estimate is the possibility of identifying indirect effects of all these variables on self-declared happiness through their impact on time spent for relationships. In the second equation of the system we now find that the time spent for relationships is relatively higher for males, negatively related to age, positively related to education and health (Table 8). Furthermore, we observe that, in the second equation, under all the considered specifications, the impact of the last income quintile on relational time is negative and significant, while the mentioned effect fades when we look at lower quintiles.[24]

We interpret these findings consistently with the hypothesis set forth in the section 'Relational goods and happiness: the fellow feelings hypothesis'. Higher income may increase, via income effect, free time which can be dedicated to social ties. Relational goods are however local public goods which need to be co-produced and co-consumed. If substitution effect is higher than income effect for just one of the co-producers of the relational good, the production of the latter falls with negative effects on happiness of his partners.

Robustness check and subsample split findings

We perform several subsample splits (OECD high income, non-OECD high-income and EU countries, male and females, religious/nonreligious active believers, intrinsically or extrinsically motivated individuals[25]) in order to check what drives our results and whether they are robust in subsample splits (Table 9). Finally, we repeat all our estimates using life satisfaction instead of happiness as dependent variable.

The most important differences in findings observed through our robustness checks are the following. In the single equation model, the relational time variable remains significant in all subsample splits and in all different selected specifications (Table 9). We observe that the magnitude of the coefficient is significantly larger for religious than for nonreligious

[24] Robustness check on subsample splits is omitted for reasons of space and available upon request.
[25] We define as intrinsically motivated individuals those indicating an average value above 3 when asked about the relative importance of religion, family and friends on a 1–4 scale. We define as extrinsically motivated individuals those with an average value above 5 when asked on the relative importance of consumed goods and wealth on a 1–10 scale.

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Table 8. Happiness, relational time and income (two equation system)

	Model B		Model D		Model E		Model F	
	$Happy_i$	$Reltime_i$	$Happy_i$	$Reltime_i$	$Happy_i$	$Reltime_i$	$Happy_i$	$Reltime_i$
Age	−0.055** (0.003)	−0.012** (0.001)	−0.049** (0.004)	−0.001 (0.001)	−0.049** (0.005)	0.001 (0.001)	−0.049** (0.005)	0.000 (0.001)
[Age]^2	0.000** (0.000)	0.000** (0.000)	0.001** (0.000)	0.000** (0.000)	0.001** (0.000)	0.000** (0.000)	0.001** (0.000)	0.000** (0.000)
Male	−0.168** (0.015)	0.172** (0.006)	−0.294** (0.021)	0.247** (0.006)	−0.313** (0.023)	0.252** (0.007)	−0.312** (0.023)	0.252** (0.007)
Mideduc	0.15** (0.02)	0.041** (0.007)	0.097** (0.026)	0.06** (0.008)	0.057** (0.028)	0.097** (0.008)	0.06** (0.028)	0.091** (0.008)
Upeduc	0.203** (0.025)	0.089** (0.009)	0.063 (0.033)	0.148** (0.01)	0.029 (0.036)	0.176** (0.01)	0.033 (0.036)	0.181** (0.011)
Timerel	0.26** (0.011)		0.256** (0.018)		0.265** (0.019)		0.266** (0.019)	
Health			0.79** (0.015)	0.085** (0.004)	0.782** (0.016)	0.092** (0.004)	0.783** (0.016)	0.094** (0.004)
Selfemp	−0.066** (0.027)	0.086** (0.009)	−0.033 (0.031)	0.114** (0.009)	−0.02 (0.032)	0.104** (0.01)	−0.02 (0.032)	0.1** (0.01)
Unempl	−0.376** (0.029)	−0.033** (0.011)	−0.236** (0.038)	−0.05** (0.011)	−0.237** (0.043)	−0.05** (0.012)	−0.235** (0.043)	−0.053** (0.012)
DIncome1	−0.493** (0.024)	0.022** (0.009)	−0.372** (0.090)	0.016 (0.009)	−0.355** (0.079)	0.023** (0.01)	−0.357** (0.012)	0.021** (0.01)
DIncome2	−0.215** (0.02)	−0.003 (0.009)	−0.151** (0.027)	−0.014 (0.01)	−0.143** (0.029)	−0.024** (0.01)	−0.143** (0.029)	−0.026** (0.01)
DIncome4	0.165** (0.023)	−0.03** (0.01)	0.146** (0.03)	0.000 (0.011)	0.144** (0.032)	−0.023** (0.012)	0.145** (0.032)	−0.023 (0.012)
DIncome5	0.295** (0.029)	−0.038** (0.012)	0.234** (0.043)	−0.032** (0.014)	0.224** (0.047)	−0.032** (0.015)	0.223** (0.047)	−0.033** (0.015)
Eqincome	3E−10 3E−10	8E−09** 3E−09	9E−09** 4E−09	8E-09** 4E−09	9E−09** 3E−09	2E−10** 1E−10		
[Eqincome]^2	−3E−17 (−2E−17)	−3E−17 (−2E−17)	−4E−17** (−2E−17)	−3E−17 (−2E−17)	−4E-17** (−2E−17)		−3E-17** (−1E−17)	
Numsons	0.011 (0.006)	0.012** (0.002)	−0.002 (0.007)	0.02** (0.002)	−0.009 (0.008)	0.015** (0.002)	−0.004 (0.008)	0.015** (0.002)
Single	0.003 (0.036)	0.094** (0.013)	−0.171** (0.048)	0.069** (0.014)	−0.209** (0.052)	0.071** (0.015)	−0.179** (0.051)	0.067** (0.015)
Married	0.579** (0.03)	−0.08** (0.011)	0.307** (0.041)	−0.1** (0.011)	0.243** (0.044)	−0.118** (0.012)	0.294** (0.041)	−0.128** (0.012)
Divorced	−0.12** (0.044)	−0.043** (0.018)	−0.373** (0.077)	−0.07** (0.023)	−0.363** (0.086)	−0.093** (0.026)	−0.31** (0.083)	−0.083** (0.027)
Separed	−0.288** (0.073)	−0.089** (0.024)	−0.477** (0.104)	−0.096** (0.028)	−0.484** (0.108)	−0.055 (0.029)	−0.425** (0.105)	−0.073** (0.029)
Efw					0.216** (0.074)	−0.129** (0.005)	−0.004 (0.021)	−0.1** (0.004)
Obs.	75 305		40 055		34 563		34 563	

Notes: For the definition of the two equation model, see section 'The two equation system' in this article. Regressors legend: see section 'The single equation estimate'. Model column headers refer to specifications in Table 7. Country dummies are added to this regressors but omitted from the table for reasons of space.
** Denotes statistical significance at the 1% level.

Table 9. Robustness check on the relational time effect on happiness in the single equation estimate (aggregate relational time indicator)

Subsample splits	B	D	E	F
Male	0.276** (0.016)	0.286** (0.026)	0.309** (0.028)	0.309** (0.027)
Female	0.254** (0.015)	0.236** (0.025)	0.229** (0.027)	0.229** (0.027)
Hioecd	0.274** (0.022)	0.501** (0.055)	0.501** (0.056)	0.501** (0.056)
No Hioecd	0.256** (0.012)	0.232** (0.019)	0.239** (0.020)	0.239** (0.019)
European Union	0.227** (0.023)	0.592** (0.138)	0.591** (0.138)	0.592** (0.138)
Intrinsic	0.261** (0.013)	0.241** (0.020)	0.248** (0.021)	0.248** (0.021)
Extrinsic	0.348** (0.027)	0.256** (0.028)	0.271** (0.029)	0.271** (0.029)
Religious	0.288** (0.013)	0.253** (0.019)	0.261** (0.020)	0.261** (0.020)
Nonreligious	0.157** (0.019)	0.142** (0.046)	0.144** (0.051)	0.145** (0.051)

Notes: Table cells report magnitude and SEs of the effect of the Relational Time Index (RTI) on the dependent variable of different model specifications. Column headers identify different specifications (see Table 7) and row headers criteria for sample splits. For the definition of the RTI index, see Table 5.
** Denotes statistical significance at the 1% level.

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individuals and much larger in the high-income OECD and EU subsamples (Table 9). We also find that, in the high-income OECD and EU subsamples, the coefficient of the relational time spent with religious members is not larger than all other relational time coefficients. This finding does not depend on a drop of the coefficient of this variable, but on the rise of coefficients of some of the other relational variables as well as on the reduced degrees of freedom which affect confidence intervals. In Table 10 we perform a robustness check by evaluating the significance of the individual relational time items in different subsample splits (based on gender, OECD/non-OECD affiliation and religious practice). The most relevant results are that, as expected, time spent with religious friends is not relevant for those who are not active believers, while time spent with working colleagues has no significant impact on happiness for women and active believers.

To conclude our robustness check consider that with these cross-sectional data we are unable to identify clear cut causal relationships in one direction or in another. It is nonetheless reasonable to assume that causation goes in both directions, with happier people being more sociable and with the time spent for relationships fostering human happiness.[26]

The risk of reverse causality when we regress self-declared happiness on the time spent for relationships becomes less severe if we consider the nexus between the former variable and the value that individuals declare to attach to leisure or relationships. To make an example, if an individual is forced to work too many hours, due to his professional duties, he may be unhappy and his unhappiness may also cause additional reduction of the time spent with friends if it turns into a depressive mood (the reverse causality problem here applies). The stressing working conditions though should not change and affect the individual's opinion on the value of leisure, or on the importance of relationships, which should remain for him a strong unfulfilled personal desire (the reverse causality problem does not – or it is less likely to – apply here).

We therefore perform a robustness check on our findings by instrumenting the relational time variable with individuals declaration on the value of the time spent for relationships. In Table 11 we report magnitude and SEs of the relational variable and document that its significance remains substantially unaltered in the instrumented regressions.[27]

V. Conclusions

Our empirical investigation on the determinants of happiness, in spite of the many caveats common to these empirical analyses, shows that the main links between happiness and its main drivers should be argument of reflection in the formulation of economic policies and should help to understand some apparent paradoxes of individual economic behaviour.

In spite of the inevitable methodological problems, our results clearly highlight that the quality of relational life is a crucial determinant of an individual's happiness. The significance of this

[26] The recent evidence on moment based studies in happiness seems to show that the second direction of causality is strong (Kahnman, 2000). In these studies individuals tend to record on their agenda their highest peaks of happiness in correspondence of the time spent for relationships.
[27] Full details of these estimates are omitted for reasons of space and available upon request.

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Table 10. Robustness check on the relational time effect on happiness in the single equation estimate (individual relational time indicators)

	Male	Female	Hioecd	NoHioecd	EU	Relig	NonRelig	Extrin	Intrin
$Time_1$	0.052** (0.023)	0.053** (0.021)	0.162** (0.048)	0.042** (0.016)	0.056 (0.113)	0.068** (0.016)	0.015 (0.039)	0.045** (0.017)	0.033 (0.022)
$Time_2$	0.047** (0.016)	−0.009 (0.016)	0.07** (0.032)	0.013 (0.032)	0.169** (0.077)	0.013 (0.032)	0.032 (0.028)	0.021 (0.012)	0.029 (0.017)
$Time_3$	0.055** (0.022)	0.055** (0.022)	0.08** (0.039)	0.051** (0.017)	0.055 (0.113)	0.053** (0.016)	0.06 (0.035)	0.045** (0.017)	0.023** (0.08)
$Time_4$	0.138** (0.017)	0.113** (0.016)	0.155** (0.031)	0.107** (0.012)	0.135 (0.078)	0.109** (0.012)	−0.047 (0.034)	0.107** (0.012)	0.112** (0.017)
$Time_5$	0.065** (0.017)	0.058** (0.019)	0.088** (0.018)	0.057** (0.014)	0.14 (0.078)	0.061** (0.013)	0.068** (0.03)	0.063** (0.013)	0.057** (0.018)

Notes: Table cells report magnitude and SEs of the effect of different items of the RTI on the dependent variable of different model specifications. Column headers identify criteria for sample splits and row headers the following relational time items:

- $Time_1$ = *Timefriends*
- $Time_2$ = *Time jobfriends*
- $Time_3$ = *Time relatives*
- $Time_4$ = *Time religious friends*
- $Time_5$ = *Timesport friends*

** Denotes statistical significance at the 1% level.

Table 11. The relational time effect on happiness in the single equation estimate (aggregate relational time indicator) (IV probit estimate)

Subsample splits	B	D	E	F
Male	1.184** (0.052)	1.132** (0.136)	1.142** (0.151)	1.183** (0.052)
Female	1.157** (0.045)	1.402** (0.082)	1.321** (0.100)	1.154** (0.045)
Hiocse	1.222** (0.065)	1.732** (0.144)	1.732** (0.144)	1.216** (0.067)
NoHiocse	1.177** (0.036)	1.252** (0.075)	1.208** (0.087)	1.176** (0.036)
European Union	0.951** (0.098)	1.563** (0.303)	1.563** (0.303)	0.934** (0.101)
Religious	1.232** (0.405)	1.299** (0.081)	1.299** (0.096)	1.232** (0.040)
Nonreligious	1.077 (0.063)	1.042** (0.047)	1.046** (0.053)	1.068** (0.060)
Intrinsic	1.268** (0.048)	1.390** (0.086)	1.334** (0.106)	1.267** (0.048)
Extrinsic	0.820** (0.067)	0.756** (0.049)	0.773** (0.053)	0.825** (0.059)

Note: Table cells report magnitude and SEs of the effect of the RTI on the dependent variable of different model specifications. Column headers identify different specifications and row headers criteria for sample splits. For the definition of the RTI index, see Table 5.
** Denotes statistical significance at the 1% level.

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regressor is robust to different specifications and subsample splits.

By further exploring the nexus among quality of relational life, income and happiness we outline the existence of a paradox. While higher income is associated *per se* with higher self-declared happiness, its indirect effect is that of reducing the time dedicated to relational life which is, in turn, a significant happiness driver.

We believe that our findings provide interesting insights for policymakers suggesting that development policies, to be politically successful, need complementary measures to avoid adverse side effects on individual relational life.

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Appendix

The index of economic freedom published in the *Economic Freedom of the World: 2000 Annual Report* is a weighted average of the seven following composed indicators designed to identify the consistency of institutional arrangements and policies with economic freedom in seven major areas: (i) Legal Structure and Security of Property Rights (A) Judicial independence. The judiciary is independent and not subject to interference by the government or parties in disputes; (B) Impartial court. A trusted legal framework exists for private businesses to challenge the legality of government actions or regulation; (C) Protection of intellectual property; (D) Military interference in rule of law and the political process; (E) Integrity of the legal system: (ii) Access to Sound Money (A) Average annual growth of the money supply in the last five years minus average annual growth of real GDP in the last 10 years; (B) Standard inflation variability in the last five years; (C) Recent inflation rate; (D) Freedom to own foreign currency bank accounts domestically and abroad. (iii) Freedom to Exchange with Foreigners (A) Taxes on international trade (i) Revenue from taxes on international trade as a percentage of exports plus imports; (ii) Mean tariff rate; (iii) Standard deviation of tariff rates; (B) Regulatory trade barriers (i) Hidden import barriers. No barriers other than published tariffs and quotas; (ii) Costs of importing. The combined effect of import tariffs, licence fees, bank fees, and the time required for administrative red-tape raises the costs of importing equipment; (C) Actual size of trade sector compared to expected size; (D) Difference between official exchange rate and black market rate; (E) International capital market controls (i) Access of citizens to foreign capital markets and foreign access to domestic capital markets (ii) Restrictions on the freedom of citizens to engage in capital market exchange with foreigners index of capital controls among 13 IMF categories; (iii) Regulation of Credit, Labor, and Business, (A) Credit Market Regulations, (i) Ownership of banks. Percentage of deposits held in privately owned banks; (ii) Competition. Domestic banks face competition from foreign banks; (iii) Extension of credit. Percentage of credit extended to private sector; (iv) Avoidance of interest rate controls and regulations that lead to negative real interest rates; (v) Interest rate controls. Interest rate controls on bank deposits and/or loans are freely determined by the market; (B) Labor Market Regulations; (i) Impact of minimum wage. The minimum wage, set by law, has little impact on wages because it is too low or not obeyed; (ii) Hiring and firing practices. Hiring and firing practices of companies are determined by private contract; (iii) Share of labour force whose wages are set by centralized collective bargaining; (iv) Unemployment Benefits. The unemployment benefits system preserves the incentive to work; (v) Use of conscripts to obtain military personnel; (C) Business Regulations; (i) Price controls. Extent to which businesses are free to set their own prices; (ii) Administrative conditions and new businesses. Administrative procedures are an important obstacle to starting a new business; (iii) Time with government bureaucracy. Senior management spends a substantial amount of time dealing with government bureaucracy; (iv) Starting a new business. Starting a new business is generally easy; (v) Irregular payments. Irregular, additional payments connected with import and export permits, business licenses, exchange controls, tax assessments, police protection, or loan applications are very rare. *Economic Freedom of the World: 2000 Annual Report*.

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