The 60es turnaround as a test on the causal relationship between sociability and happiness

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Abstract

The nexus between social leisure and life satisfaction is riddled with endogeneity problems. In investigating the causal relationship going from the first to the second variable we start from considering that retirement is an event after which the time investable in (the outside job) relational life increases. We instrument social leisure with various measures of the age cohort specific probability of retirement. With such approach we document that social leisure has a positive and significant effect on life satisfaction. Our findings shed some light on the age-happiness pattern. Policy implications are also discussed.

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1. Introduction

Anyone who cannot belong to a community, or has no need to do so in view of his self-sufficiency is a beast or a god.

Aristotle[1]

The number of papers investigating the determinants of life satisfaction published in economic journals has been dramatically growing in the last decade (see Clark et al., 2008 and Frey, 2008). In fact in recent years psychologists and economists and other social scientists began to agree that subjective well-being can be measured with reliability and validity, using relatively simple self-rating questions about "happiness" and "life satisfaction" (see Helliwell, 2006 and Krueger and Schkade, 2008).

A key motivation for the use of subjective well-being data in economics has been the desire to study the welfare implications of non-traded goods. The Life Satisfaction Approach (Frey et al.,

[1] *Politics,* I, 2, 1253a 28-30.

2004) can in fact be seen as an alternative to the traditional methods of measurement based on contingent valuation or revealed preferences.

Subjective assessments of well-being have been used to estimate the shadow value of a wide range of environmental and social conditions, such as air quality and pollution (Welsch, 2002 and 2006), airport noise (Van Praag and Baarsma, 2005), terrorism (Frey et al., 2007), the fear of crime (Moore and Shepherd, 2006), marriage (Johnson and Wu, 2002; Blanchflower and Oswald, 2004; Frey and Stutzer, 2006) and unemployment (Clark and Oswald, 1994; Gallie and Russell, 1998; Di Tella et al., 2001 and 2003).

An important class of non traded goods is represented by non instrumental social relationships or 'relational goods', as they are often defined in the literature: relational goods are the outcome of social activities such as interactions with friends, participation in the life of clubs, religious bodies, political parties, unions and civic and cultural organizations etc.

Many studies in psychology support the conclusion that social relationships are essential to well-being: we refer the interested reader to the comprehensive overview in Diener and Seligman (2004). However in standard economic models individuals maximize the utility they derive from consumption of market goods and non-work time, while the choice between solitary and 'relational' leisure is left in the background. As we will see in more detail in the next section, both choices are obviously influenced not only by the price system but by the social environment and can be affected by a wide range of policies. In particular we shall see how, due to coordination failure and /or to bounded rationality, consumption of relational goods may be inefficiently low at the individual level and even that the society as a whole may get stuck in a Pareto-dominated equilibrium, which may be called a 'social poverty trap'.

If economic indicators do not correlate well with the quality of social relationships a key contribution to well-being is omitted in standard analyses of policies. The happiness data offer us a way to quantify such an omission, and thus open a way towards a better evaluation of the equivalent variations of policies.

The Life Satisfaction Approach has been used to evaluate social relationships by Helliwell and Putnam (2004), Bartolini et al. (2007), Corrado and Aslam (2007), Becchetti et al. (2008), Bruni and Stanca (2008), Meier and Stutzer (2008) and Powdthavee (2008) among others. All these works confirm the findings by psychologists that relational goods are positively associated with SWB. However association does not imply causation: an important question still open in this literature is whether the direction of causality goes from social relationships to well-being as the idea that high well-being leads to more and better relationships is also plausible.[2]

The problem of biunivocal causality and endogeneity is pervasive in economics but particularly severe in the field of happiness. Beyond age (but not longevity!) almost all other variables introduced as regressors in life satisfaction equations may both cause and be caused by life satisfaction. For instance, the significant relationship between money and happiness may also be determined by unobserved individual traits (optimism, a well balanced personality, etc.) which positively affect both subjective well being (SWB) and professional success.

A first important opportunity of reducing the endogeneity problem is offered by the availability of panel data. We exploit this possibility by conducting our analysis using the German Socio Economic Panel (GSOEP) which contains both cross-sectional and longitudinal information (from 1984 to 2007) on many variables, including self declared happiness and indicators of relational life, for a large sample of individuals.[3]

In fact, fixed effect estimation makes it possible to control for the confounding role of personality differences by which optimists will always say they are happy with their life: in many instances a self-fulfilling expectation. In studying personal relationships it is quite obvious that a cheerful nature, whether due to genes or to upbringing, will make one's social life easier and more

[2]Interestingly Bartolini et al. (2008) working on US cross-sectional data (US General Social Survey) find that intrinsically motivated group membership ('Putnam group' memberships) is positively associated with well-being, while for membership in 'Olson' groups , i.e. instrumentally motivated, the opposite is true.

[3] The GSOEP is a longitudinal household survey sponsored by the Deutsche Forschungsgemeinschaft and organized by the German Institute for Economic Research (Berlin) and the Center for Demography and Economics of Aging (Syracuse University). We are grateful to these institutes and to he project director Dr. G. Wagner for making this data set available.

rewarding: it is therefore doubly important in this case to control for permanent psychological traits by using panel data: Becchetti et al. (2008) and Powdathvee (2008) show that the link between happiness and social life survives the elimination of this fixed component by using respectively German and British panel data.

However even when using panel data techniques the problem remains that time variations in SWB for the same individual may affect potential happiness determinants.

This time varying dimension of the endogeneity problem is particularly severe when we consider the relational goods - well being nexus. Just by introspection, it seems quite obvious that not only personality, but also more transient feelings affect our propensity to meet people.

To deal with this form of reverse causality, which cannot be taken care of by fixed effects estimation, we have to find a proper instrument, i.e. a variable which is exogenous but that is correlated with the endogenous regressor, in the absence of natural experiments.[4]

Our instrumentation strategy hinges on retirement. Retirement may be conceived as a permanent change in the individual organization of time. The fall in hours worked (not necessarily leading to zero worked hours since many retired individuals keep some informal working activities) corresponds to a large increase in leisure, potentially investable in social activities. However, even if it possesses important properties for the solution of the problem, retirement cannot instrument as such the relational goods indicator we use because the timing of retirement may be a choice influenced by one's wellbeing. In Germany the mandatory age for retirement is 65 but the law creates a wide window of opportunities for retirement decisions around this age. Moreover we find that retirement belongs to the equation as a regressor, as it can have a direct positive effect on SWB, through for instance the ceasing or diminishing disutility of work.

We want some factors, correlated with the time spent in social life, which cannot be suspected of endogeneity at the individual level. We find such variables in age cohort specific

[4] Meier and Stutzer (2008), who concentrate on volunteering, tackle the causality problem by using the collapse of the East Germany volunteering infrastructure.

current and lagged retirement probabilities (calculated either on the sample or on the entire German population) and demonstrate that our instrument are valid and relevant.

Summing up, we create value added in the happiness literature by improved identification of the causal effect of social leisure on life satisfaction.

Our results emphasize that relational consequences of economic policies need to be carefully taken into account when pursuing the goal of maximising social welfare. The advice stemming from our paper is that measures aimed at stimulating social life and at preventing negative side-effects on it of policies are of crucial importance.

The paper is divided into five sections (including introduction and conclusions). The second section reviews some theoretical analyses on relational goods. The third and the fourth present and comment our descriptive and econometric findings. The fifth section concludes.

2. Relational goods: an overview of the theoretical background

The concept of 'Relational goods' was introduced by Gui (1987) and Uhlaner (1989) to define a set of intangibles ranging from companionship, sympathy and intimacy, to feeling part of a community with same values or tastes etc. Bardsley and Sugden (2006) borrows from Adam Smith's Theory of Moral Sentiments the term 'fellow-feelings', to describe the mental states produced during such non instrumental social interactions. The production process of these goods is the meeting - 'encounter' in Gui 2005's definition - with family and friends or with a wider net of partners, i.e. many kinds of social events (association gatherings, cultural or sport events, etc.). Participating in a political debate, volunteering, applauding at a theatre are examples of relational goods produced on this larger scale.

A defining feature of relational goods is that their value crucially depends on the sincerity and genuineness of the people involved. This implies that they can be generated as a by product of some instrumental activity but not exchanged through the market or indeed produced by state,

which of course implies they don't have a price and that their value has instead to be estimated. Nor can the estimation be done just by looking at their opportunity cost in terms of labour income given up by choosing leisure. Indeed leisure includes many heterogeneous activities which can be relational, pseudo-relational (second life in internet) or utterly non relational (hours spent alone on TV). Interestingly, life satisfaction has been found to be negatively correlated with TV viewing, directly in Frey et. al. (2007) and indirectly by reducing time spent in relational activities in Bruni and Stanca (2008). Frey et al. (2007) find this evidence difficult to reconcile with the theory of revealed preferences, by which any observed choice is utility maximizing, and interpret the finding as suggesting that people do not always act rationally, but often just follow habits and impulses. Indeed Frey et al. (2006) argue that individuals are prone to mispredict utility, through underestimation of adaptation, distorted memories of past experiences, materialistic beliefs fostered by institutions (e.g. marketing) and that these cognitive limits lead to overconsume goods satisfying extrinsic needs (material goods beside basic necessities) and underconsume goods satisfying intrinsic needs, relational goods among them. Empirical evidence on these distorted choices is offered by these authors by studying commuting. On the other hand, evidence on the association between well-being and generosity (measured in experiments) is found in Konow and Earley (2008).

A different explanation, by no means alternative to the 'behavioral' one put forward by Frey et al. (2007) for the opposite signs of the correlation of happiness with solo and social leisure-time, hinges on the fact that relational goods, by definition, are not an option freely available at the individual level. An individual's time use choices may be contingent on the time use choices of others, because the utility derived from leisure time often benefits from the presence of companionable others. Corneo (2005), Jenkins and Osberg (2003) Antoci et al. (2005) and Bruni et al. (2008) develop models starting from this premise that one cannot have a social life unilaterally. Various types of external effects concerning relational goods can be distinguished: there are externalities in the formation of an agent's social network as the probability of a successful

match with a partner increases with the time the agent and the potential partners devote to searching, while a second type of externality concerns the efforts by the agent and the potential partners in cultivating their skills as partners. Finally there are externalities at the aggregate level: Merz and Osberg (2006) find that the proportion of leisure time devoted to social leisure is higher in Lander with more public holidays. It is easier and more rewarding to participate in an association in a social context characterized by a rich network of associative opportunities.

Due to these multi-level net of externalities, equilibria with low socializing may coexist with equilibria with high socializing for groups of individuals as well as for nations as a whole.[5]

The consumption of relational goods will affect labour supply decisions: when *other* persons increase their hours of paid work, the probability of a feasible and desirable leisure match falls, which decreases the personal utility of non-work time. The consequences of such strategic complementarities in the enjoyment of leisure are considered in Alesina et. al. (2005) and Burda et al. (2008) in analyzing the difference in hours worked between Europe and the US, which has emerged in the 1970's and has been increasing since then. This difference might not be due to a difference in the tax system, as maintained by Prescott (2004), or in tastes as suggested by Blanchard (2006), instead history (e.g., the first oil shock) and institutions (labor-market regulations) might have simply led otherwise identical Americans and Europeans to coordinate on different equilibria.[6] In the "US" equilibrium, individuals work a lot, consume a lot, and have little time for communal activities. In the "European" equilibrium, consumers work less and consume less, but enjoy more common leisure. The European equilibrium Pareto dominates the US outcome in which individuals "bowl alone," as deplored by Putnam (2000).

[5] Antoci et al. (2007) show how bounded individual rationality and externalities combine in producing 'social poverty' traps.

[6] According to these authors one of the strongest pieces of evidence in favor of complementarities across leisure is that an overwhelming share of the population both in Europe and the US takes its two days of leisure during Saturday and Sunday. There would be huge benefits from staggering work so that different people take different days off during the week: this could reduce commuting time and would allow capital to be spread over more workers: the fact that this is not done suggest that the costs in terms of forgone welfare due to less coordinated leisure would be sizable as well. However the relevant complementarities could be across work, rather than leisure.

Indeed Alesina et al. (2005) find that happiness is higher in countries with lower working hours. We can add that for the European countries there is a upward-sloping trend in happiness and a downward sloping trend in hours worked while for the US there is no trend in happiness and a upward sloping trend in hours worked as shown by Wolfers and Stevenson (2008).

Finally, the theme of relational goods is at least implicitly present in the vast literature on social capital, which studies the impact of social ties on the productivity of traditional private goods. Higher social participation may bring about social capital accumulation as a by-product. For instance, trust (or empathy) may be reinforced and generalised through social interactions.[7]

This rhapsodic overview of the recent economic literature on relational goods is far from complete. However we hope it is enough to convince the reader that the empirical study of the hypothesis that less common leisure leads to lower lifetime utility, on which we report in the following sections, has vast implications for the study of contemporary society.

3. Descriptive empirical findings

The obvious problem in identifying a positive relationship from relational goods to life satisfaction is that the hypothesis of a reverse causality link is equally convincing. To solve the puzzle we should isolate factors which determine an exogenous shock in time used in social life. To this purpose we thought of an event which occurs in every worker's life: retirement. At a descriptive level we find that: i) retirement (voluntary or involuntary) mainly occurs in the early 60s in our sample reflecting the national trend; ii) retirement (unsurprisingly!) causes a sharp reduction in working time; iii) a significant increase in time spent in social life occurs in the early 60s; iv) in that same age category we observe a rise in life and, even more, in leisure satisfaction.

[7] We notice however that the econometric techniques we use are unable to capture these more universal benefits of relational goods.

More specifically, using GSOEP waves from 1984 to 2007[8], we notice that the share of retired individuals by age jumps up at 60 (from 30 to 50 percent) and at 65 (from 80 to 93): see Figure 1. In fact most individuals in our sample retire between 60 and 65. If we restrict the analysis to the subset of individuals retiring during the survey (4,580 observations) and look at the cumulative density function, we observe that 50 percent of the sample gets retired before 60, while 45 percent of the sample gets retired between 60 and 63, as Figure 2 shows.

Figure 3 shows that the retired work much less than the non retired of the same age (the average difference is 4.3 hours between 50 and 52, 4.9 between 56 and 58, while dropping to 2.4 between 65 and 67), but in these cohorts there is a decline in hours worked even for the non retired.

To start our analysis we first have to build a *"Relational Time Index"* (RTI). To this purpose we use five relevant variables available in the GSOEP. Individuals are asked about the intensity with which they: i) "*attend social gatherings*"; ii) "*attend cultural events*"; iii) "*participate in sports*"; iv) "*perform volunteer work*"; v) "*attend church or religious events*". We combine answers to these questions in a variable which can take values from 3 to 0, depending on how much time is devoted to each particular activity (0=Never, 1=Less Frequently, 2=Every Month, 3=Every Week) [9]. Our relational time index is simply an un-weighted average of the points given to the five questions by each respondent.

Our choice is motivated by two main reasons: first, all the above mentioned activities produce relational goods of the kind described in the previous section, even if the degree of their productivity in creating or strengthening ties among participants may vary, i.e. our synthetic

[8] The data used in this paper was extracted using the Add-On package PanelWhiz for Stata®. PanelWhiz (http://www.PanelWhiz.eu) was written by Dr. John P. Haisken-DeNew (john@PanelWhiz.eu). See Haisken-DeNew and Hahn (2006) for details. The PanelWhiz generated DO file to retrieve the data used here is available from us upon request. Any data or computational errors in this paper are our own responsibility.

[9] We use this scale since answers do not allow us to infer an exact per month or per week frequency when "less frequently" is the response. It is likely that the distance from "every month" to "every week" corresponds to a more than proportional increase in sociability than the distance between "less frequently" and "every month". If that is the case, our unweighted average flattens high intensity responses and may be conceived as a sort of log transform of the true unobserved frequency of relational activity. A robustness check in which we impute the presumed actual (per month) frequencies on the basis of qualitative responses (and, more specifically, one every two months is equated to the "less frequently answer") has been performed. Results are substantially unchanged and available from the authors upon request.

indicator goes beyond the information that each single component could provide. Second, our measure allows us to reduce the problem of missing data since none of the five variables above is surveyed along the 24 waves. In order to have a higher number of observations and cover more years we calculate the RTI index on the basis of non missing relational variables for each individual-year.

By looking at the RTI indicator and at its individual components we find that the time spent in relational activities becomes significantly higher after retirement, controlling for socio demographic variables and time dummies in a fixed effect panel estimate. The result holds when we plot estimated age effects on attending sport events, time spent with friends in religious circles, in volunteering activities, in attending cultural events and social gatherings (Figure 4).

Since most workers retire in their early sixties, we inspect the age-happiness pattern and find that the increase in life and leisure satisfaction is well visible in the first part of the 60s. Average life satisfaction as a function of age exhibits the U-shape found in many previous studies, summarised in Frijters and Beatton (2008): at 29 average life satisfaction is 7.13, it falls to a minimum of 6.76 at 55, and rises up to 7.07 for the 65 years old respondents (see Figure 5). The difference between the three levels is significant at the 95 percent level. The U-shape in life satisfaction is paralleled by a similar, and more pronounced, U-shape in leisure satisfaction (see Figure 6). Average leisure satisfaction is 6.42 at 29 years, drops to a minimum (6.24) at 34 and rises up to 8.05 at 67. There is a spike in the indicator between 59 and 63. During this period average leisure satisfaction is significantly higher each year vis-à-vis the previous one at 95 percent.

It is interesting to observe that our results are strongly consistent with those found by Engfer (2009) in a different dataset (time budget data collected by the Federal Statistical Agency of Germany in 2001/2). Collected evidence shows that prime-age adults suffer from time pressure and that their leisure satisfaction rise significantly around the retirement age. Indeed, after the retirement transition the time previously devoted to work is reallocated to family and friends, as well as to

household maintenance and other leisure activities. As a consequence, the share of people who feel that they are not able to spend enough time with the spouse or friends drops consistently.

To sum up, people experience a sharp change in their work/leisure ratio between their late 50s and early 60es, i.e. around a threshold which roughly corresponds to retirement. In parallel, we find a significant rise in social life and life and leisure satisfaction.

4. Econometric findings

Based on these descriptive findings we go on to test the relational goods-happiness nexus through the following steps: i) we start with a base specification ii) we add our relational index to this base specification; iii) we perform an IV estimate in which the relational index is instrumented; iv) we do robustness checks with various subsamples and modified models.

Our base specification includes the explanators typically found in happiness regressions: marital and employment status, changes in employment and marital status, years of education, health status, number of children in the household, log of equivalised real household income, an East/West dummy, house ownership[10]. We also include time dummies and age categories.[11] Opinions on the inclusion of year dummies in these types of estimates are mixed. On the one side, it is observed that they capture aggregate shocks to macroeconomic performance, political events etc. whose influence can be important so that excluding them would cause serious omitted variable bias. On the other side, when fixed effects are included and age and age squared are entered as regressors, including years dummies would create perfect collinearity: this is why, following Clark (2007) we use age categories instead. In fact, this choice is crucial for estimating the relationship between age and SWB: if year dummies are not included, as in Frijters and Beatton (2008), the U-

[10] For a detailed description of the variables see the Appendix, Table A1.

[11] Differently from two previous studies which investigate the age-happiness relationship on the same data (Frijters and Beaton, 2008; Van Landeghem, 2008), we do not restrict the analysis to West Germans, as Frijters and Beatton (2008) and do not work only on the balanced panel, as Van Landeghem (2008). Our main results are however supported also in these two specific subsamples. Results are omitted for reasons of space and available upon request.

shaped relationship found when using age categories disappears and SWB is monotonically decreasing in age. This is in our opinion due to the fact that the panel, even the unbalanced one, ages, so that a disproportionate number of observations on the young come from the first years. These were happy years for Germany, presumably because of the reunification, so that excluding year dummies from the regression biases the coefficient on age.[12]

In the first four columns of Table 1 we present the following specifications: i) the base equation; ii) the base equation plus the retirement variable; iii) the base equation plus the RTI variable; iv) the base equation plus the retirement and RTI variables. Since the RTI variable is present only in a limited number of waves the number of observations in columns 3 and 4 falls considerably.[13]

Our findings confirm the "almost stylised facts" of the happiness literature, from the positive and significant effect of household income, marriage status and the negative and significant effect of separation, unemployment and health status (Table 1, column 1).

A distinctive element with respect to most papers in the literature is our use of equivalised household income computed following the OECD equivalence scale,[14] together with the number of children variable. This makes the children variable positive and significant. In this way we are able to disentangle two children effects: a negative one represented by the reduction of per capita income within the household and a positive one represented by the psychological value of having them.

Both the retirement and the relational good variables are positive and significant when separately considered and when jointly introduced in the estimates (Table 1, columns 2-4). The rationale for the retirement effect is twofold. On the one side, consistently with the standard assumption in economics that leisure is a good, people will enjoy retirement as the disutility from

[12] For a different opinion, focused on entry and survivorship bias, see Frijters and Beatton (2008).

[13] Limiting the number of observations to those of the RTI augmented estimate (Table 1, column 3) does not change significantly the findings obtained in the base equation (Table 1, columns 1 – 2). Results are omitted for reasons of space and available upon request.

[14] Equivalised income is household income which is adjusted by using an equivalence scale to take into account the size and composition of the household. Here we used the "OECD equivalence scale". This assigns a value of 1 to the first household member, of 0.7 to each additional adult and of 0.5 to each child. This scale (also called "Oxford scale") was mentioned by OECD (1982) for possible use in "countries which have not established their own equivalence scale". For this reason, this scale is sometimes labelled "(old) OECD scale".

work ceases. However another complementary explanation is that with retirement an increase in the quantity and quality of social life is possible. Indeed, as we have seen in the previous section with the descriptive statistics and as demonstrated by Engfer (2009) on time budget data for people reaching pension age, people become more satisfied with their everyday agenda.

We notice that coefficients of the age cohorts from 59 to 61 are still positive and significant even when we include the RTI and retirement variables. We thought of two plausible arguments reconciling such findings with the hypothesis that what explains the surge in SWB at the age of retirement is indeed retirement: i) hours worked are reduced in this age category even for those still working, as emerges from Figure 3, so the disutility of work is reduced for them, even if to a lower degree than for the retired; ii) if the consumption of relational goods increases even for those still working, one could argue that, when many in the peers of the non retired are retired, it is easier for all in this cohort to avoid the relational poverty trap. People are better off when their reference group starts to retire, whether or not they themselves retire. [15]

4.1 Tackling the endogeneity problem: the IV estimates

We observed that our estimates that the coefficient of the relational time indicator is significant and strongly positive, even when permanent personality traits are netted out by fixed effect estimation. This result will be found to be robust to different subsamples and estimation models (see section 4.2).

However the direction of causality could run from time-demeaned subjective well being to time-demeaned intensity of social contacts. Our attempt here is to deal with this two-way causation type of endogeneity. In what follows we explain our strategy for estimating a within group instrumental variable (IV) regression: the results are presented in Table 1, column 5 – 6.

[15] Of course it is not difficult to think of other (concurrent) explanations: it is possible that those who retire later hold particularly psychologically rewarding jobs, or, due to a relatively strong work ethics and competitive attitude take pride from working at a later age, etc. However we have not attempted to disentangle these various possible effects.

As anticipated in the introduction, our identification strategy hinges on retirement. However we do not use individual retirement as an instrument because our analysis in the previous section strongly suggests that an exclusion restriction for this variable is not possible. Instead, we adopt the proportion of retirees in the population sample by age cohort, for each year. Given the large number of observations available we are quite confident that the sample statistic does conveniently approximate that of the entire population[16] and retains as well the characteristics of not being influenced by the observed individual retirement decision.

Therefore, we make use of two instrumental variables: the probability that people of the same age may retire (*QuotaAg*e) and the probability that people one year younger than the individual may retire (*QuotaAge_1*). Results for this two - stages least squared estimation are shown in Table 1, column 4.

It is plausible that such probabilities do not affect directly the SWB of an individual since they are not choice variables for the individual and therefore cannot be related to the time-varying psychological factors captured in the error of our structural equation. Hence, on logical grounds, the retirement age patterns of the sample seem to be reasonably valid instruments since they are only indirectly associated with the individual satisfaction of life. The validity of instruments used is commonly tested through the Hansen test. Because the p – value is greater than 0.05, we do not reject the null hypothesis of lack of correlation between the instrumental variables and the error term of the structural regression, instead we conclude that our instruments are valid.

At the same time, these two instruments are enough correlated to the individual level of RTI to be fairly relevant in predicting the endogenous regressor. The F statistic for joint significance of instruments in the first stage regression of the endogenous regressor RTI is much higher than 10, the critical value suggested by Staiger and Stock (1997) indicating a problem of weak instrument.

[16] Börsch – Supan and Schnabel (1999) in their overview on the German Social Security system, as well by Berkel and Börsch-Supan (2003) in their estimations of the long term impact of reforms on retirement decisions in Germany made use of the retirement statistics drawn from the GSOEP to describe the national figures.

An important statistic to compute in the instrumented specification is the Davidson – MacKinnon (1993) test of exogeneity for a fixed-effect regression estimated via instrumental variables, where the null hypothesis states that an ordinary least squares (OLS) estimator of the same equation would yield consistent estimates. Our F statistic strongly rejects the null of exogeneity and confirms the need of instruments (Table 1, column 5).

The instrumented RTI coefficient remains positive and significant even though the fixed effect IV coefficient is quite higher than the fixed effect OLS coefficient (almost ten times). This might be due to the limited cross-sectional variability of our instrument. Consider however that our principal aim at this stage of research is not to quantify the shadow value of social leisure but rather to verify its existence and to give a sign to the causal effect of social leisure on SWB. So far, our results are not inconsistent with the possibility that such effect exists and it is positive.

The individual retirement observation nonetheless contributes to the sample average even though its contribution is negligible. To overcome this problem we added a third variable: the average retirement entrance age in Germany[17]. Actually the data is detailed by year, sex and regional location (West and East Germany). In order to satisfy the requirement of validity, we designed a variable which assigns to each individual the average retirement entrance age of the opposite sex, respecting the year and the regional location (*SexRetAvAge*). The relevance of this last instrument per se, confirmed by our tests, is not immediate and needs to be explained. A higher average retirement age implies more distance from retirement in the worker‘s time horizon and a lower probability of earlier retirement. Since relational goods are jointly produced and consumed a lower probability of earlier retirement of other individuals in the same age cohort who are potential relational good partners matters. This implies that, in the end, this third instrument is correlated with the previous two. The variable, indeed, cannot be accused of being related to the error term in the life satisfaction specification but is quite correlated with the endogenous variable of interest.

[17]National statistics are supplied by the German association of public pension providers (Verband Deutscher Rentenversicherungsträger - VdR) and cover the period 1989 - 2005. The data elaboration we used here is by Sackmann (2007).

Besides the econometric requirements, the national average age of retirement should be strongly correlated with the individual one and therefore correlated with something that is not specified in the model for life satisfaction but that does influence the choice of the individual to retire such as gender specific issues of labour market participation. Associating to each individual the average age of retirement of the opposite sex allows us to put aside these issues present in the black box of the structural error term.

The introduction of this additional regressor does not modify substantially our diagnostics but reduces the magnitude of the coefficient and the standard error of our endogenous variable (Table 1, column 6). So that when we use the three instruments, the 2SLS coefficient for RTI becomes 1.53 instead that 1.98, compared with the OLS coefficient for RTI of 0.21 we are still distant from a correct identification of the parameter, but we made an attempt to get rid of the endogeneity in the estimation.

Note that the significance of the 59-61 up to 55-57 age categories disappears in the IV estimates and that the only significant age categories remained are 62-64 and 65-67 in the second type of IV estimated. This finding does not contradict our hypothesis that the upward bump in happiness-age function found in the early 60s may be determined by the retirement/increase in social leisure combination.

4.2 Robustness in subsample splits

Table 2 shows that our findings replicate in different subsamples (women, men, East and West Germans, occupationally disabled[18] and not, registered as unemployed and not). The retirement effect on life satisfaction is almost four times larger for males than for females, while the enjoyment of relational life is similar for the two sexes. This may be interpreted in the sense that job-induced

[18] Any person whose capacity for social and/or occupational integration is severely restricted by an impairment or reduction of their physical and/or mental capacity is eligible for the aid awarded by the social assistance.

relational poverty during their working years is much stronger for males, who work longer hours and have full time jobs more often than women. Being retired attracts a significant coefficient for both employed and disabled workers[19]. In particular, among those who were registered as unemployed, the retirement effect is much higher than for those who were not: it seems likely that this is due to the end of a condition carrying a social stigma, and indeed shown to be very detrimental to SWB in many studies.

The RTI variable is always significant in the observed subsamples even when we introduce the retirement variable. When instrumented with the age-retirement pattern, it remains significant for all subgroups with the exception of the unemployed.

4.3 Robustness in estimation methods

In this section we want to check whether the effect of relational goods on happiness remains significant in relevant subsamples if we modify the choices on how to include age, time and individual fixed effects. As described above (see section 4), the benchmark model is estimated with a fixed effect regression including time dummies and age categories. Analysing here the possible alternative specifications with their drawbacks and advantages allows us to better justify our estimation choices.

The first choice to make was how to introduce age in the regression: nearly all recent papers enter terms in age and age squared. Frijters and Beatton (2008) show that in most of these studies the effect of the linear term in age is always negative, whilst that of age-squared is positive, indicating a U-shape. Although this seems to be a typical finding in happiness regressions, we

[19] Besides old age pensions the German welfare system provides d*isability benefits* to workers of all ages not able to carry on a regular employment. If this inability is complete they receive full old age benefits, the so called disability pension ("Erwerbsunfähigkeitsrente", EU). A person that can work only half of the time or less compared to a healthy person received two-thirds of old age benefits ("Berufsunfähigkeitsrente", BU). In the 1970s and early 1980s, the German jurisdiction has interpreted the rules on disability very broadly, in particular the applicability of the first rule. Disability is the most important pathway to retirement for civil servants: 47% of those who retired in the year 1999 used disability retirement. Hence we may consider the disabled group as a hybrid set (of not fully- irregularly employed partially subsidized workers) which stands between full employment and straight unemployment. See Borsch-Supan and Wilke (2004).

prefer not to impose a rigid functional form on age. Following Clark (2007) and Van Landeghem (2008), we use dummies representing age-bounded categories. Each age category comprises 3 years: 17-19, 20-22 . . . 77-79, and the omitted category is the age group containing individuals in their eighties.

Another issue is whether to estimate a pooled cross-sectional or a fixed effects regression.

In Table 3.a we present the pooled regression results where we compare the two possible ways to enter age. The relational time index is strongly significant and positive over all subsamples and it maintains almost the same coefficient regardless of the way age enters the regression, even when we introduce the retirement variable. On the contrary, the retirement variable has a positive effect when age is entered in a quadratic form and the opposite when we use age categories (negative impact).

In Table 3.b we show the results with fixed effects estimation. We did not include time dummies because of the perfect multicollinearity that relates them to age in its linear form. The RTI variable maintains a strongly significant effect on life satisfaction. For all other regressors, here omitted for reasons of space, we confirm the standard results in the literature. However, both these models suffer from a possible omitted variable bias due to the exclusion of time dummies.

We ended up choosing a benchmark model estimated with fixed effect regression where we include time dummies and age categories. An important limit of this model can be the approximation of the categorical life satisfaction variable by a continuous one. Although this is common in the happiness literature, we verify whether our results on relational life are confirmed when we account for the discrete ordered categorical nature of our dependent variable by means of an Ordered Probit model. In order to make use of the panel structure of the dataset and to correct for individual fixed effect, we follow the Mundlak (1978) approach. We incorporate as correction factors the mean across time of the socio demographic regressors we used in the base equation. These averages should capture the correlation between time varying explanatory variables and individual effects due to persistent personality traits. Moreover, we make use of time dummies so to

account for fixed time effects. Results are presented in table 4. Even with this estimation model, the impact of RTI on SWB is found to be strongly significant and positive.

5. Conclusions

Common sense tells us that relational life plays an important role in life satisfaction. As human beings we are dramatically influenced by recognition, appreciation and acceptance by others.

With the Meier and Stutzer (2008) exception, the empirical contributions investigating the relational goods-happiness nexus have not solved the endogeneity problem. If the links between life satisfaction and almost all its potential determinants could go both ways, this is all the more true for social life.

In this paper we devise a new approach to tackle the endogeneity issue. We consider that the retirement event allows individuals to re-master their own agenda and to invest more time in social and relational activities. However, retirement is partially endogenous. So, we observe the age pattern behind retirement decisions and use it to create valid instruments. Our findings document that relational goods have a significant effect on life satisfaction which is quite robust under different specifications and subsamples.

Our paper may also shed some light on the U-shaped relationship between age and happiness, which has become one of the stylised facts in the happiness literature. In fact we find that the rising part of the parabola may be explained by the retirement/increase in social leisure effect.

In standard economic models relational arguments do not appear in agents' utility functions and are therefore not taken into account when evaluating policies. Our findings suggest that this omission is important.

Figure 1. Share of the retired population by age in the GSOEP 24 wave sample

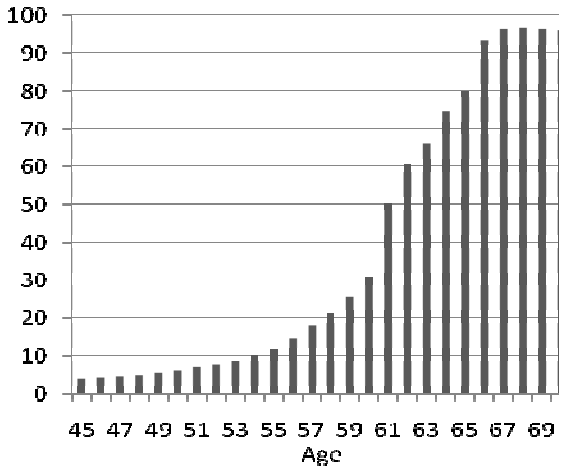

Figure 2. Cumulative distribution function of retirement age in the GSOEP during the sample period

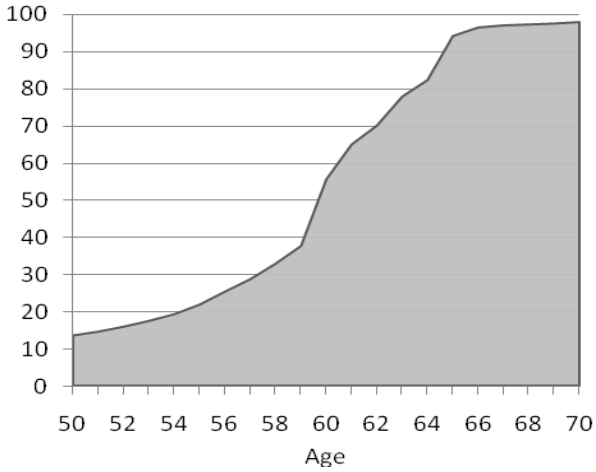

Figure 3. Daily average worked hours for retired and non retired individuals in different age categories (working week, Saturdays and Sundays)

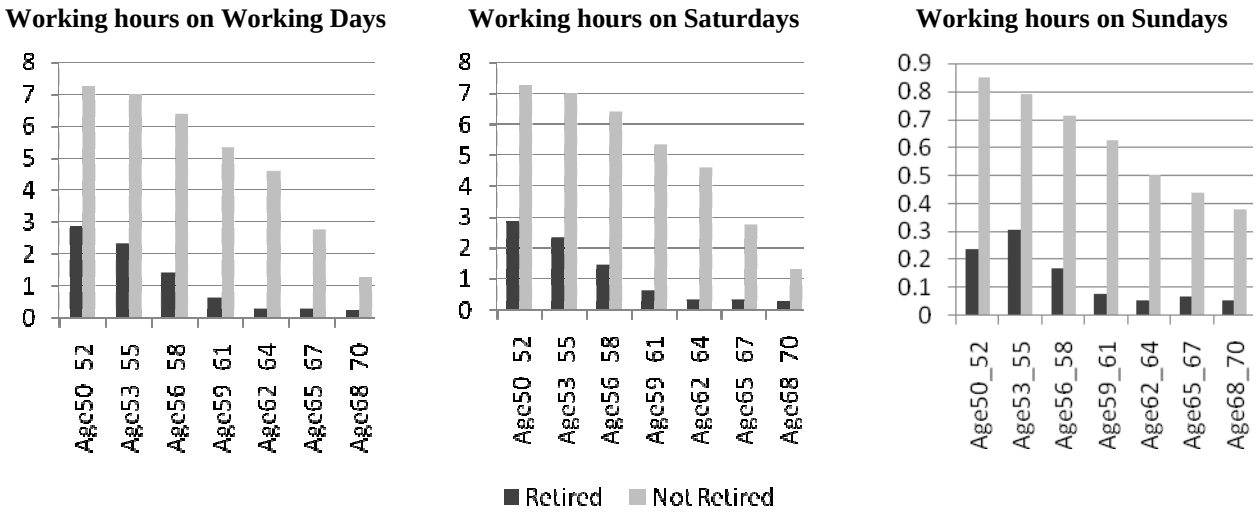

Figure 4. Predicted age effects on time spent in relational life events such as Social Gathering, Volunteering, Sport, Cultural events, Religion, after controlling for socio demographic variables (income, employment status, marital status, health) and time dummies in a fixed effect panel estimate. Range of variation on the vertical axis: (0=Never, 1=Less Frequently, 2=Every Month and 3=Every Week)

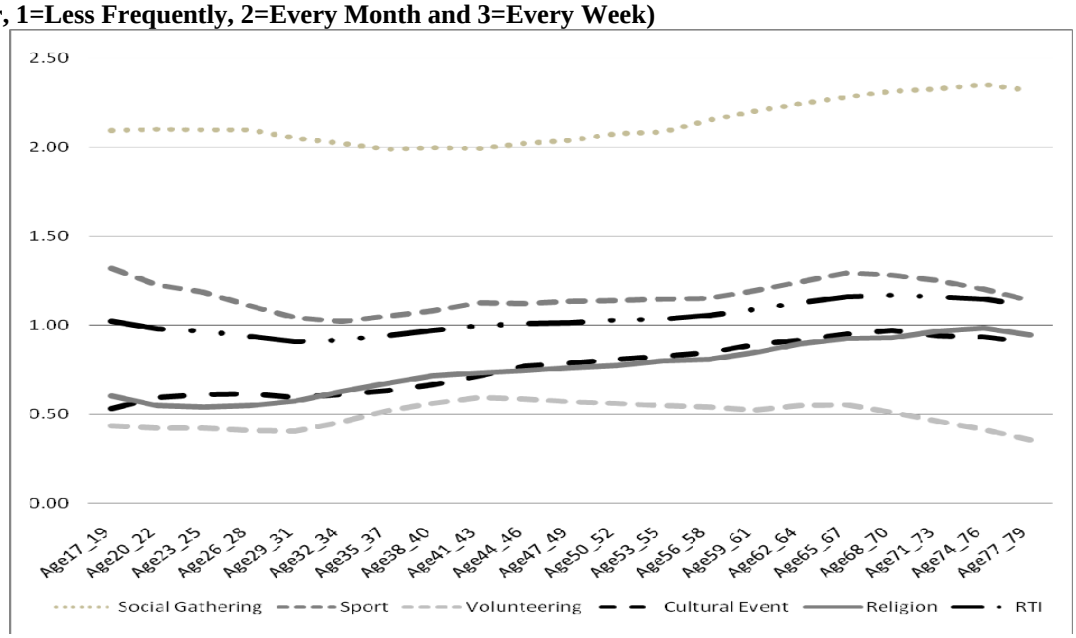

Figure 5. Average Life Satisfaction levels by Age

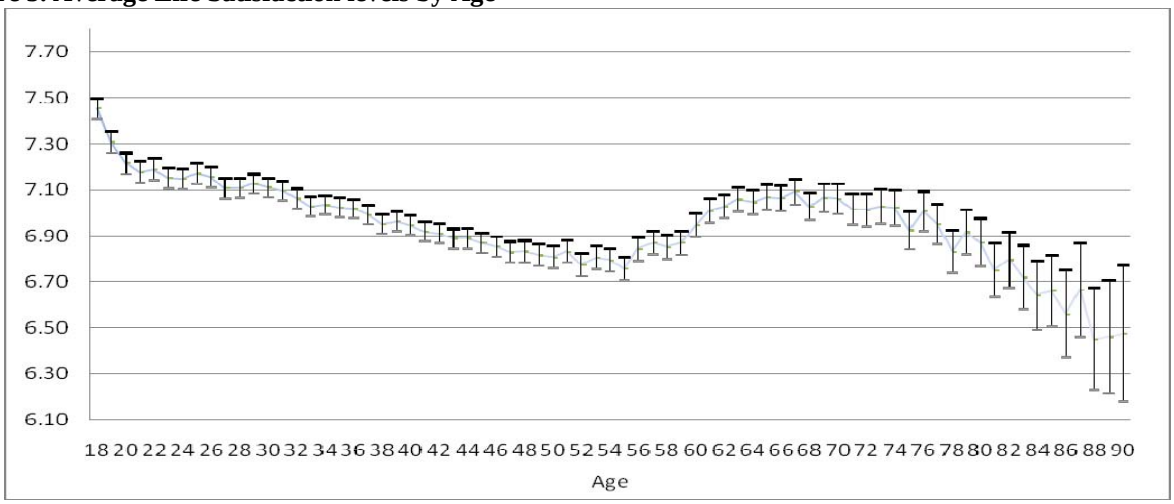

Figure 6. Average Leisure Satisfaction levels by Age

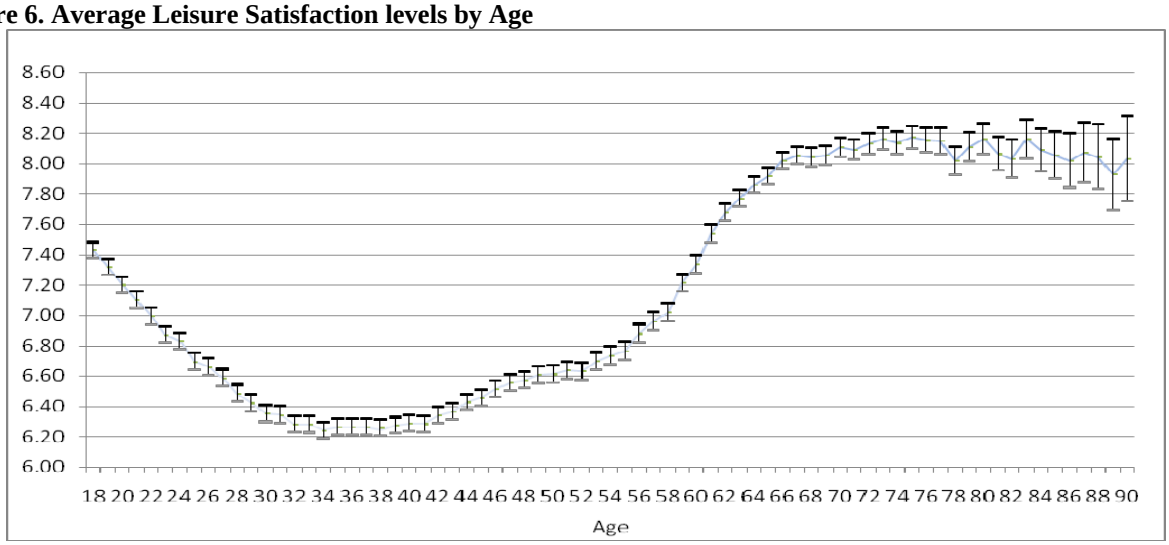

Table 1. The effect of relational goods on Life Satisfaction: GSOEP, 1984 – 2007 (fixed effects regression)

VARIABLES	Base	Base_Retired	Base_RTI	Retired_RTI	IV_2	IV_3
Dependent: LifeSat						
RTI			0.213***	0.213***	1.980***	1.539***
			(0.012)	(0.012)	(0.521)	(0.440)
Retired		0.133***		0.133***	0.100***	0.109***
		(0.023)		(0.027)	(0.028)	(0.027)
lgERHInc	0.216***	0.215***	0.229***	0.228***	0.206***	0.212***
	(0.013)	(0.013)	(0.015)	(0.015)	(0.016)	(0.015)
Unemp	-0.253***	-0.242***	-0.266***	-0.256***	-0.266***	-0.264***
	(0.020)	(0.020)	(0.024)	(0.024)	(0.024)	(0.023)
lossjob	-0.129***	-0.134***	-0.158***	-0.163***	-0.160***	-0.161***
	(0.024)	(0.024)	(0.029)	(0.029)	(0.032)	(0.031)
Emp	0.089***	0.109***	0.110***	0.131***	0.145***	0.141***
	(0.013)	(0.014)	(0.016)	(0.016)	(0.017)	(0.016)
Married	0.119***	0.122***	0.154***	0.157***	0.355***	0.305***
	(0.028)	(0.028)	(0.032)	(0.032)	(0.066)	(0.058)
getMar	0.256***	0.254***	0.232***	0.230***	0.215***	0.218***
	(0.024)	(0.024)	(0.031)	(0.031)	(0.034)	(0.033)
getSep	-0.320***	-0.320***	-0.307***	-0.308***	-0.328***	-0.323***
	(0.058)	(0.058)	(0.076)	(0.076)	(0.082)	(0.079)
Separated	-0.113**	-0.111**	-0.060	-0.059	0.145	0.094
	(0.055)	(0.055)	(0.063)	(0.063)	(0.089)	(0.081)
Divorced	0.079*	0.081*	0.103**	0.104**	0.324***	0.269***
	(0.045)	(0.045)	(0.050)	(0.050)	(0.081)	(0.072)
getDiv	-0.079*	-0.079*	-0.079	-0.079	-0.121*	-0.111*
	(0.045)	(0.045)	(0.057)	(0.057)	(0.063)	(0.061)
Widowed	-0.248***	-0.264***	-0.218***	-0.235***	-0.248***	-0.244***
	(0.057)	(0.057)	(0.062)	(0.062)	(0.056)	(0.054)
childHH	0.032***	0.032***	0.029***	0.029***	0.059***	0.051***
	(0.009)	(0.009)	(0.010)	(0.010)	(0.013)	(0.012)
nEdyear	0.016***	0.015***	0.017***	0.016**	0.033***	0.029***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.008)	(0.007)
Owner	0.069***	0.070***	0.069***	0.070***	0.065***	0.066***
	(0.016)	(0.016)	(0.018)	(0.018)	(0.018)	(0.017)
HospStay	-0.194***	-0.193***	-0.190***	-0.190***	-0.140***	-0.152***
	(0.010)	(0.010)	(0.013)	(0.013)	(0.020)	(0.018)
OccupDis	-0.283***	-0.294***	-0.259***	-0.270***	-0.233***	-0.242***
	(0.023)	(0.023)	(0.026)	(0.025)	(0.027)	(0.025)
WestDT	0.294***	0.294***	0.251***	0.252***	0.189***	0.206***
	(0.064)	(0.064)	(0.072)	(0.072)	(0.070)	(0.067)
Age17_19	-0.217	-0.210	-0.008	-0.001	0.189	0.142
	(0.210)	(0.210)	(0.253)	(0.253)	(0.275)	(0.264)
Age20_22	-0.332*	-0.325	-0.114	-0.107	0.103	0.051
	(0.202)	(0.201)	(0.243)	(0.243)	(0.266)	(0.255)
Age23_25	-0.299	-0.287	-0.116	-0.104	0.092	0.044
	(0.193)	(0.193)	(0.232)	(0.232)	(0.253)	(0.243)
Age26_28	-0.282	-0.265	-0.085	-0.069	0.124	0.076
	(0.184)	(0.184)	(0.221)	(0.221)	(0.241)	(0.231)
Age29_31	-0.228	-0.207	-0.037	-0.016	0.183	0.134
	(0.175)	(0.175)	(0.210)	(0.210)	(0.230)	(0.220)
Age32_34	-0.218	-0.193	-0.031	-0.007	0.147	0.109
	(0.166)	(0.166)	(0.200)	(0.199)	(0.215)	(0.207)
Age35_37	-0.191	-0.162	-0.038	-0.010	0.083	0.060
	(0.158)	(0.157)	(0.189)	(0.189)	(0.201)	(0.194)
Age38_40	-0.169	-0.137	-0.012	0.020	0.056	0.047
	(0.149)	(0.149)	(0.178)	(0.178)	(0.189)	(0.182)
Age41_43	-0.137	-0.100	-0.012	0.024	0.021	0.022
	(0.140)	(0.140)	(0.167)	(0.167)	(0.177)	(0.171)
Age44_46	-0.122	-0.082	-0.009	0.030	0.020	0.023
	(0.131)	(0.131)	(0.156)	(0.156)	(0.165)	(0.159)
Age47_49	-0.112	-0.067	-0.020	0.023	0.010	0.013
	(0.123)	(0.123)	(0.146)	(0.146)	(0.154)	(0.148)

Table 1. The effect of relational goods on Life Satisfaction: GSOEP, 1984 – 2007 (fixed effects regression) (follows)

Age50_52		-0.093	-0.046	-0.004	0.042	0.008	0.017
		(0.115)	(0.115)	(0.136)	(0.136)	(0.143)	(0.138)
Age53_55		-0.069	-0.020	-0.010	0.039	-0.025	-0.009
		(0.107)	(0.107)	(0.125)	(0.126)	(0.133)	(0.128)
Age56_58		0.040	0.089	0.067	0.114	0.022	0.045
		(0.098)	(0.098)	(0.115)	(0.115)	(0.123)	(0.118)
Age59_61		0.186**	0.221**	0.232**	0.264**	0.118	0.155
		(0.090)	(0.090)	(0.105)	(0.105)	(0.117)	(0.111)
Age62_64		0.321***	0.325***	0.348***	0.351***	0.144	0.196*
		(0.082)	(0.082)	(0.095)	(0.095)	(0.116)	(0.108)
Age65_67		0.407***	0.390***	0.428***	0.410***	0.145	0.211**
		(0.075)	(0.075)	(0.086)	(0.086)	(0.118)	(0.108)
Age68_70		0.371***	0.352***	0.378***	0.359***	0.075	0.146
		(0.067)	(0.067)	(0.077)	(0.077)	(0.114)	(0.103)
Age71_73		0.333***	0.318***	0.337***	0.322***	0.059	0.125
		(0.060)	(0.060)	(0.067)	(0.067)	(0.103)	(0.092)
Age74_76		0.268***	0.257***	0.291***	0.280***	0.052	0.109
		(0.052)	(0.052)	(0.060)	(0.060)	(0.089)	(0.080)
Age77_79		0.154***	0.146***	0.198***	0.191***	0.057	0.090
		(0.041)	(0.041)	(0.049)	(0.049)	(0.063)	(0.058)
Time dummy		Yes	Yes	Yes	Yes	Yes	Yes
	year 1992	0.811***	0.831***	0.765***	0.786***	0.702***	0.723***
		(0.054)	(0.054)	(0.063)	(0.063)	(0.071)	(0.067)
Constant		5.061***	4.994***	4.654***	4.589***		
		(0.141)	(0.141)	(0.163)	(0.164)		
Observations		271280	271280	179458	179458	172539	172538
F-first-excluded						32.40	28.25
R-squared		0.040	0.040	0.041	0.042	-0.167	-0.076
Number of ID		36250	36250	35818	35818	28899	28899
Hansen overidentification test						Chi-sq(1)=0.490 P-val= 0.4841	Chi-sq(2)=4.254 P-val = 0.1192
Davidson-MacKinnon test of exogeneity						F(1,143586) = 15.5466 P-value=8.1e-05	F(1,143585) = 11.18607 P-value= 8.2e-04

***Notes*:** Robust standard errors in parentheses, stars for significance levels: *** *p<0.01*, ** *p<0.05*, * *p<0.1*.Omitted age category: >79. IV estimates: RTI instrumented by sample and national retirement patterns. Instruments for **IV_2** regression: *QuotaAge* (share of retired individuals of the same age cohort in the sample at time t) and *QuotaAge_1* (share of retired individuals of the age cohort younger than one year in the sample at time t). Instruments for **IV_3** regression: *QuotaAge*, *QuotaAge_1* and *SexRetAvgAge*: national average retirement entrance age of the opposite sex, respecting the year and the regional location of the individual at time t.

Table 2. Robustness in subsample splits

	East	West	Women	Men	Occupational Disable	Not Occupational Disable	Unemployed	Not Unemployed
Base Retired								
Retired	0.250***	0.111***	0.064**	0.249***	0.291***	0.113***	0.271***	0.077***
	(0.047)	(0.027)	(0.032)	(0.034)	(0.054)	(0.025)	(0.062)	(0.025)
Observations	54231	217049	140233	131047	30269	241011	25184	246096
R-squared	0.037	0.041	0.037	0.046	0.045	0.033	0.035	0.037
Number of ID	7611	29115	18548	17702	6076	34720	8778	35142
Base RTI								
RTI	0.197***	0.212***	0.224***	0.205***	0.378***	0.176***	0.189***	0.215***
	(0.027)	(0.013)	(0.017)	(0.017)	(0.042)	(0.012)	(0.055)	(0.012)
Observations	37646	141812	92812	86646	19438	160020	17094	162364
R-squared	0.037	0.044	0.037	0.050	0.047	0.035	0.040	0.039
Number of ID	7546	28707	18337	17481	5651	34155	7859	34544
Base Retired RTI								
Retired	0.254***	0.111***	0.038	0.290***	0.274***	0.125***	0.300***	0.079***
	(0.058)	(0.031)	(0.037)	(0.040)	(0.064)	(0.030)	(0.088)	(0.029)
RTI	0.195***	0.212***	0.224***	0.204***	0.372***	0.176***	0.188***	0.215***
	(0.027)	(0.013)	(0.017)	(0.017)	(0.042)	(0.012)	(0.055)	(0.012)
Observations	37646	141812	92812	86646	19438	160020	17094	162364
R-squared	0.038	0.044	0.037	0.051	0.048	0.035	0.041	0.039
Number of ID	7546	28707	18337	17481	5651	34155	7859	34544
IV_3								
RTI	3.916**	0.600*	2.032***	1.865***	2.535***	1.256***	0.892	1.420***
	(1.609)	(0.361)	(0.764)	(0.460)	(0.905)	(0.465)	(1.725)	(0.433)
Retired	0.114	0.105***	-0.005	0.268***	0.148*	0.108***	0.292***	0.048
	(0.093)	(0.028)	(0.040)	(0.040)	(0.088)	(0.029)	(0.092)	(0.029)
Observations	36293	135987	89287	83251	17438	152585	13161	155156
Number of ID	6193	22882	14812	14087	3651	26721	3926	27337
R-squared	-0.684	0.033	-0.173	-0.139	-0.199	-0.047	0.020	-0.065
F-first-excluded	4.151	35.21	10.85	28.09	9.271	23.98	2.801	27.41

No*tes*: Sub samples are male vs. female, West vs. East Germans, Registered as unemployed vs. not registered, reporting occupational disability vs. not reporting. Robust standard errors in parentheses, stars for significance levels: *** *p<0.01,* ** *p<0.05,* * *p<0.1.* Omitted age category: >79. IV estimates: RTI instrumented by sample and national retirement patterns - QuotaAge: share of retired individuals of the same age cohort in the sample at time t; QuotaAge_1: share of retired individuals of the same age cohort in the sample at time t-1; *SexRetAvgAge*: national average retirement entrance age of the opposite sex, respecting the year and the regional location of the individual at time t.

Sources: for 1989 East German data: Reinberg A. et Hummel M. (1999), Bildung und Beschäftigung im vereinigten Deutschland, Nuremberg. For all other data: Verband Deutscher Rentenversicherungsträger (2006), Rentenversicherung in Zeitreihen, Frankfurt/M., p. 78

Table 3.a. Robustness check in alternative models: pooled regression with quadratic age specification (1) or age categories (2). Same controls as in the benchmark model with time dummies.

	All					Not			Not
Pooled 1	**sample**	**Women**	**Men**	**East**	**West**	**OccupDis**	**OccupDis**	**Unemp**	**Unemp**
Retired	0.171***	0.113***	0.330***	0.433***	0.152***	0.213***	0.155***	0.460***	0.121***
	(0.015)	(0.020)	(0.024)	(0.035)	(0.017)	(0.017)	(0.038)	(0.057)	(0.016)
Age AgeSquare	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	271280	140233	131047	54231	217049	241011	30269	25184	246096
Pooled 2									
Retired	-0.031*	-0.075***	0.121***	0.108***	-0.022	0.013	0.045	0.406***	-0.088***
	(0.017)	(0.023)	(0.028)	(0.041)	(0.019)	(0.020)	(0.039)	(0.057)	(0.018)
Age Categories	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	271280	140233	131047	54231	217049	241011	30269	25184	246096
Pooled 1									
RTI	0.429***	0.462***	0.400***	0.458***	0.419***	0.388***	0.708***	0.443***	0.423***
	(0.008)	(0.011)	(0.011)	(0.019)	(0.009)	(0.008)	(0.027)	(0.031)	(0.008)
Age AgeSquare	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	179458	92812	86646	37646	141812	160020	19438	17094	162364
Pooled 2									
RTI	0.414***	0.450***	0.384***	0.438***	0.405***	0.377***	0.678***	0.435***	0.411***
	(0.008)	(0.011)	(0.011)	(0.019)	(0.009)	(0.008)	(0.027)	(0.031)	(0.008)
Age Categories	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	179458	92812	86646	37646	141812	160020	19438	17094	162364
Pooled 1									
Retired	0.165***	0.112***	0.337***	0.414***	0.139***	0.200***	0.168***	0.428***	0.115***
	(0.018)	(0.024)	(0.030)	(0.042)	(0.021)	(0.020)	(0.047)	(0.069)	(0.019)
RTI	0.428***	0.461***	0.399***	0.454***	0.418***	0.386***	0.710***	0.440***	0.423***
	(0.008)	(0.011)	(0.011)	(0.019)	(0.009)	(0.008)	(0.027)	(0.031)	(0.008)
Age AgeSquare	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	179458	92812	86646	37646	141812	160020	19438	17094	162364
Pooled 2									
Retired	-0.013	-0.050*	0.148***	0.139***	-0.015	0.018	0.078	0.373***	-0.067***
	(0.021)	(0.028)	(0.034)	(0.048)	(0.024)	(0.024)	(0.048)	(0.070)	(0.022)
RTI	0.414***	0.449***	0.385***	0.439***	0.405***	0.377***	0.679***	0.433***	0.411***
	(0.008)	(0.011)	(0.011)	(0.019)	(0.009)	(0.008)	(0.027)	(0.031)	(0.008)
Age Categories	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	179458	92812	86646	37646	141812	160020	19438	17094	162364

Notes: Robust standard errors in parentheses, stars for significance levels: *** p<0.01, ** p<0.05, * p<0.1.
Omitted age category: >79.

Table 3.b. Robustness check in alternative models: fixed effect regression with quadratic age specification (1) or age categories (2). Same controls as in the benchmark model, no time dummies.

	All sample	Women	Men	East	West	Not OccupDis	OccupDis	Unemp	Not Unemp
Fixed Effect 1									
Retired	0.250***	0.168***	0.381***	0.410***	0.218***	0.231***	0.355***	0.273***	0.201***
	(0.017)	(0.024)	(0.026)	(0.040)	(0.020)	(0.020)	(0.047)	(0.067)	(0.019)
Age Age Squared	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	271280	140233	131047	54231	217049	241011	30269	25184	246096
Number of ID	36250	18548	17702	7611	29115	34720	6076	8778	35142
Fixed Effect 2									
Retired	0.117***	0.045*	0.237***	0.217***	0.097***	0.093***	0.281***	0.236***	0.060***
	(0.019)	(0.026)	(0.029)	(0.043)	(0.022)	(0.022)	(0.048)	(0.067)	(0.021)
Age Categories	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	271280	140233	131047	54231	217049	241011	30269	25184	246096
Number of ID	36250	18548	17702	7611	29115	34720	6076	8778	35142
Fixed Effect 1									
RTI	0.209***	0.220***	0.200***	0.218***	0.205***	0.176***	0.349***	0.192***	0.210***
	(0.010)	(0.014)	(0.014)	(0.024)	(0.011)	(0.011)	(0.039)	(0.057)	(0.011)
Age AgeSquared	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	179458	92812	86646	37646	141812	160020	19438	17094	162364
Number of ID	35818	18337	17481	7546	28707	34155	5651	7859	34544
Fixed Effect 2									
RTI	0.202***	0.214***	0.192***	0.198***	0.200***	0.171***	0.338***	0.191***	0.204***
	(0.010)	(0.014)	(0.014)	(0.024)	(0.011)	(0.011)	(0.039)	(0.057)	(0.011)
Age Categories	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	179458	92812	86646	37646	141812	160020	19438	17094	162364
Number of ID	35818	18337	17481	7546	28707	34155	5651	7859	34544
Fixed Effect 1									
Retired	0.253***	0.148***	0.425***	0.424***	0.218***	0.250***	0.340***	0.306***	0.206***
	(0.022)	(0.031)	(0.034)	(0.051)	(0.025)	(0.025)	(0.061)	(0.099)	(0.024)
RTI	0.207***	0.218***	0.197***	0.210***	0.203***	0.174***	0.340***	0.191***	0.208***
	(0.010)	(0.014)	(0.014)	(0.024)	(0.011)	(0.011)	(0.039)	(0.057)	(0.011)
Age Age Squared	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	179458	92812	86646	37646	141812	160020	19438	17094	162364
Number of ID	35818	18337	17481	7546	28707	34155	5651	7859	34544
Fixed Effect 2									
Retired	0.120***	0.021	0.283***	0.222***	0.101***	0.107***	0.275***	0.276***	0.066**
	(0.024)	(0.034)	(0.037)	(0.054)	(0.028)	(0.028)	(0.063)	(0.100)	(0.026)
RTI	0.202***	0.214***	0.192***	0.196***	0.200***	0.171***	0.333***	0.191***	0.204***
	(0.010)	(0.014)	(0.014)	(0.024)	(0.011)	(0.011)	(0.039)	(0.057)	(0.011)
Age Categories	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	179458	92812	86646	37646	141812	160020	19438	17094	162364
Number of ID	35818	18337	17481	7546	28707	34155	5651	7859	34544

Notes: Robust standard errors in parentheses, stars for significance levels: *** p<0.01, ** p<0.05, * p<0.1.
Omitted age category: >79

Table 4. The effect of relational goods on Life Satisfaction: GSOEP, 1984 – 2007 (ordered probit regression with Mundlak correction)

Variable	Base	Base Retired	Base RTI	Base Retired RTI	Fuzzy Retired	Fuzzy Retired Turn Around
lgERHInc	0.240***	0.269***	0.260***	0.260***	0.241***	0.258***
	(32.39)	(28.35)	(27.45)	(27.44)	(34.80)	(18.84)
Unemp	-0.347***	-0.345***	-0.350***	-0.347***	-0.344***	-0.230***
	(-22.66)	(-17.98)	(-18.48)	(-18.12)	(-21.91)	(-8.95)
lossjob	-0.024	-0.013	-0.011	-0.011	-0.015	-0.010
	(-1.34)	(-0.57)	(-0.48)	(-0.51)	(-0.85)	(-0.30)
Emp	0.087***	0.089***	0.094***	0.096***	0.101***	0.085***
	(9.61)	(7.55)	(8.22)	(8.19)	(10.76)	(4.46)
WestDT	0.168***	0.134***	0.134***	0.135***	0.140***	0.034
	(4.86)	(3.18)	(3.19)	(3.19)	(3.91)	(0.32)
Married	0.128***	0.133***	0.155***	0.155***	0.101***	0.215
	(7.32)	(5.98)	(6.99)	(7.00)	(5.77)	(1.94)
getMar	0.218***	0.194***	0.193***	0.193***	0.226***	0.091
	(11.08)	(7.72)	(7.67)	(7.66)	(11.43)	(1.48)
Separated	-0.137***	-0.161***	-0.141***	-0.140***	-0.170***	-0.158
	(-4.10)	(-3.84)	(-3.35)	(-3.34)	(-5.05)	(-1.28)
getSep	-0.182***	-0.121**	-0.121**	-0.121**	-0.177***	-0.108
	(-4.80)	(-2.50)	(-2.49)	(-2.50)	(-4.64)	(-1.36)
Divorced	0.054**	0.039	0.062	0.062	0.016	0.071
	(2.17)	(1.22)	(1.95)	(1.95)	(0.63)	(0.61)
getDiv	-0.067**	-0.051	-0.052	-0.052	-0.058	-0.042
	(-2.17)	(-1.26)	(-1.29)	(-1.29)	(-1.87)	(-0.54)
Widowed	-0.356***	-0.373***	-0.368***	-0.370***	-0.427***	-0.331***
	(-12.11)	(-9.93)	(-9.80)	(-9.83)	(-14.56)	(-2.90)
Nkid	0.098***	0.104***	0.105***	0.105***	0.108***	0.163***
	(17.91)	(14.98)	(15.07)	(15.08)	(20.06)	(10.80)
nEdYear	0.010***	0.008	0.009**	0.009**	0.007	-0.002
	(2.99)	(1.83)	(2.08)	(2.04)	(2.03)	(-0.18)
Owner	0.087***	0.092***	0.091***	0.091***	0.073***	0.089***
	(8.66)	(7.30)	(7.26)	(7.26)	(7.19)	(3.41)
HospStay	-0.135	-0.140***	-0.134***	-0.134***	-0.135***	-0.213***
	(-18.19)	(-14.72)	(-14.09)	(-14.09)	(-18.01)	(-16.35)
OccupDis	-0.335***	-0.357***	-0.345***	-0.347***	-0.337***	-0.312***
	(-29.27)	(-25.47)	(-25.03)	(-24.88)	(-28.94)	(-19.18)
Retired		0.013		0.015	0.027	0.080***
		(0.77)		(0.87)	(1.88)	(4.36)
RTI			0.229***	0.229***		
			(30.95)	(30.95)		

Table 4. The effect of relational goods on Life Satisfaction: GSOEP, 1984 – 2007 (ordered probit regression with Mundlak correction) (follows)

Variable	Base	Base Retired	Base RTI	Base Retired RTI	Fuzzy Retired	Fuzzy Retired Turn Around
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes
Dummy for 1992	0.044	0.015	0.045	0.045	0.096	0.135
	(2.75)	(0.92)	(2.75)	(2.74)	(7.27)	(5.44)
Age Categories	Yes	Yes	Yes	Yes	Yes	Yes
Mundlak correction terms	Yes	Yes	Yes	Yes	Yes	Yes
Constant						
Intercept term 1	-0.477	-0.516	-0.679	-0.664	0.032	0.196
	(-5.28)	(-5.17)	(-7.03)	(-6.77)	(0.28)	(1.13)
Intercept term 2	-0.155	-0.181	-0.343	-0.328	0.354	0.531
	(-1.73)	(-1.83)	(-3.57)	(-3.36)	(3.07)	(3.07)
Intercept term 3	0.319	0.298	0.140	0.154	0.828	1.007
	(3.56)	(3.02)	(1.46)	(1.59)	(7.19)	(5.84)
Intercept term 4	0.822	0.805	0.650	0.665	1.331	1.524
	(9.18)	(8.18)	(6.82)	(6.86)	(11.57)	(8.84)
Intercept term 5	1.228	1.210	1.056	1.071	1.736	1.962
	(13.71)	(12.29)	(11.08)	(11.06)	(15.09)	(11.38)
Intercept term 6	2.040	2.026	1.875	1.890	2.545	2.880
	(22.77)	(20.57)	(19.67)	(19.50)	(22.11)	(16.70)
Intercept term 7	2.565	2.553	2.403	2.418	3.071	3.447
	(28.63)	(25.91)	(25.19)	(24.94)	(26.67)	(19.98)
Intercept term 8	3.402	3.393	3.244	3.259	3.909	4.285
	(37.94)	(34.39)	(33.96)	(33.57)	(33.93)	(24.81)
Intercept term 9	4.692	4.688	4.540	4.554	5.200	5.650
	(52.19)	(47.36)	(47.37)	(46.77)	(45.05)	(32.63)
Intercept term 10	5.595	5.596	5.447	5.462	6.103	6.516
	(62.108)	(56.37)	(56.66)	(55.91)	(52.80)	(37.55)
Observations	241938	155468	155473	155468	238590	75998
Log likelihood	- 407413.3	-265596	-265127.65	-265119.59	-401462.89	-126994.87

***Note*: *Z* – statistics are in parenthesis, stars for significance levels : **<5%, ***<1%.
Mundlak correction terms are the averages over time of the socio demographic variables. Turn around: individuals aged from 50 to 70.

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Appendix

Table A1. Summary statistics and variable description

Variable		Mean	Std. Dev.	Min	Max	Observations
LifeSat	*individual response to the question about overall life satisfaction on a scale from 0 (completely dissatisfied) to 10 (completely satisfied)*					
	overall	7.01	1.84	0	10	N = 353572
	between		1.50	0	10	n = 44842
	within		1.29	-2.15	14.75	T-bar = 7.88484
lgERHInc	*logarithm of the real household income post government tax computed using the OECD equivalence scale which gives a value of 1 to the first household member, of 0.7 to each additional adult and of 0.5 to each child*					
	overall	4.86	0.57	-3.05	9.49	N = 365652
	between		0.55	-2.02	8.67	n = 47278
	within		0.33	-2.46	8.82	T-bar = 7.73408
Unemp	*dummy for being registered as unemployed the previous year*					
	overall	0.09	0.29	0	1	N = 350843
	between		0.22	0	1	n = 44625
	within		0.22	-0.85	1.05	T-bar = 7.86203
lossjob	*dummy for becoming unemployed during the previous year*					
	overall	0.03	0.18	0	1	N = 301181
	between		0.11	0	1	n = 37679
	within		0.16	-0.63	0.99	T-bar = 7.99334
Emp	*dummy for employment status, which takes the value of 1 if the individual is full-time employed. The base category is composed by the remaining employment status options: regular part time employment, vocational training, marginal employed, near retirement or zero working hours, military service, community service, disabled employed, not employed*					
	overall	0.60	0.49	0	1	N = 364507
	between		0.43	0	1	n = 46671
	within		0.29	-0.36	1.56	T-bar = 7.81014

Married	*dummy for being married*					
	overall	0.63	0.48	0	1	N = 358722
	between		0.47	0	1	n = 45137
	within		0.21	-0.33	1.59	T-bar = 7.9474
getMar	*dummy for becoming married*					
	overall	0.02	0.12	0	1	N = 308230
	between		0.07	0	1	n = 38416
	within		0.12	-0.48	0.97	T-bar = 8.02348
getSep	*dummy for being separated*					
	overall	0.01	0.08	0	1	N = 308230
	between		0.05	0	1	n = 38416
	within		0.07	-0.49	0.96	T-bar = 8.02348
Separated	*dummy for becoming separated*					
	overall	0.02	0.12	0	1	N = 358722
	between		0.10	0	1	n = 45137
	within		0.10	-0.90	0.97	T-bar = 7.9474
Divorced	*dummy for being divorced*					
	overall	0.06	0.24	0	1	N = 358722
	between		0.21	0	1	n = 45137
	within		0.12	-0.90	1.02	T-bar = 7.9474
getDiv	*dummy for becoming divorced*					
	overall	0.01	0.08	0	1	N = 308230
	between		0.05	0	1	n = 38416
	within		0.07	-0.49	0.96	T-bar = 8.02348
Widowed	*dummy for being widowed*					
	overall	0.06	0.24	0	1	N = 358722
	between		0.23	0	1	n = 45137
	within		0.10	-0.90	1.02	T-bar = 7.9474
childHH	*the number of children in the household*					
	overall	0.64	0.97	0	10	N = 374167
	between		0.87	0	8.29	n = 47850
	within		0.53	-6.47	6.56	T-bar = 7.81958
nEdyear	*number of years of education*					
	overall	11.48	2.58	7	18	N = 346801
	between		2.57	7	18	n = 43240
	within		0.72	2.04	20.05	T-bar = 8.02037
Owner	*dummy for being tenant or owner of the dwelling*					
	overall	0.46	0.50	0	1	N = 374167
	between		0.46	0	1	n = 47850
	within		0.23	-0.49	1.42	T-bar = 7.81958
HospStay	*dummy for overnight stay in hospital during the previous year*					
	overall	0.12	0.32	0	1	N = 328492
	between		0.21	0	1	n = 44517
	within		0.28	-0.82	1.07	T-bar = 7.37902

OccupDis	*dummy for being unable to work or severely handicapped*					
	overall	0.09	0.29	0	1	N = 374167
	between		0.23	0	1	n = 47850
	within		0.18	-0.85	1.05	T-bar = 7.81958
WestDT	*dummy for living in a Federal Land of the former West Germany*					
	overall	0.79	0.41	0	1	N = 374167
	between		0.40	0	1	n = 47850
	within		0.06	-0.17	1.73	T-bar = 7.81958
Retired	*dummy for being retired the previous year*					
	overall	0.20	0.40	0	1	N = 374167
	between		0.36	0	1	n = 47850
	within		0.20	-0.76	1.16	T-bar = 7.81958
QuotaAge	*ratio of retired over the sample population composed by people of the same age as the individual, by year*					
	overall	0.20	0.33	0	1	N = 374167
	between		0.32	0	1	n = 47850
	within		0.13	-0.60	1.00	T-bar = 7.81958
QuotaAge_1	*ratio of retired over the whole sample population composed by people of one year younger than the individual, by year*					
	overall	0.20	0.32	0	1	N = 374167
	between		0.25	0.00	0.92	n = 47850
	within		0.15	-0.71	0.96	T-bar = 7.81958
SexRetAvAge	*avarage retirement age by year, west and east germany and by opposite sex*					
	overall	60.17	0.91	57.4	61.7	N = 362040
	between		0.75	57.4	61.7	n = 47057
	within		0.53	56.96	63.06	T-bar = 7.69365
Age	*age of respondent*					
	overall	44.62	17.30	17	102	N = 372818
	between		18.26	17	102	n = 47213
	within		4.47	29.8	59.2	T-bar = 7.89651
Age17_19	*dummies for age group : 3 years*					
	overall	0.05	0.23	0	1	N = 372818
	between		0.26	0	1	n = 47213
	within		0.16	-0.70	1.01	T-bar = 7.89651
Age20_22	overall	0.05	0.22	0	1	N = 372818
	between		0.17	0	1	n = 47213
	within		0.18	-0.70	1.01	T-bar = 7.89651
Age23_25	overall	0.05	0.22	0	1	N = 372818
	between		0.16	0	1	n = 47213
	within		0.19	-0.70	1.01	T-bar = 7.89651
Age26_28	overall	0.05	0.23	0	1	N = 372818
	between		0.15	0	1	n = 47213
	within		0.20	-0.70	1.01	T-bar = 7.89651
Age29_31	overall	0.06	0.23	0	1	N = 372818
	between		0.15	0	1	n = 47213

	within		0.20	-0.69	1.01	T-bar = 7.89651
Age32_34	overall	0.06	0.24	0	1	N = 372818
	between		0.15	0	1	n = 47213
	within		0.21	-0.69	1.02	T-bar = 7.89651
Age35_37	overall	0.06	0.24	0	1	N = 372818
	between		0.15	0	1	n = 47213
	within		0.21	-0.69	1.02	T-bar = 7.89651
Age38_40	overall	0.06	0.24	0	1	N = 372818
	between		0.15	0	1	n = 47213
	within		0.21	-0.69	1.02	T-bar = 7.89651
Age41_43	overall	0.06	0.24	0	1	N = 372818
	between		0.15	0	1	n = 47213
	within		0.21	-0.69	1.02	T-bar = 7.89651
Age44_46	overall	0.06	0.23	0	1	N = 372818
	between		0.15	0	1	n = 47213
	within		0.21	-0.69	1.02	T-bar = 7.89651
Age47_49	overall	0.05	0.23	0	1	N = 372818
	between		0.14	0	1	n = 47213
	within		0.20	-0.70	1.01	T-bar = 7.89651
Age50_52	overall	0.05	0.22	0	1	N = 372818
	between		0.14	0	1	n = 47213
	within		0.19	-0.70	1.01	T-bar = 7.89651
Age53_55	overall	0.05	0.21	0	1	N = 372818
	between		0.13	0	1	n = 47213
	within		0.19	-0.70	1.01	T-bar = 7.89651
Age56_58	overall	0.04	0.21	0	1	N = 372818
	between		0.13	0	1	n = 47213
	within		0.18	-0.71	1.00	T-bar = 7.89651
Age59_61	overall	0.04	0.20	0	1	N = 372818
	between		0.13	0	1	n = 47213
	within		0.18	-0.71	1.00	T-bar = 7.89651
Age62_64	overall	0.04	0.20	0	1	N = 372818
	between		0.13	0	1	n = 47213
	within		0.17	-0.71	1.00	T-bar = 7.89651
Age65_67	overall	0.04	0.19	0	1	N = 372818
	between		0.12	0	1	n = 47213
	within		0.16	-0.71	1.00	T-bar = 7.89651
Age68_70	overall	0.03	0.17	0	1	N = 372818
	between		0.11	0	1	n = 47213
	within		0.15	-0.72	0.99	T-bar = 7.89651
Age71_73	overall	0.02	0.15	0	1	N = 372818
	between		0.11	0	1	n = 47213
	within		0.13	-0.73	0.98	T-bar = 7.89651
Age74_76	overall	0.02	0.14	0	1	N = 372818

	between		0.10	0	1	n = 47213
	within		0.12	-0.73	0.98	T-bar = 7.89651
Age77_79	overall	0.02	0.12	0	1	N = 372818
	between		0.09	0	1	n = 47213
	within		0.10	-0.73	0.97	T-bar = 7.89651

Note: N is the total number of observations; n is the total number of individuals; T is the number of waves.