The monetary-equivalent effect of voluntary work on mental wellbeing in Europe

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Voluntary work, health and subjective wellbeing: a resource for active ageing?

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Abstract

The hypothesis that active community involvement is beneficial for health finds strong support in the medical literature and in most policy guidelines for active ageing in OECD countries. We test it empirically documenting that lagged voluntary work is significantly correlated with later changes in various aggregated and disaggregated health indicators. However, when controlling for panel attrition, endogeneity and reverse causality, the positive effect of voluntary work remains robust only for a limited number of indicators. We calculate the monetary equivalent of health-related subjective wellbeing benefits of volunteer work with the compensating variation approach and compare it with benefits in terms of the social value of increased longevity.

Keywords: health satisfaction, voluntary work, life satisfaction, public health costs, active ageing.

JEL numbers: I12 *Health behavior*; I31 *General welfare, wellbeing*, J17 *Value of life*.

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1. Introduction

The hypothesis that active community involvement (and, more specifically, voluntary work) is beneficial for health has an established tradition. Community involvement is one of the main suggestions in policy guidelines for active ageing[1] formulated in most high income countries (see, among others, those of Australia, New Zealand, the US and UK in Hutchison et al., 2006). The rationale behind this policy is well explained by Watson (2001) who argues that "*Continued participation in the workforce, volunteering, community activities or family responsibilities contributes to the maintenance of mental capacity and a sense of wellbeing in older adults. This is a type of psychological capital or the extent to which the person can deal with threats to mental health – whether, for example, they can resist depression and anxiety when under stress. Individuals who have built up their psychological capital are resilient and able to cope with change and other stresses*."[2]

The idea of a nexus between other regarding activities and health outcomes is widely acknowledged in medicine and biology but still partially unexplored in economics. Empirical evidence in the first two disciplines is widespread (Post, 2005). Hunter and Lin (1980) compare retired individuals who volunteer with those who do not. They find that the former have significantly higher levels of self-declared life satisfaction and lower symptoms of anxiety, depression and somatization. A positive nexus between other regarding activities and life satisfaction is also found, among others, by Dulin and Hill (2003), Liang et al. (2001) and Morrow-Howell et al. (2003). Along this line of research Field et al. (1998) document that older

[1] According to the World Health Organisation (2002) definition '*Active ageing is the process of optimizing opportunities for health, participation and security in order to enhance quality of life as people age*' (World Health Organisation, 2002, pp. 12) where it is further clarified that "Activity" implies a '*continuing participation [of older people] in social, economic, cultural, spiritual and civic affairs, [and] not just the ability to be physically active or to participate in the labour force*' (ibid, pp. 12) and, still in a multidimensional perspective, the term health '*refers to physical, mental and social wellbeing*' (ibid, pp. 12).

[2] Watson, (2001 – p. 24)

adults volunteering with infants at nursery schools exhibit lowered stress hormones including salivary cortisol and plasma norepinephrine and epinephrine. The negative nexus between stress and health through cellular aging has been thoroughly investigated by biologists who document that psychological stress is associated with determinants of cell aging such as telomerase activity and telomere length. Epel et al. (2004) document that women with high levels of psychological stress live one decade less than those with low stress. Oman et al. (1999) follow over time a sample of 2,025 residents in California and find that those who volunteer have a 63 percent lower death probability than those who do not. Such probability falls to 44 percent after controlling for socio-demographic factors and objective and perceived health conditions.

Some of these studies help us to understand more in depth the channels through which volunteering may impact on health. Luks (1988)[3] provides evidence that volunteer activity generates the "helper's high" which is negatively correlated with the three big negative emotions - sadness/depression, fear/anxiety, and anger/hostility - which evoke the "fight-flight response".[4] The latter produces stress, aggressive and depressive emotions generating increasing exposure to diseases and negative health outcomes (Post, 2005). Midlarsky (1991) observes that the benefits of altruistic behavior for older adults mainly involve higher social integration and superior meaningfulness which imply higher eudaimonic life satisfaction, higher sense of efficacy and competence, health and active lifestyles which contrast the cultural pressure toward passivity. All these benefits are highly likely to impact directly on health status but also to reduce those depressive symptoms which may negatively affect health (Musick and Wilson, 2003).

[3] The research documents that two thirds of helpers report a distinct physical sensation in association to their action, 50 percent of them a "high" feeling, while a lower share experience, among others, a sense of being stronger and more energetic, warm, calmer and less depressed, experience greater self-worth and fewer aches and pains (Post, 2005).

[4] The fight–flight response is a well-known and documented biological defence mechanism by which human beings react to perceived dangers. The problem with health arises when the threat is not temporary but prolonged for an extended period. In such case the persistence of the fight-flight response may impact adversely the immune and cardiovascular system making individuals more susceptible to abnormal internal cellular processes and malignant cell degeneration (Sternberg, 2001).

In spite of the high consideration for community involvement among strategies for active ageing and the tradition of studies in the medical literature the hypothesis of its positive effects on health for the elderly has been only partially tested so far in the economic and social science literature.

In this paper we aim to bridge this gap. More specifically, we pick up one of the above mentioned dimensions of community involvement (voluntary work) and test (for the first time to our knowledge) its impact on health for a large sample of Europeans aged above 50.[5] The idea is novel since the existing empirical contributions have separately looked at the efffect of volunteering on subjective wellbeing (e.g., Brooks, 2006; Borgonovi, 2008; Meier and Stutzer, 2008; Becchetti et al. 2013; Binder and Freytag, 2013) and at the impact of health impairments on subjective wellbeing (e.g., among others, Binder and Coad, 2013 and Carrieri, 2012).

Our contribution is original in many other respects. First, using the SHARE dataset we analyse the impact of volunteer work on health at cross-country level[6] on a sample of Europeans aged above 50 with the goal of testing whether the above described predictions from medical and biological literature are correct on large scale. Second, with respect to the previous literature we exploit the time dimension of the data, correct for attrition bias and adopt an IV approach to control for endogeneity and reverse causality which are serious concerns when testing the links among volunteer work and health. Third, we calculate the shadow value of voluntary work in terms of health improvement with the compensating variation approach widely used in the empirical life satisfaction literature for valuing non-market goods like, among others, air pollution (Welsch, 2002 and Luechinger, 2009), terrorist activity (Frey et al., 2009), noise nuisance (van Praag and Baarsma, 2005) and flood disasters (Luechinger and Raschky, 2009).

[5] A more specific nexus between voluntary work and active ageing within community involvement has been advocated by Ehlers et al. (2011) who argue that volunteering is an active strategy which reduces social risk for the elderly where social risk is fuelled by poor social networks and family status. The latter may produce isolation and loneliness in aged people with poor access to social and health care services (Clemens and Naegele, 2004 and Hoff, 2008).

[6] More specifically SHARE observations comes from 19 countries (Austria, Germany, Sweden, Netherlands, Spain, Italy, France, Denmark, Greece, Switzerland, Belgium, Israel, Czech Republic, Poland, Ireland, Hungary, Portugal, Slovenia and Estonia).

Last but not least, we evaluate the economic significance of the volunteer work impact on health by comparing the monetary equivalent wellbeing effect with the foregone costs for the individual, for NHSs and the social value of increased longevity (Murphy and Topel, 2006).[7]

Our main results document that carrying out voluntary work at a given point in time is positively and significantly correlated with later changes in several health indicators. A consequence of our findings from the individual point of view is that doing voluntary work contributes to active ageing and is a rational maximizing choice even though the volunteer effort is not compensated by a monetary reward. In this sense our paper also contributes to the literature that investigates the determinants of people's decision to volunteer. As is well known, pro-social preferences[8] are important to explain the "anomaly" of volunteer work, that is, the choice for individuals who decide to "work for nothing" (Freeman, 1997) by putting their productive effort at the service of a cause without asking monetary compensation in exchange. This is because one of the most plausible rationales for explaining the anomaly is that volunteering for an ideal cause which satisfies pro-social preferences and intrinsic motivations is a substitute for extrinsic motivations satisfied by a monetary reward. Even though several non other-regarding rationales of volunteer work exist such as investment in human capital (see, among others, Devlin, 1998) or the desire to signal cooperative attitudes which may positively affect future job opportunities (Katz and

[7] The evaluation of the economic significance of our findings is of particular policy relevance today in the light of the emergence of new financial instruments which start being used to finance private provision of public goods and services such as social impact bonds (Reeder et al. 2012). The more innovative and original characteristic of social impact bonds is their variable interest payment. If the NGO financed by the social impact bond is successful in producing a public good or service part of the money saved by the government is transferred with additional interest payments to investors and this increases attractiveness for financial investors. The crucial factor for the applicability and success of these schemes is the presence of an outcome which is clearly measurable and on whose measure counterparts fully agree. This is why so far the first social impact bonds have been conceived and/or devised in two specific segments where measurability is easier (reduction of jail recidivism, reduction of early school abandonment). An improvement in techniques for measuring welfare benefits of other social actions is therefore urgently needed to broaden the scope of action of such instruments or, more generally, to give policymakers a clear idea in monetary terms of the wellbeing impact of activities which have positive impact such as volunteer work.

[8] The investigation of the manifold aspects which help us to provide a richer picture of preferences and motivations of human beings is one of the most fascinating frontiers of current economic research. Behavioural economics has so far identified several well established sources of (intention or distribution based) pro-social preferences documenting the role and importance, among others, of inequity aversion (Fehr and Schmidt, 1999), pure or impure altruism (Andreoni, 1989 and 1990), betrayal aversion (Bohnet and Zeckhauser, 2004, Bohnet et al., 2008), guilt aversion (Charness and Dufwenberg, 2006) and reciprocity (Fehr and Gächter, 1998) as drivers of economic choices.

Rosenberg 2005),[9] many of them (including the two mentioned above) can be hardly applied to the case of voluntary work of aged individuals, most of which are retired, as it occurs in our sample. What we argue in our paper is that volunteer work contributes to active ageing and as such, it may produce significant health benefits thereby providing an additional explanation to the volunteering puzzle.

The paper is divided into five sections (introduction and conclusions included). The second section provides descriptive findings. The third section illustrates our econometric results on the impact of volunteer work on various health indicators. The fourth section looks at the economic significance of our findings. The fifth section concludes.

2. The database description and descriptive findings

We use survey data from the waves of the Survey of Health, Ageing and Retirement in Europe (SHARE) containing information on health, socio-economics and social networks. Variable legend is provided in Table 1a, while in Tables 1b-1c we provide descriptive statistics for our sample. The total number of observations for variables without missing values is 105,101.[10] The sample is almost perfectly balanced by gender (55.8 percent females) (Table 1c). The average number of education years is 10.4, 70 percent of the interviewed individuals are married while, consistently with sample age, a quite large share is widowed (14.4 percent). The average number of children is about 2, while the average number of grandchildren is around 3. Around 15 percent of sample respondents carried out voluntary/charity work in the last month (variable *Voluntary*). The average level of life satisfaction is 7.68 and the distribution of the variable is right skewed

[9] The rationale here is that most human interactions in the society or at the workplace take the form of social dilemmas (similar to prisoner's dilemmas or trust games (Berg et al., 1989)) where cooperative attitudes produce superior productive outcomes vis-à-vis non cooperative attitudes.

[10] The number will be considerably reduced in our dynamic estimates due to the loss of the initial year and the missing observations in several control variables.

consistently with almost all the empirical evidence in this field. 52 percent of individuals in the sample are retired.

Table 1b provides as well descriptive statistics for four categories of health indicators.

A first group of synthetic indicators and functionality indexes includes: i) health (un)satisfaction (*health_insat*), which is a categorical variable proxying for the respondent's self-perceived health status and ranging from 1 (excellent) to 5 (poor); ii) the CASP score (*casp*) which measures quality of life; [11] iii) the Activities of Daily Living indicator (ADLA);[12] iv) the Instrumental Activities of Daily Living indicator (IADLA);[13] v) a cognitive function index (*n_wordsrecalled*);[14] vi) a mobility index (*mobilityind*) ;[15] vii) a numeracy score (*numeracy*); viii) a (0/1) dummy taking value of one if the individual reports long-term health problems, illnesses, disability or infirmity (*longtermillness*).

A second group of specific illnesses includes the following (0/1) dummies taking value one if the individual experiences: i) heart attack including myocardial infarction or coronary thrombosis or any other heart problems including congestive heart failure (*heartattack*); ii) high blood pressure or hypertension (*hypertension*); iii) high blood cholesterol (*highbloodcholesterol*); iv) stroke or cerebral vascular disease (*stroke*); v) diabetes or high blood sugar (*diabetes*); vi) chronic lung disease such as chronic bronchitis or emphysema (*chroniclungdisease*); vii) asthma (*asthma*);

[11] The CASP-12 is a psychometrically validated shorter version of the original 19-item version (CASP-19) (Hyde et al., 2003) and is a self-assessed index built on a 12-item questionnaire. It is based on four subscales of control, autonomy, pleasure and self-realization (CASP score is the sum of these four subscales and ranges from 12 to 48). Healthier individuals have higher values.

[12] The ADLA indicator is the sum of answers provided on the self-assessed ability of performing the following tasks: dressing, bathing or showering, eating and cutting up food, walking across a room and getting in or out of bed. The higher the index, the more the difficulties with these activities and the lower the respondent's mobility. The ADLA indicator ranges from 0 to 5.

[13] The Instrumental Activities of Daily Living Indices (IADLA) indicator is the sum of answers provided on the self-assessed ability of performing the following tasks: telephone calls, taking medications and managing money. The higher the index, the more the difficulties with the activities and the lower the mobility of the respondent. IADLA ranges from 0 to 3.

[14] The test consists in providing a list of ten words and asking after a given time the number of words recalled by the respondent.

[15] The mobility index is the sum of answers provided on the self-assessed ability of performing the following tasks: walking 100 metres, walking across a room, climbing several flights of stairs and climbing one flight of stairs. The higher the index, the lower the respondent's mobility.

viii) arthritis, including osteoarthritis, or rheumatism (*arthritis*); ix) osteoporosis (*osteoporosis*); x) cancer or malignant tumour, including leukaemia or lymphoma, but excluding minor skin cancers (*cancer*); xi) stomach or duodenal ulcer, peptic ulcer (*ulcer*); xii) Parkinson disease (*Parkinson*); xiii) cataracts (*cataracts*); xiv) hip fracture or femoral fracture (*femoralfracture*); xv) other conditions, not yet mentioned (*otherconditions*).

A third group of symptom indicators includes the following (0/1) dummies taking value one if the individual is bothered by: i) pain in the back, knees, hips or any other joint (*joint pain*); ii) heart trouble or angina, chest pain during exercise (*hearttrouble*); iii) breathlessness, difficulty breathing (*breathlessness*); iv) persistent cough (*persistentcough*); v) swollen legs (*swollenlegs*); vi) sleeping problems (*sleepingproblems*); vii) falling down (*fallingdown*); viii) fear of falling down (*fearoffallingdown*); ix) dizziness, faints or blackouts (*dizziness*); x) stomach or intestine problems, including constipation, air, diarrhoea (*stomachorintestine*).

Synthetic descriptive evidence on health variables documents that only 27.8 percent of respondents report no symptoms of whatever kind of illness. More than half declare to suffer from some form of pain while around 21 percent from sleeping problems. 34.4 percent suffer from high blood pressure or hypertension and 21 percent from high cholesterol. Around 4.8 percent of our sample of Europeans aged above 50 declare to have a cancer. The average number of doctor visits per year in the sample is 6.7.

Those who volunteer report a significantly lower number of doctor visits per year (5.45 against 6.85) and better outcomes in terms of functionalities (5.70 words recalled against 4.94 and better results in terms of numeracy scores and mobility indicator). They also register in a significantly lower proportion high blood pressure or hypertension (30 percent against 35 percent) and report in a smaller proportion sleeping problems (19.2 percent against 22.3 percent). From a dynamic point of view volunteers register a significantly higher improvement in cancer transitions and enhance their positive distance in terms of functionalities. More specifically, among those who

reported cancer in the previous period those who volunteered in the same previous period have a 5 percent higher probability of not reporting it in the following period; conversely, among those who have not cancer in the previous period those who volunteered in the same previous period have a 10 percent lower probability of contracting cancer in the period which follows (30 percent lower if we restrict the sample to retired individuals). As it can be imagined however probabilities in these decomposed transitions are small since only 4.8 percent of the sample respondents report cancer in the sample and the risk of contracting whatever form of cancer on a median follow-up of 42 months is 7 per 1,000 individuals. More specifically on this point the relative risk of contracting cancer for those who did not volunteer in the previous period vis-à-vis those who did is 1.95 which raises to 2.25 if we restrict the sample to retired workers, while odds ratios for the probability of recovering are 2.08 and 1.97 respectively. Given to the small transition probabilities, differences between volunteers and non volunteers need to be studied by aggregating all transitions (entry and permanence into, exit from illness) together. In the section which follows we will check whether the observed descriptive evidence is robust when controlling for concurring factors, attrition bias and whether it hides plausible causal relations.

3. Econometric findings

The main hypothesis we want to test in this study is whether voluntary work at a given point in time affects later changes in health status. In order to provide empirical evidence on this hypothesis we exploit the time dimension and the rich information on health status in our sample and regress changes in the different health indicators considered on their lagged levels and the lagged dichotomous choice of voluntary work. The use of health indicators as dependent variables expressed in first differences reduces the concerns of measurement errors in the health indicator, while the introduction of a lagged voluntary work dichotomous variable as our key dependent variable gives support to the (direct) causal interpretation of the link between

voluntary work and health status. Furthermore, the lagged health indicator among regressors captures the initial health conditions that may influence both later health changes and the contemporaneous decision to volunteer. The remaining endogeneity concerns will be dealt with in the subsection 3.2 with an IV approach.

Based on what considered above our benchmark econometric specification is

$$\begin{aligned}\Delta Health\_indicator_{i,t} &= \alpha + \beta Ln\_Income_{i,t-1} + \gamma \Delta\, Ln\_Income_{i,t} + \sum_{k=1}^{K} \delta_k\ Socio\_Dem_{i,t-1} \\ &+ \xi\, Voluntary_{i,t-1} + \sum_{l=1}^{L} \lambda_l\ DShocks_{i,t} + \ \mu\, Health\_indicator_{i,t-1} \\ &+ \sum_{v=1}^{V-1} \chi_v\ DInt\_Year_{i,v} + \sum_{g=1}^{G-1} \kappa_g\ DCountry_{i,g} + \varepsilon_{i,t}\end{aligned} \tag{1}$$

where $\Delta Health\_indicator_{i,t} = Health\_indicator_{i,t} - Health\_indicator_{i,t-1}$ is the first difference of our health variable extracted - in alternative specifications - from the three typologies of health variables described in the previous section (synthetic indicators and functionality indexes, specific illnesses, symptom indicators).

The impact of voluntary work in the previous wave on changes in health is captured by the variable $Voluntary\_Work_{i,t-1}$. *Socio_Dem* includes previous-wave socio-demographic characteristics (i.e. gender, age, schooling years, employment and marital status, body mass index, number of children and grandchildren) as well as information on sport, alcohol and smoking habits. *Ln_income* is the natural logarithm of the respondent's per capita total household income while ΔLn_Income captures its changes across waves.[16] *DShocks* is a set of *L*-dummy

[16] As is well known the SHARE dataset suffers from missing value problems for variables like income. We address this problem with a commonly used solution, i.e. using imputed values for the variables of interest for our analysis which are available as supplementary datasets at the SHARE website. More specifically, as suggested by Christelis (2011), we use the dataset where the missing information is imputed with Fully Conditional Specification method (FCS) (Van Buuren et al., 2006). In brief, this method generates a distribution for the missing value of a given variable conditional on the non-missing values of other variables in the dataset. This procedure generates five

variables equal to one if between the previous and the current wave the respondent reports a change in marital status (variable *gets_divsep*) and employment status (variables *gets_retired*, *gets_unemployed*), improves in the frequency of vigorous physical activities (*improvesport*), reduces alcohol consumption (*reducedrinking*), becomes grandmother/grandfather (*getsgrandchildren*). We also control for asynchronous survey administration in each wave by introducing interview-year dummies (*DInt_year*) as well as country fixed effects (*DCountry*).[17] In order to address sample heterogeneity in initial conditions that can affect both later health chances and decision to volunteer, we also control for the lagged level of the dependent variable ($Health\_indicator_{i,t-1}$).[18]

Results presented in column 1 of Table 2 document that voluntary activities are significantly correlated with various health indicators. More specifically, we find that lagged voluntary work has significant effects on changes in: i) health insatisfaction (*health_insat*) (negative);[19] ii) instrumental activities of daily living indexes (*IADLA* indicator) (positive); iii) performance in the word recall task (*n_wordsrecalled*) (positive); iv) cancer (*cancer*) (negative); v) sleeping problems (negative); vi) other conditions (positive).

Among the relevance of other controls in the above described regressions[20] we find, as expected, that drinking and smoking habits, being overweight/obese and vigorous physical activities affect health indicators in the expected direction. The relevance of gender on health conditions is as

imputed datasets (one for each iteration) which are downloadable from the SHARE website. The imputed variables used in our study are *number of children, ln_income* and *number of grandchildren*. For these variables, each respondent displays five different values but for simplicity we consider an average of them across the five datasets.

[17] Our sample countries (not dropped by missing variables among those included in the estimates) are Austria, Germany, Sweden, Netherlands, Spain, Italy, France, Denmark, Greece, Switzerland, Belgium, Poland and Czechia.

[18] Collinearity problems may arise from the correlation between health and voluntary work indicators on the right-hand side in (1) since they are both measured at *t-1*. This concern will be indirectly addressed in the IV simultaneous-equation estimation where in the first stage lagged voluntary work is regressed on a set of instruments and socio-demographic and economic controls including also the lagged level of the relevant health indicator (see subsection 3.2).

[19] The importance of the effect of voluntary work on self-assessed health should not be neglected. Crivelli et al. (2014) remember that this subjective variable is a good predictor of mortality, morbidity and functional limitations (Benjamins et al. 2004; Idler and Benyamin, 1997; Ferraro and Farmer 1999; McDonough and Amick 2001 and Jylha 2009). Interestingly enough the impact of such variable on health conditions remains also after controlling for objective health measures. Note as well that, since self-assessed life satisfaction is extremely sensitive to culture and norms, the inclusion of country effects in our multicountry panel is extremely important.

[20] Full estimation results are reported in Tables A1a-A3a in the Appendix.

well confirmed on almost all indicators with women being relatively less likely to contract most of the specific illnesses. Similarly, years of education are significantly and negatively associated to the probability of getting many diseases. Education years have as well a significant and negative correlation with changes in almost all symptoms indicators. The impact of education years on changes in health satisfaction and composite indicators (CASP, IADLA, ADLA mobility index, world recalled and numeracy) are as well all strongly positive and significant.[21] Country effects are almost all significant and capture a combination of factors including local components (climate, diet), residence factors and the efficiency of National Health Systems.[22]

3.1 Attrition correction and robustness checks.

Panel attrition, especially when dealing with health issues, can lead to biased estimates due to the worsening of health conditions and/or the death of respondents. Not accounting for attrition would lead to biased estimates of the true impact of voluntary work on health indicators if the latter are themselves among the drivers of attrition. We control for it by weighting observations in all the previous regressions with the inverse of their estimated attrition probability.[23] Results - summarized in Table 2, column 2 - show that the effect of lagged voluntary work remains robust (and is highly statistically significant) only for changes in the number of words recalled, cancer

[21] For the interpretation of the impact of schooling years on health and its theoretical underpinnings (i.e. the productive and the allocative model) see, among others, the extensive survey of the vast literature on health and education by Grossman (2006).

[22] A valuable reference for the calculation of the quality of national health systems is Paris et al. (2010).

[23] The attrition model is estimated as follows

$A_{i,t}=\alpha+\sum_{k=1}^{K}\beta_k\ Sociodem_{i,t}+\gamma\ noconditions_{i,t}+\delta\ nosymptoms_{i,t}+\sum_{v=1}^{V-1}\chi_v\ DInt\_Year_{i,v}+\sum_{g=1}^{G-1}\kappa_g\ DCountry_{i,g}+\epsilon_{i,t}$,where $A_{i,t}$ is a dummy variable = 1 if the respondent is not in the panel for at least 2 waves, *Sociodem* is a set socio-demographic and economic controls including gender, age, education years, employment and marital status, number of children and grandchildren, smoking, drinking and doing vigorous physical activity, income and a dummy for the overweight or obese condition; *nocondition* and *nosymptoms* are dummy variables equal to one if the respondent reports not having specific illnesses or symptoms respectively. Gender (female), number of grandchildren and the *nocondition* variable negatively influence attrition while being divorced/separated, doing sport activities infrequently and lack of symptoms are positively correlated with it. An approach similar to ours on the attrition weighting procedure is also followed, among others, by Raab et al. (2005), Nicoletti and Peracchi (2005) and Vandecasteele and Debels (2007).

and sleeping problems.[24] For this reason, we will consider only these three health indicators for the robustness checks we implement below.

As an additional robustness check we re-estimate the model in column 2 of Table 2 by restricting the sample to the respondents at higher risk of social exclusion (i.e. widowed, separated, divorced, retired or without grandchildren). Results are summarized in Table 3, column 3. As expected, for these respondents social involvement through voluntary work plays a more sizable role on later changes in health, especially on cancer and cognitive ability (*n_wordsrecalled*). Furthermore, in order to reduce the omitted variable bias arising from family background variables (see Braakman, 2010), we report in column 2 of Table 3 results from the re-estimation of the model in column 2 of Table 2 with the introduction of two variables proxying for parent's investment in children (i.e. the number of books when ten, *n_books_at10* and the relative position to others mathematically when ten, *mathpos_at10*). Previous results are robust also to this check. Finally, we re-estimate model in column 2 (Table 2) restricting the sample only to retired respondents and find that our main findings apply as well for this subsample (Table 3, column 4). This confirms what considered in the introduction about the invisible gains in voluntary work which provide a further rationale for this activity when pursued by those (retired individuals) who do not have potential strategic motivations behind volunteering such as improving the chances to find a new job, expanding the business network, etc.

3.2 IV results

As is well known when finding a significant econometric relationship between a regressor and a dependent variable what must be investigated is whether the observed direct causal link conceals a reverse causal path or endogeneity with third unobserved factors driving the correlation between the two observed ones.

[24] Full estimation results are reported in Tables A1b-A3b in the Appendix.

First differencing the dependent variable and correcting for its lagged level reduce the concerns about measurement errors in health indicators; considering the lagged (and not contemporaneous) decision to volunteer as a regressor reduces reverse causality even though it cannot eliminate by itself the suspicion of endogeneity in voluntary work. The latter may be induced an unobserved (e.g. a personality trait) which may lead individuals to perform volunteer work and affect at the same time the observed changes in health indicators.[25] Along this line, pro-sociality may well be assumed as driving both the decision to volunteer and a positive attitude by which individuals register a significantly lower deterioration of their health satisfaction (may be because they adapt more to ageing). However, if the above mentioned personality trait is assumed to be time invariant,[26] it automatically cancels out when using first difference estimates as we do. Given what said above, even controlling for a large set of observed individual characteristics and for their heterogeneous initial health conditions, we cannot completely rule out unobserved endogeneity arising from the non-random decision to volunteer. For this reason, we implement an IV estimation of the specifications in column 1 of Table 2 (and Tables A1a-A3a in the Appendix) in which voluntary work is robust to attrition. In particular, the IV strategy we adopt can be summarized by the following set of equations

$$Voluntary_{i,r,t-1} =$$

$$\zeta + \xi\, \overline{Voluntary\_Work}_{-i,r,t-1} +$$

$$+ \theta\, \overline{Voluntary\_Work}_{i,-r,t-1} + \mu\, Health\_indicator_{i,r,t-1} +$$

$$+ \sum_{m=1}^{M} \delta_m\ Socio\_Dem_{i,r,t-1} + \eta_{i,r,t} \qquad (2a)$$

$$\Delta Health\_indicator_{i,r,t} =$$

$$\alpha + \beta LnIncome_{i,r,t-1} + \gamma \Delta\, LnIncome_{i,r,t} +$$

[25] As observed by Braakman (2010) the underlying omitted drivers may be also parental or family background, parental investments into their children or differences in non-cognitive traits or time preferences.

[26] The assumption of a rather stable or time invariant unobserved personality trait (i.e., for instance, pro-sociality) is not completely implausible given the age composition of our dataset.

$$+\sum_{k=1}^{K}\delta_k\ Sociodem_{i,r,t-1} + +\xi\ \widehat{Voluntary}_{i,r,t-1} +$$

$$+\sum_{l=1}^{L}\lambda_l\ DShocks_{i,r,t} + \mu\ Health\_indicator_{i,r,t-1}\ +$$

$$+\sum_{v=1}^{V-1}\chi_v\ DInt_{Year}{}_{i,r,v} + \sum_{g=1}^{G-1}\kappa_g\ DCountry_{i,r,g} + \varepsilon_{i,r,t}$$

(2b)

where equations (2a) and (2b) represent respectively the first and second stage of our IV estimation. We instrument $Voluntary_{i,t-1}$ in (1) with two variables: i) $\overline{Voluntary\_Work}_{-i,r,t-1}$, i.e. the share of respondents who carried out voluntary work activities in the *i*'s own region *r,* with *i*'s voluntary work status being excluded from the computation of the average, and ii) $\overline{Voluntary\_Work}_{i,-r,t-1}$ i.e. the share of respondents who carried out voluntary work activities in the *i*'s neighbouring region -*r*. In case of multiple neighbours we use a weighted average of $Voluntary_{i,t-1}$ for each of the *i*'s neighbouring region, with the weights equal to the length of the shared border.[27]

Our identification approach can be framed in the literature of peer effects and/or social conformity by interpreting $\overline{Voluntary\_Work}_{-i,r,t-1}$ as intra-group and $\overline{Voluntary\_Work}_{i,-r,t-1}$ as out-group effects which are equal to the average of the responses across all 'neighbouring' groups/regions but *i*'s one. Extending the work by Cohen-Cole (2006) and Corrado and Fingleton (2012) we are therefore able to identify the potentially endogenous

[27] More specifically, the instrumental variables have been derived by choosing the second level of the NUTS (Nomenclature of Territorial Units for Statistics) subdivision as the basic unit of the calculation. Records with missing information at both second and third NUTS levels were discarded. In some cases, information at first (Germany) or third (Denmark and Estonia) level was used to replace missing values at second NUTS level. The variable is built by using the GIS (Geographic Information System) framework: for each record, we identified the adjacent NUTS to the residence; we then calculated the lengths in km of the shared boundaries between the residence NUTS and each of the adjacent ones; subsequently, we averaged the values of the corresponding non-instrumental parameter detected in each adjacent NUTS using the respective length of the shared boundary as a weight. For non-neighbours NUTS (i.e. islands), we considered the value of the instrumental variable detected in the closest NUTS. Assuming routes within the same nation as more likely than international ones, adjacent or closest NUTS belonging to the respondent's nation received a 75% more weighted value in the calculation of the mean. To generate the instrumental variable, we used cartographical data provided by "Eurostat". Since some countries changed names, number and geographic boundaries of their NUTS during the time period considered here, two sets of cartographical data were used, i.e. the administrative units of 2003 (for Greece, Italy, Denmark, Estonia, Sweden and Germany) and of 2010 (for the other countries). All the analyses were performed using the R 3.1.1 software and the add-one packages "maptools", "rgeos", "spdep" and "doParallel". For the use of geographical aggregates as internal instruments see also Aslam and Corrado (2012).

effect in equation $\overline{Voluntary\_Work}_{-i,r,t-1}$ (2a) taking into consideration interdependencies not only within groups but also between groups, where a group is defined by individuals living in a specific region *r*. It is clear from (2a) that we can identify the key parameter in the structural equation if the number of individuals is larger than the number of regions (which is our case) and if some agents in a given region are affected in their decision to volunteer by the share of volunteers in other surrounding regions.[28]

We believe in the relevance of our instrument since it is reasonable to think of intra and inter group behaviour as being highly correlated with individual behaviour – due to, for instance, contagion, peer effects and/or social conformity. We also believe our exclusion restriction is valid, since it is plausible for the chosen instruments to affect changes in health indicators only through $Voluntary_{i,t-1}$ and not through other unobservable variables.[29]

The simultaneous estimation of equations (2a) and (2b) with the introduction of the lagged health indicator also in the first stage (2a) is aimed at accounting for i) heterogeneity in volunteering decisions on the basis of personal health status at *t-1*, and ii) the possible multicollinearity problem in (1) between lagged voluntary work and lagged health indicator.

Full estimation results for both equations are reported in Table A4 in the Appendix but summarized in column 1 of Table 3 for the health indicators of interest. Except for performance in the word recall task (*n_wordsrecalled*), the effects of lagged voluntary work on sleeping problems and cancer remain significant also under this IV robustness check.

4. Monetizing the impact of voluntary work on health

[28] Note also that the possible reverse causality caused by the individual behaviour, $Voluntary_{i,r,t-1}$, affecting the own group, $\overline{Voluntary\_Work}_{-i,r,t-1}$, is attenuated since we exclude the *i*-th individual from the computation of the latter.

[29] Note that $\overline{Voluntary\_Work}_{i,-r,t-1}$ is not significant when added as a control in the specifications in Table 2.

To evaluate the economic significance of our findings we calculate the associated compensating surplus, following the standard approach used in the literature measuring the value of non-market goods based on happiness data (see Welsch, 2002, Luechinger, 2009, Frey et al., 2009, van Praag and Baarsma, 2005 and Luechinger and Raschky, 2009).

The starting point of this approach consists in the OLS estimation of the following life satisfaction equation

$$Life\_Sat_{i,t} = \alpha + \sum_{j=1}^{J} \beta_s \; Health\_indicator_{i,j,t} + \sum_{k=1}^{K} \gamma_k \; Socio\_Dem_{i,k,t} + \delta \; Ln\_Income_{i,t} + \xi \; Voluntary_{i,t} + \sum_{l=1}^{L} \lambda_l \; DSymptoms_{i,l,t} + \sum_{v=1}^{V} \chi_v \; DInt\_Year_{i,v} + \sum_{g=1}^{G} \kappa_g \; DCountry_{i,g} + \varepsilon_{i,t} \quad (3)$$

where *Life_sat* is the standard measure of life satisfaction ranging from 0 to 10 which will be considered as a proxy of individual's utility while as in (1) *health_indicator* is a set of *J* health proxy variables consisting of - in alternative specifications - composite health indices, functionalities, dummy variables for specific illnesses reported by the respondent. *DSymptoms* are a set of dummy variables for the individual's reported symptoms while *Socio_Dem* includes socio-demographic characteristics and vigorous activity, alcohol and smoking habits (see Table 1). We also control for the direct effect of voluntary work (*voluntary*) on life satisfaction as well as for the respondent's per capita total household income (*Ln_Income*), interview-year (*DInt_year*) and country (*DCountry*).

Results from these estimates are those expected and are reported in details in Table A6 in the Appendix. Voluntary work has *per se* a positive and significant relation with life satisfaction, functionalities (illnesses) have the expected positive (negative) effect while socio-demographic controls have an impact which is not dissimilar to what found in many studies (not being

unemployed, being married or with regular partner, and with grandchildren are all factors which significantly and positively affect life satisfaction).

The second step consists in evaluating the monetary value of a health impairment with the compensating surplus, i.e. by calculating the amount of money the individual would need to receive to keep her utility (proxied for by the life satisfaction measure) constant in case (s)he faces a specific disease or limited functionality. More specifically, the compensating surplus (CS) is computed as:

$$CS_{i,t} = income_i(1 - \exp(\hat{\beta}_s * \hat{\delta}^{-1} \Delta Health\_indicator_i) \quad (4)$$

where $\hat{}_s$ is the estimated coefficient on the *s-th* non-market good in question (i.e. a specific illness or a limited functionality), $\hat{}$ is the coefficient of *ln_income*, *income* is the level of income (averaged across the three waves) and $\Delta Health\_indicator_i$ is the change in the non-market good (health conditions).

Notice that when calculating the CS for specific illnesses, given the dichotomous nature of these variables, $\Delta Health\_indicators_i$ is assumed as being equal to one: this assumption leads us to compute the monetary compensation for a given health impairment if the individual had contracted, for instance, a specific disease or cancer. When instead we calculate the CS for the functionalities and composite health indicators, $\Delta Health\_indicators_i$ is the average difference between the level of these variables in the third and the first, in the second and the first, in the third and the second wave.

By exploiting (2) and (3), we first quantify the impact of the three health indicator of interest (i.e., *n_wordsrecalled*, *cancer* and *sleepingprob*). Then we use the estimated coefficients in Table 2

and the money value of the above-mentioned classes of health indicators to compute the average monetary benefits of carrying out voluntary work[30].

The calculations are repeated for all the possible specifications of equations (1) and (3) and for their different combinations. Results for each specific model specification are summarized in Table 4.

4.1 Results

Calculus of compensating variations shows that contracting a cancer implies a loss in terms of monetary equivalent subjective wellbeing of about 77,800 euros of gross total household income (this measure is pretty robust to different model specifications; see columns 3-4, Table 4). The monetary benefits of voluntary work for cancer and sleeping problems are instead robust to model specification and are estimated to be about 1,770 and 2,623 euros per year respectively not correcting for attrition (while being almost twice as much when we adjust for it).

4.2 The economic value of health impairments

It may be important to clarify the real meaning of these quantitative effects. What we find here is that the average impact of given health impairments on life satisfaction can be compensated by an amount of money equal to the magnitudes provided above. The first effect is obviously an average among different kinds of conditions and reactions to them. There may be individuals who are confident that they will recover from the illness and therefore register a lower negative impact, while others may get depressed or desperate about that, thereby registering a much higher

[30] More specifically, the monetary benefits of voluntary work are computed as the product of two components, i.e. i) the monetary value of the health indicator (calculated using the life-satisfaction compensating surplus approach), and ii) the impact of lagged voluntary work on Δ*health_indicator*. The second component is computed by dividing the beta coefficient of lagged voluntary work by the std. deviation of Δ*health_indicator* in the regression of the latter on the former.

impact. Objective conditions may vary as well not just in terms of severity of the pathology but also of prognosis with some individuals being clearly on the way of recovering, while others getting worse off. As well we may have that, across survey years, medicine progress on some of these illnesses (i.e. different types of cancer) has been remarkable thereby affecting also our average effects. In addition to it the impact of a given illness on life satisfaction may depend as well on age. All individuals in our sample are above 50 and many of them are far beyond that threshold. The reaction to an illness at 50 or before is much different than that of individuals aged above 70 or above 80. Our numbers therefore measure an average "equivalence" in terms of subjective wellbeing between the (negative) illness shock and a correspondent (positive) money shock which takes into account all this underlying variability.

We may compare our findings with those of another approach widely used to calculate health benefits relates to the literature evaluating the value of one year of life (for a survey see Viscousi, 1993). Murphy and Topel (2006) develop a model where a representative individual maximizes lifetime expected utility over consumption and leisure and calculate the willingness to pay for one year of life in the US. They estimate that one year of life for a 50 year old man earning 60,000 dollars is between 170,000 and 700,000 dollars depending on different assumptions on his intertemporal elasticity of substitution and consumption/savings preferences. Viscousi (1993) calculates the statistical value of a life in the US in the range of 4-9 million dollars based on the wage differentials required when working in hazardous conditions and the market price of goods which reduce the likelihood of a fatal injury.

By considering that individuals in our sample are older (on average 65) and have reasonably a life expectancy around 10 years, or slightly more, the value estimated for the impact of cancer (77,800 euros of gross total household income per year) reasonably falls in the range calculated by Murphy and Topel (2006) for a wide range of reasonable discount rates (i.e. 519,553 euros with a 10 percent discount rate, 625,892 with a 5 percent discount rate or 324,415 and 353,675,

respectively, if we shorten the time horizon to 5 years). The comparison remains not easy since we do not know exactly how many years of life cancer patients are expected to lose and how much additional complications related to the pathology are going to affect their life satisfaction.

4.3 The economic effect of voluntary work on health in terms of saved cancer costs

In order to calculate the impact of the volunteer work effect in terms of savings in health costs we consider that a recent estimate of the total cost of cancer (including formal, informal health care plus productivity losses) for the EU is 126.205 billion euros (1.07 percent of the GDP) with the health cost component accounting for around 40 percent of it, or 50.994 billion euros (Luengo-Fernandez et al., 2013). By considering 2.45 million people diagnosed with cancer we get an average cost saved per patient of 5,151 euros per year in 2008. This cost must be compared with our monetary equivalent of the wellbeing loss calculated with our compensating variation approach. The former remains smaller than the latter even being optimistic about average life expectancy at the diagnosis date and using reasonable discount rates. Note as well that, since an important part of the formal health costs is paid by NHSs, the monetary equivalent of the wellbeing loss (calculated above with the compensating variation approach) is far higher than the effective economic loss paid by the patients and has obviously to do with the shortening of their time horizon and the risk of premature death. By applying to the total cost of cancer the coefficient of the volunteer work effect we find that volunteer activity may save from 1.103 [31] up to 1.741 [32] billion euros in the EU.

[31] The reference is the coefficient of the non instrumented estimate correcting for attrition bias (Table 2, column 3).
[32] The reference is the coefficient of the instrumented simultaneous estimate (Table 3, column 1).

5. Conclusions

As is well known domestic health budgets are under severe pressure because of the concurring incidence of several forces such as OECD ageing populations, the transition of many types of illnesses from deadly to chronic and the more intensive and sophisticated medical screening techniques which increase the demand for health services.

In this scenario the identification of factors affecting mortality, morbidity and functional limitations is of paramount importance for their high impact on government budgets and subjective wellbeing of a large mass of individuals. Properly identified benefits of health drivers may provide guidance to prevention policies, quantitative benchmarks for innovative private financing schemes (such as social impact bonds described in footnote 6) and help policymakers to evaluate the wellbeing effects or the budget savings which may be produced by investing in those drivers. Results from research in this field may as well provide valuable information to create a system of incentives for the adoption of correct life styles that may reduce individual health costs, as well as for calculus of health risk for insurance systems.

The research illustrated in this paper aims to contribute in this direction by investigating whether voluntary work contributes to active ageing by reducing the likelihood of morbidity on a large sample of European individuals aged above 50. We find that, after correcting for attrition bias and endogeneity, previous period voluntary work is significantly and negatively correlated with the probability of contracting a cancer and of reporting sleeping problems. In our introduction we survey a series of psychological and physiological channels identified by medical literature which provide rationales for what we find. Lagged voluntary work has also a positive effect on a functionality measure of cognitive ability (the number of words recalled in a test specifically performed by the interviewer) although its magnitude and significance is subject to model specifications. With the compensating variation approach we calculate the monetary equivalent

impact of these effects on subjective wellbeing and compare it with the social value of increased longevity and with the saved costs by individual patients and the NHSs.

Our paper suggests direction for policy measures. Policies fostering voluntary work of the elderly (i.e. “active” unemployment subsidies suggesting a voluntary activity for non retired elder) may be helpful both on the side of the cheap (voluntary) provision of public goods and services and on that of supporting active ageing and reducing health costs for the society. The two channels may contribute to the reduction of welfare costs by increasing at the same time social inclusion and life satisfaction for the elderly. In this respect boundaries of the economic significance of the voluntary work effect calculated with our different methodologies may be a reference for the quantification of the benefit in cost-benefit analyses on such policies.

Note as well that, even when for other dependent variables (different from cancer and sleeping problems) the observed correlations documented in this paper do not pass the causality test our findings remains important since they indicate that the observation of a higher share of volunteering population is a leading indicator of better health and functionality outcomes in the future.

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Table 1a. Variable Legend

Variable	Description
N_Doctorvisits	how often seen or talked to medical doctor last 12 months
N_Chronicdeseases	number of chronic diseases
Adla	activities of daily living index (high: has difficulties) (see section 2)
Iadla	instrumental activities of daily living index (high: has difficulties) (see section 2)
Mobilityind	mobility index (high: has difficulties)
N_Wordsrecalled	results of word recalling task (see section 2)
Numeracy	numeracy score: mathematical performance (see section 2)
Casp	CASP: quality of life and well-being index (see section 2)
Health_Insat.	self-perceived health - us version (1 = excellent; 2 = very good; 3 = good; 4 = fair; 5 = poor)
Longtermillness	Dummy variable=1 if the individual has a long-term illness
Heartattack	Dummy variable=1 if the doctor told you had: heart attack. 0 otherwise
Hypertension	Dummy variable=1 if the doctor told you had: high blood pressure or hypertension. 0 otherwise
Highbloodcholesterol	Dummy variable=1 if the doctor told you had: high blood cholesterol. 0 otherwise
Stroke	Dummy variable=1 if the doctor told you had: stroke. 0 otherwise
Diabetes	Dummy variable=1 if the doctor told you had: diabetes or high blood sugar. 0 otherwise
Chroniclungdisease	Dummy variable=1 if the doctor told you had: chronic lung disease. 0 otherwise
Asthma	Dummy variable=1 if the doctor told you had: asthma. 0 otherwise
Arthritis	Dummy variable=1 if the doctor told you had: arthritis. 0 otherwise
Osteoporosis	Dummy variable=1 if the doctor told you had: osteoporosis. 0 otherwise
Cancer	Dummy variable=1 if the doctor told you had: cancer. 0 otherwise
Pepticulcer	Dummy variable=1 if the doctor told you had: stomach or duodenal ulcer, peptic ulcer. 0 otherwise
Parkinson	Dummy variable=1 if the doctor told you had: Parkinson disease. 0 otherwise
Cataracts	Dummy variable=1 if the doctor told you had: cataracts. 0 otherwise
Femoralfracture	Dummy variable=1 if the doctor told you had: hip fracture or femoral fracture. 0 otherwise
Noconditions	Dummy variable=1 if the doctor told you had: none. 0 otherwise
Otherconditions	Dummy variable=1 if the doctor told you had: other conditions. 0 otherwise
Jointpain	Dummy variable=1 if the respondent has bothered by: pain in back, knees, hips or other joint. 0 otherwise
Hearttrouble	Dummy variable=1 if the respondent has bothered by: heart trouble. 0 otherwise
Breathlessness	Dummy variable=1 if the respondent has bothered by: breathlessness. 0 otherwise
Persistentcough	Dummy variable=1 if the respondent has bothered by: persistent cough. 0 otherwise
Swollenlegs	Dummy variable=1 if the respondent has bothered by: swollen legs. 0 otherwise
Sleepingproblems	Dummy variable=1 if the respondent has bothered by: sleeping problems. 0 otherwise
Fallingdown	Dummy variable=1 if the respondent has bothered by: falling down. 0 otherwise
Fearoffallingdown	Dummy variable=1 if the respondent has bothered by: fear of falling down. 0 otherwise
Dizziness	Dummy variable=1 if the respondent has bothered by: dizziness, faints or blackouts. 0 otherwise
Stomachorintestin.	Dummy variable=1 if the respondent has bothered by: stomach or intestine problems. 0 otherwise
Nosymptoms	Dummy variable=1 if the respondent has bothered by: no symptoms. 0 otherwise
Othersymptoms	Dummy variable=1 if the respondent has bothered by: other symptoms. 0 otherwise
Female	Dummy variable = 1 if the respondent's gender is female. 0 otherwise
Eduyears	years of schooling
Married	Dummy variable=1 if the respondent is married. 0 otherwise
Reg_Partnership	Dummy variable=1 if the respondent has a registered partnership. 0 otherwise
Separated	Dummy variable=1 if the respondent is separated. 0 otherwise
Never_Married	Dummy variable=1 if the respondent has never been married. 0 otherwise
Divorced	Dummy variable=1 if the respondent is divorced. 0 otherwise
Widowed	Dummy variable=1 if the respondent is widowed. 0 otherwise
Divorcsepar	Dummy variable=1 if the respondent is divorced or separated . 0 otherwise
Marriedpartn	Dummy variable=1 if the respondent is married or has a registered partnership. 0 otherwise
Retired	Dummy variable=1 if the respondent is retired. 0 otherwise
Employed	Dummy variable=1 if the respondent is employed. 0 otherwise
Unemployed	Dummy variable=1 if the respondent is unemployed. 0 otherwise
Housework	Dummy variable=1 if the respondent deals with housework . 0 otherwise
Other_Job	Dummy variable=1 if the respondent has a second job. 0 otherwise
N_Children	number of children
N_Grandchildren	number of grandchildren
Drinking	Frequency of alcohol consumption in the last 3 months (0/1 dummies): *Almosteveryday*, *5or6daysaweek*, *3or4daysaweek*, *Onceortwiceaweek*, *Onceortwiceamonth, Lessoftenthanonceamonth, Notatallinthelastthreemonths*
Sports	Frequency of sports or vigorous activities (0/1 dummies): *Min1week*, *Oneweek, OneorThreemonth, Hardly_ever_never*.
Smoking	Dummy variable=1 if the respondent smokes at the present time
Bmi	body mass index (easySHARE version)
OverWeight_Obese	Dummy variable=1 if the respondent is overweight (29.9<BMI<34.9) or obese (BMI>34.9). 0 otherwise
Country	country identifier
Voluntary	Dummy variable=1 if the respondent undertook activities last month: voluntary or charity work. 0 otherwise

$\overline{\text{Voluntary\_Work}}_{-i,r}$	See section 3.2
$\overline{\text{Voluntary\_Work}}_{i,-r}$	See section 3.2
Gets_Retired	Dummy variable=1 if the respondent gets retired between the previous and current wave. 0 otherwise
Gets_Unemployed	Dummy variable=1 if the respondent gets unemployed between the previous and current wave. 0 otherwise
Gets_Separated	Dummy variable=1 if the respondent gets separated between the previous and current wave. 0 otherwise
Gets_Divorced	Dummy variable=1 if the respondent gets divorced between the previous and current wave. 0 otherwise
Gets_Divsep	Dummy variable=1 if the respondent gets divorced or separated between the previous and current wave. 0 otherwise
Reducedrinking	Dummy variable=1 if the respondent reduces drinking habits between the previous and current wave. 0 otherwise
Improvesport	Dummy variable=1 if the respondent increases physical activity between the previous and current wave. 0 otherwise
Lnincome	Ln of household total gross income. Its value is equal to the sum over all household members of the individual-level values of: annual net income from employment and self-employment (in the previous year); Annual public old age/early or pre-retirement/disability pension (or sickness benefits); Annual public unemployment benefit or insurance, public survivor pension from partner; Annual war pension, private (occupational) old age/early retirement/disability pension, private (occupational) survivor pension from partner's job, public old age supplementary pension/public old age/public disability second pension, secondary public survivor pension from spouse or partner, occupational old age pension from a second and third job; Annual public and private long-term insurance payments; Annual life insurance payment, private annuity or private personal pension, private health insurance payment, alimony, payments from charities received; Income from rent. Values of the following household level variables are added: Annual other hhd members' net income; Annual other hhd members' net income from other sources; Household bank accounts, government and corporate bonds, stocks/shares; mutual funds.
∆lnincome	= Lnincome(*t)* - Lnincome(*t-1)*
Life_Sat	how satisfied is the respondent with life (0-10 scale)

Table 1b - Descriptive Statistics (health indicators)

	Variable	Obs	Mean	Std. Dev.	Min	Max	95% Confidence Intervals	
Synthetic indicators and functionality indexes								
	Health_Insat.	104549	3.057	1.079	1	5	3.050	3.064
	N_Doctorvisits	103804	6.706	9.570	0	98	6.648	6.765
	N_Chronicdeseases	104497	1.292	1.324	0	10	1.284	1.300
	Adla	104521	0.203	0.724	0	5	0.199	0.208
	Iadla	104521	0.081	0.401	0	3	0.078	0.083
	Mobilityind	104501	0.513	0.924	0	4	0.508	0.519
	N_Wordsrecalled	102726	5.038	1.860	0	10	5.026	5.049
	Numeracy	83739	3.356	1.153	1	5	3.348	3.363
	Casp	89304	37.309	6.258	12	48	37.268	37.350
Specific illnesses								
	Longtermillness	104570	0.485	0.500	0	1	0.482	0.488
	Heartattack	104497	0.120	0.325	0	1	0.118	0.122
	Hypertension	104497	0.344	0.475	0	1	0.341	0.347
	Highbloodcholesterol	104497	0.213	0.409	0	1	0.211	0.215
	Stroke	104497	0.037	0.188	0	1	0.035	0.038
	Diabetes	104497	0.108	0.311	0	1	0.106	0.110
	Chroniclungdisease	104497	0.056	0.230	0	1	0.055	0.057
	Asthma	104497	0.032	0.175	0	1	0.031	0.033
	Arthritis	104497	0.216	0.411	0	1	0.213	0.218
	Osteoporosis	104497	0.053	0.224	0	1	0.051	0.054
	Cancer	104497	0.048	0.214	0	1	0.047	0.049
	Pepticulcer	104497	0.048	0.214	0	1	0.047	0.049
	Parkinson	104497	0.007	0.083	0	1	0.006	0.007
	Cataracts	104497	0.076	0.265	0	1	0.074	0.078
	Femoralfracture	104497	0.021	0.142	0	1	0.020	0.021
	Noconditions	104497	0.258	0.437	0	1	0.255	0.260
	Otherconditions	104497	0.158	0.364	0	1	0.155	0.160
Symptoms								
	Jointpain	104524	0.532	0.499	0	1	0.529	0.535
	Hearttrouble	104524	0.082	0.275	0	1	0.080	0.084
	Breathlessness	104524	0.126	0.332	0	1	0.124	0.128
	Persistentcough	104524	0.060	0.238	0	1	0.059	0.062
	Swollenlegs	104524	0.133	0.339	0	1	0.131	0.135
	Sleepingproblems	104524	0.209	0.406	0	1	0.206	0.211
	Fallingdown	104524	0.043	0.203	0	1	0.042	0.044
	Fearoffallingdown	104524	0.088	0.284	0	1	0.087	0.090
	Dizziness	104524	0.093	0.290	0	1	0.091	0.094
	Stomachorintestin.	104524	0.135	0.342	0	1	0.133	0.137
	Nosymptoms	104524	0.278	0.448	0	1	0.275	0.281
	Othersymptoms	104524	0.043	0.202	0	1	0.041	0.044

Table 1c - Descriptive Statistics (socio-demographic and health behaviour)

	Variable	Obs	Mean	Std. Dev.	Min	Max	95% Confidence Intervals	
	Female	105099	0.558	0.497	0	1	0.555	0.561
Age								
	50_54	105101	0.153	0.360	0	1	0.151	0.155
	55_59	105101	0.177	0.381	0	1	0.174	0.179
	60_64	105101	0.174	0.379	0	1	0.172	0.176
	65_69	105101	0.154	0.361	0	1	0.151	0.156
	70_74	105101	0.127	0.333	0	1	0.125	0.129
	75_79	105101	0.098	0.298	0	1	0.097	0.100
	Above_80	105101	0.117	0.321	0	1	0.115	0.119
	Eduyears	91720	10.453	4.447	0	25	10.425	10.482
Job Status								
	Retired	103787	0.519	0.500	0	1	0.515	0.522
	Employed	103787	0.282	0.450	0	1	0.280	0.285
	Unemployed	103787	0.029	0.167	0	1	0.028	0.030
	Housework	103787	0.125	0.331	0	1	0.123	0.127
	Other_Job	103787	0.010	0.099	0	1	0.009	0.010
Family Status								
	Married	103797	0.701	0.458	0	1	0.698	0.704
	Reg_Partnership	103797	0.015	0.122	0	1	0.014	0.016
	Separated	103797	0.012	0.107	0	1	0.011	0.012
	Never_Married	103797	0.054	0.226	0	1	0.052	0.055
	Divorced	103797	0.074	0.262	0	1	0.073	0.076
	Widowed	103797	0.144	0.351	0	1	0.142	0.146
	N_Children	104348	2.189	1.400	0	17	2.181	2.198
	N_Grandchildren	93424	2.768	3.095	0	25	2.748	2.787
Drinking								
	Almost_Every_Day	105101	0.291	0.454	0	1	0.288	0.293
	5or6days_week	105101	0.092	0.289	0	1	0.090	0.093
	3or4days_week	105101	0.113	0.317	0	1	0.112	0.115
	1or2_week	105101	0.183	0.387	0	1	0.181	0.185
	1or2_month	105101	0.074	0.263	0	1	0.073	0.076
	<1_month	105101	0.028	0.166	0	1	0.027	0.029
	0_in_3months	105101	0.207	0.405	0	1	0.204	0.209
Sport								
	>1_week	105101	0.331	0.471	0	1	0.329	0.334
	1_week	105101	0.138	0.345	0	1	0.136	0.140
	1or3_month	105101	0.091	0.287	0	1	0.089	0.092
	Hardlyever_never	105101	0.429	0.495	0	1	0.426	0.432
	Smoking	105101	0.465	0.499	0	1	0.462	0.468
	Bmi	101072	26.533	4.482	12.487	88.376	26.505	26.561
	OverWeight_Obese	101072	0.606	0.489	0	1	0.603	0.609
	Lnincome	104490	10.382	1.332	0.273	15.398	10.374	10.390
	Voluntary	102897	0.149	0.356	0	1	0.147	0.151
Changes in status between t and t-1								
	Gets_Separated	103797	0. 632	0.482	0	1	0.629	0.635
	Gets_Divorced	103797	0.632	0.482	0	1	0.629	0.635
	Gets_Retired	103787	0.681	0.466	0	1	0.678	0.684
	Gets_Unemployed	103787	0.640	0.480	0	1	0.638	0.643
	Gets_Grandchildren	93424	0.744	0.437	0	1	0.741	0.746
	Improve_Sport	37804	0.203	0.402	0	1	0.199	0.207
	Reducedrinking	37817	0.246	0.431	0	1	0.242	0.251
	Life_Sat	74824	7.682	1.753	0	10	7.670	7.695
	Health_Insat	104549	3.057	1.079	1	5	3.050	3.064
	$\overline{\text{Voluntary\_Work}}_{-i,r}$	102974	0.141	0.081	0	0.466	0.140	0.141
	$\overline{\text{Voluntary\_Work}}_{i,-r}$	102974	0.151	0.083	0	0.614	0.151	0.152

Table 2 – Voluntary work effect on changes in health indicators

	(1)		(2)	
model:	*Baseline OLS*		*Attrition weights*	
∆health indicator	beta	se	beta	se
	Panel A: health functionalities			
Casp	0.122	(0.0917)	0.164	(0.120)
Health_Insat.	-0.0318**	(0.0133)	-0.0319	(0.0338)
N_Chronicdeseases	-0.00386	(0.0106)	-0.00612	(0.0151)
Adla	-0.00682	(0.00893)	-0.00769	(0.00861)
Iadla	-0.0102**	(0.00342)	-0.00593	(0.00493)
N_Doctorvisits	0.00794	(0.183)	0.185	(0.147)
N_Wordsrecalled	0.171***	(0.0167)	0.160***	(0.0353)
Mobilityind	-0.0152	(0.0121)	-0.0138	(0.00837)
	Panel B: Specific Diseases			
Longtermillness	-0.00274	(0.0121)	-0.0163	(0.0140)
Heartattack	-0.00359	(0.00361)	-0.00298	(0.00719)
Hypertension	0.00644	(0.00531)	-0.00263	(0.00762)
Stroke	0.00122	(0.00226)	0.00209	(0.00209)
Diabetes	-0.00577	(0.00328)	-0.00204	(0.00305)
Asthma	0.00271	(0.00207)	0.00317	(0.00560)
Arthritis	0.00307	(0.00449)	0.00564	(0.0103)
Osteoporosis	-0.00211	(0.00214)	0.00398*	(0.00214)
Cancer	-0.00511*	(0.00277)	-0.00874**	(0.00319)
Pepticul	-0.000277	(0.00240)	-0.00676	(0.00444)
Parkinson	-0.000427	(0.000997)	0.000794	(0.00165)
Cataracts	0.00188	(0.00325)	0.00727	(0.00598)
Femoralfracture	0.000807	(0.00169)	-0.00212*	(0.00113)
Othercondition	0.0110**	(0.00498)	0.0158	(0.00914)
Noconditions	0.00505	(0.00788)	0.00227	(0.0111)
	Panel C: Symptom Indicators			
Jointpain	-0.00552	(0.00744)	-0.000353	(0.0125)
Hearttrouble	-0.00722	(0.00407)	-0.0124	(0.00894)
Breathlessness	0.000503	(0.00550)	-0.0115	(0.00774)
Persistentcough	-0.00138	(0.00309)	0.00536	(0.00747)
Swollenlegs	0.00361	(0.00421)	0.0120	(0.0121)
Sleepingproblems	-0.0152***	(0.00394)	-0.0280***	(0.00875)
Fallingdown	0.000783	(0.00366)	-0.000904	(0.00342)
Fearoffallingdown	-0.00427	(0.00333)	-0.0117*	(0.00545)
Dizziness	-0.00478	(0.00324)	-0.00155	(0.00530)
Stomachorintestin.	0.000198	(0.00673)	-0.00184	(0.00839)
Othersymptoms	0.00259	(0.00275)	0.00211	(0.00805)
Nosymptoms	0.00601	(0.00692)	0.000866	(0.0108)

Note: Beta and Standard Errors refer to voluntary work (t-1). Included controls: health indicator (t-1), age (t-1), gender, years of education (t-1), job status (t-1), marital status (t-1), n_children (t-1), n_grandchildren (t-1), drinking and sport attitudes (t-1), overweight_obese (t-1), smoking (t-1), lnincome (t-1), year and country fixed effects, reducedrinking, improvesport, gets_divsep, gets_retired, gets_unemployed, ∆lnincome, gets_grandchildren. Models: (1) Standard OLS; (2) Inversely Attrition Weighed OLS: attrition probability estimated through a logistic model controlling for sociodemographic characteristics, country and year fixed effects, two dummy variables for reporting no diseases and no symptoms (see footnote 22). Full estimation results are reported in Tables A1a-A3a (non attrition-adjusted) and A1b-A3b (attrition adjusted) in the Appendix. Robust standard errors clustered at country level in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table 3 - Voluntary work effect on changes in health indicators (robustness checks)

	(1)		(2)		(3)		(4)	
model:	*IV/simultaneous eq.*		*with proxies for family background*		*only socially excluded*		*only retired*	
Δhealth indicator	Beta	se	beta	Beta	beta	se	beta	se
n_wordsrecalled	-0.725	(0.597)	0.139***	(0.0379)	0.163***	(0.0326)	0.130**	(0.0563)
cancer	-0.0138***	(0.00402)	-0.0117**	(0.00387)	-0.0104**	(0.00424)	-0.0131**	(0.00465)
sleepingproblems	-0.0871**	(0.0413)	-0.0268**	(0.0113)	-0.0255**	(0.0101)	-0.0416***	(0.0108)

Note: beta and standard errors refer to voluntary work (t-1). Included controls: health indicator (t-1), age (t-1), gender, years of education (t-1), job status (t-1), marital status (t-1), n_children (t-1), n_grandchildren (t-1), drinking and sport attitudes (t-1), overweight_obese (t-1), smoking (t-1), lnincome (t-1), year and country fixed effects, reducedrinking, improvesport, gets_divsep, gets_retired, gets_unemployed, Δlnincome, gets_grandchildren. Models: (1) IV estimation using the "cmp" routine in STATA for simultaneous equation models: first stage controls include socio-demographic characteristics and lagged health indicator; instruments for voluntary (t-1): share of voluntary workers in the own region and the neighbouring regions (see Tables A4); (2) equal to model (2) in Table 2, with family background proxies (mathpos_at10 and n_books_at10); (3) equal to model (2) in Table 2, restricting the sample only to the socially excluded individuals (widowed, separated, divorced, retired or without grandchildren); (4) equal to model (2) in Table 2, restricting the sample only to retired respondents. Full estimation results are reported in Table A5 in the Appendix. Robust standard errors clustered at country level in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table 4 – The monetary value of voluntary work and health indicators

		n_wordsrecalled		*cancer*		*sleepingprob*	
Model	*Monetary measures*	(1)	(2)	(3)	(4)	(5)	(6)
1a	Impact on life satisfaction (beta)	0.0604***		-0.230**			
	Monetary value €	-12274.10		77864.11		n/a	
	Monetary benefit of vol. work €	-1181.74	-1105.72	-1778.04	-3041.11		
2a	Impact on life satisfaction (beta)	0.0603***		-0.160*		-0.391***	
	Monetary value €	-11906.42		76839.41		78033.31	
	Monetary benefit of vol. work €	-1146.34	-1072.60	-1754.64	-3001.09	-2623.06	-4831.96
3a	Impact on life satisfaction (beta)	0.0786***		-0.221**		-0.612***	
	Monetary value €	-13867.72		77578.86		78036.13	
	Monetary benefit of vol. work €	-1335.17	-1249.28	-1771.52	-3029.97	-2623.16	-4832.13
4a	Impact on life satisfaction (beta)	0.0827***		-0.239***		-0.669***	
	Monetary value €	-259235.70		76900.67		78035.62	
	Monetary benefit of vol. work €	-24958.96	-23353.41	-1756.04	-3003.48	-2623.14	-4832.10
4b	Impact on life satisfaction (beta)	0.181***		-0.517***		-1.136***	
	Monetary value €	-411213.21		77636.33		78035.43	
	Monetary benefit of vol. work €	-39591.20	-37044.40	-1772.84	-3032.21	-2623.14	-4832.09
4c	Impact on life satisfaction (beta)	0.183***		-0.517***		-1.136***	
	Monetary value €	-422180.11		77626.16		78035.42	
	Monetary benefit of vol. work €	-40647.08	-38032.36	-1772.61	-3031.81	-2623.13	-4832.09
5a	Impact on life satisfaction (beta)	0.188***		-0.432***		-1.120***	
	Monetary value €	-703369.25		77644.36		78036.09	
	Monetary benefit of vol. work €	-67719.70	-63363.46	-1773.02	-3032.52	-2623.16	-4832.13
5b	Impact on life satisfaction (beta)	0.188***		-0.438***		-1.113***	
	Monetary value €	-712288.23		77681.63		78036.09	
	Monetary benefit of vol. work €	-68578.41	-64166.93	-1773.87	-3033.98	-2623.16	-4832.13

Model legend:

- 1a: Pooled OLS regression of life satisfaction (life_sat) on health indicators. Regression weights include the inverse of the estimated attrition probability. Controls include: health indicators (excluding symptoms), age classes, gender, years of education, job status, marital status, drinking and sport attitudes, overweight_obese dummy, smoking, lnincome, year and country fixed effects (see Table A6, col. 1 and 3 in the Appendix). Monetary value of the health indicator calculated through the life satisfaction compensating variation approach. Monetary benefits of voluntary work are computed as the product of the monetary value of the health indicator and the impact of lagged voluntary work on Δhealth_indicator (specifically, the latter is computed by dividing the beta coefficient of lagged voluntary work by the std. error of Δhealth_indicator from the regression of the latter on the former).

- 2a: As in 1a, adding symptoms indicators in the pooled OLS regression of life satisfaction on health indicators (see Table A6, col. 2 and 4 in the Appendix).
- 3a: As in 2a, but keeping in the pooled OLS regression of life satisfaction only n_wordsrecalled, cancer and sleeping problems as health indicators (see Table A6, col. 5 in the Appendix).
- 4a: As in 3a, without the attrition correction in the life satisfaction regression (see Table A7a, col 1 in the Appendix).
- 4b: Simultaneous multiple equations estimation of life satisfaction (model 4a) and health indicators (n_wordsrecalled, cancer and sleeping problems). Equations for n_wordsrecalled, cancer and sleeping problems include their lagged value, socio-demographic controls, health attitudes and lagged voluntary work (see Table A7a, col 2-5 in the Appendix). No attrition correction.
- 4c: Simultaneous estimation of life satisfaction (model 4a), health indices (n_wordsrecalled, cancer and sleeping problems) and lagged voluntary work. Equations for n_wordsrecalled, cancer and sleeping problems include their lagged value, socio-demographic controls, health attitudes and lagged voluntary work. Equation for lagged voluntary work include socio-demographic and economic controls (gender, age class, n. children, n.grandchildren, marital status, job status, education years, lnincome) plus the lag health indicators considered (n_wordsrecalled, cancer and sleeping problems) and two instruments (share of voluntary workers in the own region and in the neighbouring ones) (see Table A7a, col 6-10 in the Appendix). No attrition correction.
- 5a: As in 4b but adjusting for attrition (see Table A7b, col 2-5 in the Appendix).
- 5b: As in 4c but adjusting for attrition (see Table A7b, col 6-10 in the Appendix).

Notes: Values in the even (odd) columns reports monetary benefits of voluntary work when the latter is estimated adjusting (not adjusting) for attrition; the full regression results for voluntary work are reported in Tables A1b-A3b (A1a-A3a) in the Appendix. Simultaneous models are estimated using the "cmp" routine in Stata. *** p<0.01, ** p<0.05, * p<0.1.

APPENDIX

Table A1a – The determinants of changes in health synthetic indicators

	(1) Δcasp	(2) Δhealth_insat	(3) Δn_chronicdeseases	(4) Δadla	(5) Δiadla	(6) Δn_doctorvisits	(7) Δn_wordsrecalled	(8) Δmobilityind
Voluntary (t-1)	0.122	-0.0318**	-0.00386	-0.00682	-0.0102**	0.00794	0.171***	-0.0152
	(0.0917)	(0.0133)	(0.0106)	(0.00893)	(0.00342)	(0.183)	(0.0167)	(0.0121)
Casp (t-1)	-0.507***							
	(0.0252)							
Health_Insat. (t-1)		-0.522***						
		(0.0124)						
N_Chronicdes.(t-1)			-0.446***					
			(0.0177)					
Adla (t-1)				-0.450***				
				(0.0229)				
Iadla (t-1)					-0.592***			
					(0.0851)			
N_Doctorvisits (t-1)						-0.636***		
						(0.0310)		
N_Wordsrecalled (t-1)							-0.667***	
							(0.0150)	
Mobilityind (t-1)								-0.447***
								(0.0179)
Female	-0.235**	0.0116	0.0305**	-0.0112*	-0.0200***	-0.0381	0.282***	0.0359***
	(0.0784)	(0.0105)	(0.0113)	(0.00582)	(0.00564)	(0.0686)	(0.0375)	(0.00890)
Age55_59 (t-1)	0.119	0.00306	0.109***	0.0117	0.00108	0.0936	-0.0750***	0.0269***
	(0.138)	(0.0128)	(0.0237)	(0.00989)	(0.00398)	(0.148)	(0.0216)	(0.00765)
Age60_64 (t-1)	0.163	0.0226	0.192***	0.0133	0.0114*	0.431*	-0.177***	0.0649***
	(0.182)	(0.0231)	(0.0283)	(0.0129)	(0.00536)	(0.229)	(0.0277)	(0.0158)
Age65_69 (t-1)	-0.237	0.0746**	0.271***	0.0316**	0.00469	0.616**	-0.438***	0.121***
	(0.254)	(0.0276)	(0.0321)	(0.0117)	(0.00865)	(0.212)	(0.0392)	(0.0244)
Age70_74 (t-1)	-0.375	0.139***	0.323***	0.0882***	0.0325***	0.894**	-0.644***	0.194***
	(0.292)	(0.0334)	(0.0250)	(0.0232)	(0.0104)	(0.304)	(0.0452)	(0.0307)
Age75_79 (t-1)	-0.909**	0.188***	0.336***	0.171***	0.0899***	1.148***	-0.962***	0.315***
	(0.332)	(0.0353)	(0.0378)	(0.0255)	(0.0161)	(0.254)	(0.0530)	(0.0438)
AgeAbove_80 (t-1)	-1.517***	0.259***	0.295***	0.349***	0.235***	0.917**	-1.282***	0.480***
	(0.349)	(0.0339)	(0.0392)	(0.0498)	(0.0263)	(0.381)	(0.0745)	(0.0429)
Eduyears (t-1)	0.0512**	-0.0147***	-0.0120***	-0.00500***	-0.00413***	-0.0477**	0.0597***	-0.00983***
	(0.0202)	(0.00122)	(0.00165)	(0.00102)	(0.000636)	(0.0205)	(0.00677)	(0.00179)
N_Children (t-1)	-0.0503	-0.00527	-0.00820*	0.00254	0.000988	-0.0144	-0.00619	-0.00249
	(0.0388)	(0.00599)	(0.00439)	(0.00433)	(0.00211)	(0.0484)	(0.0131)	(0.00491)
N_Grandchildren (t-1)	-0.00882	0.00296	0.00481	0.00230	0.00124	0.0339	-0.00368	0.00402**
	(0.0139)	(0.00230)	(0.00388)	(0.00222)	(0.00148)	(0.0355)	(0.00400)	(0.00168)
Retired (t-1)	0.0370	0.0460*	0.0328*	-0.0268	-0.0167*	0.214	0.0335	-0.0425**
	(0.144)	(0.0213)	(0.0152)	(0.0165)	(0.00845)	(0.211)	(0.0270)	(0.0183)
Unemployed (t-1)	-0.597***	0.0403	0.0840**	-0.0296**	-0.00861	-0.236	0.00739	-0.0481**
	(0.187)	(0.0335)	(0.0364)	(0.0134)	(0.00654)	(0.277)	(0.0469)	(0.0207)
Marriedpartn (t-1)	0.413**	0.00121	0.0200	-0.0127	-0.00648	0.445**	0.0293	-0.00875
	(0.148)	(0.0339)	(0.0280)	(0.0108)	(0.0102)	(0.152)	(0.0440)	(0.0183)
Divorcsepar (t-1)	0.0460	-0.000300	0.0439	0.00372	-0.00963	0.771**	0.0449	0.00830
	(0.218)	(0.0446)	(0.0271)	(0.0105)	(0.0113)	(0.254)	(0.0419)	(0.0256)
Widowed (t-1)	0.416**	-0.00786	0.0553	0.0161	-0.00188	0.591**	0.00166	0.0303
	(0.178)	(0.0411)	(0.0319)	(0.0189)	(0.0139)	(0.194)	(0.0371)	(0.0252)
DRINKING (t-1)								
5or6days_week	0.488**	-0.0648***	-0.0315	-0.0648***	-0.0321***	-0.444**	0.173***	-0.0807***
	(0.171)	(0.0203)	(0.0178)	(0.0125)	(0.00924)	(0.187)	(0.0426)	(0.0132)
3or4days_week	0.472**	-0.0762***	-0.0928***	-0.0689***	-0.0365***	-0.533**	0.140***	-0.0943***
	(0.199)	(0.0226)	(0.0298)	(0.0177)	(0.00816)	(0.185)	(0.0325)	(0.0155)
1or2_week	0.579***	-0.116***	-0.0926***	-0.0654***	-0.0392***	-0.590**	0.163***	-0.113***
	(0.154)	(0.0246)	(0.0224)	(0.00886)	(0.00840)	(0.209)	(0.0352)	(0.0157)
1or2_month	0.474**	-0.130***	-0.109***	-0.0886***	-0.0532***	-0.869**	0.181***	-0.107***
	(0.215)	(0.0235)	(0.0224)	(0.0141)	(0.0102)	(0.305)	(0.0461)	(0.0151)
<1_month	0.451**	-0.131***	-0.0695*	-0.0653**	-0.0525**	-0.632	0.302***	-0.119***
	(0.177)	(0.0371)	(0.0366)	(0.0237)	(0.0196)	(0.361)	(0.0671)	(0.0279)
0_in_3months	0.472**	-0.105***	-0.0786***	-0.0541***	-0.0400***	-0.638**	0.147***	-0.0817***
	(0.158)	(0.0229)	(0.0222)	(0.0121)	(0.00551)	(0.237)	(0.0414)	(0.0171)
SPORT (t-1)								
1_week	-0.534***	0.119***	0.0857***	0.0417***	0.0209***	0.496***	-0.0281	0.114***
	(0.0678)	(0.00966)	(0.0152)	(0.0102)	(0.00462)	(0.107)	(0.0242)	(0.0130)
1or3_month	-0.875***	0.157***	0.126***	0.0474***	0.0183**	1.119***	-0.0764*	0.154***
	(0.0917)	(0.0202)	(0.0194)	(0.0115)	(0.00614)	(0.200)	(0.0396)	(0.0103)

Hardlyever_never	-1.100***	0.235***	0.184***	0.128***	0.0585***	1.517***	-0.175***	0.248***
	(0.0984)	(0.0103)	(0.0184)	(0.0119)	(0.00654)	(0.167)	(0.0325)	(0.0182)
Smoking (t-1)	-0.375***	0.104***	0.00476	0.0116**	0.00195	0.137	-0.0339	0.0475***
	(0.0639)	(0.0176)	(0.0181)	(0.00501)	(0.00327)	(0.117)	(0.0294)	(0.0119)
Overweight_Obese (t-1)	-0.114**	0.0798***	0.162***	0.00229	-0.0199***	0.516***	-0.0168	0.0652***
	(0.0509)	(0.0144)	(0.0128)	(0.00737)	(0.00350)	(0.0957)	(0.0180)	(0.00892)
Lnincome (t-1)	0.382***	-0.0372***	-0.00117	0.00147	0.00695*	-0.175*	0.0974***	-0.00886*
	(0.0565)	(0.0104)	(0.00756)	(0.00452)	(0.00351)	(0.0951)	(0.0209)	(0.00480)
Reducedrinking	-0.424***	0.105***	0.0397***	0.0537***	0.0300***	0.975***	-0.0499	0.0863***
	(0.0797)	(0.00946)	(0.0101)	(0.00939)	(0.00479)	(0.132)	(0.0383)	(0.0129)
Improvesport	1.127***	-0.268***	-0.155***	-0.137***	-0.0573***	-1.317***	0.178***	-0.278***
	(0.135)	(0.0162)	(0.0258)	(0.0150)	(0.00786)	(0.161)	(0.0312)	(0.0228)
Gets_Divsep	-0.592*	0.0250	0.0548*	0.0327	-0.000105	0.189	-0.0898*	-0.000622
	(0.318)	(0.0322)	(0.0301)	(0.0314)	(0.0133)	(0.268)	(0.0488)	(0.0318)
Gets_Retired	0.385***	-0.00945	0.0258	-0.00857	-0.00908	0.141	-0.00978	-0.0447**
	(0.0829)	(0.0247)	(0.0253)	(0.0136)	(0.00785)	(0.214)	(0.0274)	(0.0177)
Gets_Unemployed	-1.142***	0.0972	0.0467	-0.0238	-0.00194	-0.0530	-0.0493	-0.0176
	(0.228)	(0.0649)	(0.0611)	(0.0227)	(0.0116)	(0.612)	(0.0769)	(0.0281)
∆lnincome	0.189***	-0.00811	0.0225***	0.00573*	0.00221	-0.0326	0.0397*	-0.000814
	(0.0347)	(0.00497)	(0.00712)	(0.00267)	(0.00256)	(0.0552)	(0.0189)	(0.00486)
Gets_Grandchildren	-0.0910	-0.00190	0.00286	0.00224	-0.00176	0.0421	6.76e-06	0.00564
	(0.0805)	(0.00686)	(0.0123)	(0.0104)	(0.00500)	(0.0948)	(0.0179)	(0.0105)
Year Dummies	YES	YES	YES	YES	YES	YES	YES	YES
Country Dummies	YES	YES	YES	YES	YES	YES	YES	YES
Observations	25,949	33,834	33,830	33,840	33,852	33,635	33,400	33,836
R-Squared	0.255	0.269	0.213	0.150	0.174	0.291	0.332	0.190

Omitted benchmarks: employed, housework, other_job for job status, never_married for marital status, Austria for country dummies, age50_54 for age dummies, almost_every_day for drinking habits, <1_week for sport activities. Robust standard errors in parentheses clustered at country level. *** p<0.01, ** p<0.05, * p<0.1.

Table A1b – The determinants of changes in health synthetic indicators (attrition-adjusted)

	(1) ∆casp	(2) ∆health_insat	(3) ∆n_chronicdeseases	(4) ∆adla	(5) ∆iadla	(6) ∆n_doctorvisits	(7) ∆n_wordsrecalled	(8) ∆mobilityind
Voluntary (t-1)	0.164	-0.0319	-0.00612	-0.00769	-0.00593	0.185	0.160***	-0.0138
	(0.120)	(0.0338)	(0.0151)	(0.00861)	(0.00493)	(0.147)	(0.0353)	(0.00837)
Casp (t-1)	-0.507***							
	(0.0261)							
Health_Insat (t-1)		-0.519***						
		(0.0222)						
N_Chronicdes.(t-1)			-0.449***					
			(0.0262)					
Adla (t-1)				-0.485***				
				(0.0415)				
Iadla (t-1)					-0.601***			
					(0.0734)			
N_Doctorvisits (t-1)						-0.629***		
						(0.0269)		
N_Wordsrecalled (t-1)							-0.665***	
							(0.0182)	
Mobilityind (t-1)								-0.470***
								(0.0222)
Female	-0.183**	-0.00867	0.00581	-0.0146	-0.0257**	0.0216	0.311***	0.0228***
	(0.0685)	(0.0296)	(0.0213)	(0.0114)	(0.00856)	(0.146)	(0.0495)	(0.00510)
Age55_59 (t-1)	0.249	-0.0227	0.0941	0.0354***	-0.00155	0.315*	-0.0611**	0.0113
	(0.244)	(0.0249)	(0.0558)	(0.0103)	(0.00776)	(0.174)	(0.0264)	(0.0215)
Age60_64 (t-1)	0.218	0.0240	0.174***	0.0316**	0.00708	0.823***	-0.141***	0.0761**
	(0.284)	(0.0397)	(0.0511)	(0.0141)	(0.00433)	(0.260)	(0.0198)	(0.0345)
Age65_69 (t-1)	-0.121	0.0204	0.213***	0.0349	0.00891	0.880***	-0.422***	0.0930**
	(0.245)	(0.0479)	(0.0534)	(0.0202)	(0.0154)	(0.221)	(0.0396)	(0.0399)
Age70_74 (t-1)	-0.673**	0.123**	0.260***	0.120**	0.0341**	0.823**	-0.570***	0.235***
	(0.243)	(0.0563)	(0.0629)	(0.0408)	(0.0135)	(0.320)	(0.0371)	(0.0545)
Age75_79 (t-1)	-0.689***	0.139*	0.262***	0.151***	0.0614***	0.790	-0.889***	0.289***
	(0.218)	(0.0781)	(0.0523)	(0.0449)	(0.0153)	(0.465)	(0.0715)	(0.0686)
AgeAbove_80 (t-1)	-1.055***	0.218***	0.212***	0.305***	0.185***	0.819*	-1.315***	0.389***
	(0.300)	(0.0520)	(0.0470)	(0.0488)	(0.0287)	(0.377)	(0.0596)	(0.0329)
Eduyears (t-1)	0.0539*	-0.0150***	-0.00842***	-0.00417**	-0.00459***	-0.0162	0.0733***	-0.0107***
	(0.0262)	(0.00129)	(0.00221)	(0.00179)	(0.000758)	(0.0253)	(0.0103)	(0.00221)
N_Children (t-1)	-0.119	-0.0128	-0.00465	0.0101	-0.00323	0.00873	-0.00391	-0.00525

	(0.0739)	(0.00721)	(0.00984)	(0.00777)	(0.00339)	(0.0845)	(0.0203)	(0.00505)
N_Grandchildren (t-1)	0.0329*	0.000930	0.00339	-0.00377	0.00258	0.0236	0.00155	0.00384
	(0.0176)	(0.00482)	(0.00423)	(0.00391)	(0.00172)	(0.0225)	(0.00640)	(0.00304)
Retired (t-1)	0.105	0.0535	0.0517*	-0.0204	-0.0187**	0.249	0.0295	-0.0520
	(0.139)	(0.0518)	(0.0249)	(0.0173)	(0.00787)	(0.171)	(0.0275)	(0.0329)
Unemployed (t-1)	-0.368**	0.0366	0.00941	0.00712	-0.0212**	-0.796*	0.0594	-0.0205
	(0.158)	(0.0671)	(0.0473)	(0.0356)	(0.00966)	(0.369)	(0.102)	(0.0316)
Marriedpartn (t-1)	0.226	0.0544	0.157**	-0.0453	-0.00824	0.654***	0.0252	-0.00681
	(0.212)	(0.0406)	(0.0519)	(0.0263)	(0.0245)	(0.179)	(0.0860)	(0.0233)
Divorcsepar (t-1)	-0.482	0.0285	0.210***	-0.0517	-0.000709	1.068***	-0.00832	0.0555***
	(0.333)	(0.0541)	(0.0414)	(0.0475)	(0.0177)	(0.226)	(0.131)	(0.0147)
Widowed (t-1)	0.167	0.0321	0.222***	-0.0383	-0.0215	0.866***	-0.0187	0.0473
	(0.102)	(0.0422)	(0.0474)	(0.0434)	(0.0313)	(0.102)	(0.0623)	(0.0287)
DRINKING (t-1)								
5or6days_week	0.442	-0.0615***	-0.0124	-0.0620***	-0.0527***	-0.489	0.170**	-0.0556***
	(0.348)	(0.0183)	(0.0513)	(0.0158)	(0.00964)	(0.300)	(0.0734)	(0.0149)
3or4days_week	0.396	-0.0769**	-0.0600	-0.0618	-0.0498**	-0.523***	0.167***	-0.0736***
	(0.517)	(0.0293)	(0.0501)	(0.0397)	(0.0185)	(0.164)	(0.0400)	(0.0162)
1or2_week	0.566**	-0.123***	-0.0838***	-0.0318*	-0.0606***	-0.845**	0.179***	-0.103***
	(0.252)	(0.0245)	(0.0191)	(0.0172)	(0.0144)	(0.331)	(0.0456)	(0.0220)
1or2_month	0.515	-0.128***	-0.154*	-0.0651	-0.0582***	-1.061*	0.181**	-0.0843***
	(0.358)	(0.0391)	(0.0713)	(0.0407)	(0.0154)	(0.529)	(0.0595)	(0.0170)
<1_month	0.357*	-0.197***	-0.142*	-0.0808**	-0.0873***	-0.618**	0.301**	-0.0517
	(0.193)	(0.0535)	(0.0712)	(0.0305)	(0.0182)	(0.252)	(0.103)	(0.0398)
0_in_3months	0.587*	-0.141***	-0.0846**	-0.0628***	-0.0593***	-0.826*	0.172**	-0.0770**
	(0.304)	(0.0348)	(0.0344)	(0.0197)	(0.00964)	(0.389)	(0.0577)	(0.0260)
SPORT (t-1)								
1_week	-0.836***	0.110***	0.109***	0.0704***	0.0327***	0.427**	-0.0564	0.116***
	(0.225)	(0.0105)	(0.0252)	(0.0105)	(0.00661)	(0.185)	(0.0451)	(0.0256)
1or3_month	-1.001***	0.129***	0.188***	0.0545***	0.0207***	0.971***	-0.0952	0.122***
	(0.187)	(0.0254)	(0.0342)	(0.00959)	(0.00485)	(0.206)	(0.0580)	(0.0234)
Hardlyever_never	-1.375***	0.219***	0.229***	0.160***	0.0722***	1.391***	-0.174***	0.280***
	(0.0961)	(0.0151)	(0.0363)	(0.0266)	(0.00731)	(0.221)	(0.0472)	(0.0445)
Smoking (t-1)	-0.260*	0.0974***	-0.0322	0.0363***	0.00159	0.0529	-0.0258	0.0470**
	(0.122)	(0.0129)	(0.0261)	(0.00866)	(0.00292)	(0.145)	(0.0392)	(0.0182)
Overweight_Obese (t-1)	-0.0758	0.0996***	0.147***	-5.05e-05	-0.0231***	0.372**	-0.00703	0.0523***
	(0.0661)	(0.0145)	(0.0292)	(0.0105)	(0.00267)	(0.147)	(0.0189)	(0.0114)
Lnincome (t-1)	0.288***	-0.0657***	0.00951	-0.0272	0.0103**	0.206	0.0130	0.00360
	(0.0329)	(0.00979)	(0.0109)	(0.0228)	(0.00435)	(0.155)	(0.0348)	(0.00484)
Reducedrinking	-0.543***	0.0931***	0.0606***	0.0566***	0.0325***	0.974***	-0.0914*	0.0903***
	(0.118)	(0.0122)	(0.0156)	(0.0131)	(0.00456)	(0.209)	(0.0469)	(0.0184)
Improvesport	1.393***	-0.271***	-0.237***	-0.167***	-0.0726***	-1.224***	0.141***	-0.297***
	(0.151)	(0.0150)	(0.0573)	(0.0297)	(0.0136)	(0.209)	(0.0402)	(0.0299)
Gets_Divsep	-0.372	0.0882***	0.0372*	-0.000112	-0.0255	-0.00581	-0.156**	-0.00243
	(0.433)	(0.0245)	(0.0194)	(0.0163)	(0.0203)	(0.172)	(0.0584)	(0.0392)
Gets_Retired	0.330	0.0105	0.0121	-0.0346	0.00554	0.512	-0.0895**	-0.0919*
	(0.206)	(0.0647)	(0.0319)	(0.0235)	(0.0110)	(0.423)	(0.0326)	(0.0436)
Gets_Unemployed	-1.155**	0.133**	0.0710	-0.0192	-0.00158	-0.639	-0.236*	-0.0206
	(0.378)	(0.0536)	(0.135)	(0.0280)	(0.00952)	(0.727)	(0.111)	(0.0365)
∆lnincome	0.0160	-0.0285***	0.0443***	0.00934	0.00672**	0.153***	-0.00190	0.0190***
	(0.0366)	(0.00262)	(0.00841)	(0.00699)	(0.00307)	(0.0120)	(0.00486)	(0.00526)
Gets_Grandchildren	0.0145	0.00112	-0.00367	0.00659	0.00280	-0.123	-0.00631	0.00422
	(0.109)	(0.0124)	(0.0131)	(0.00583)	(0.00321)	(0.191)	(0.0151)	(0.0182)
Year Dummies	YES	YES	YES	YES	YES	YES	YES	YES
Country Dummies	YES	YES	YES	YES	YES	YES	YES	YES
Observations	25,710	33,480	33,482	33,481	33,491	33,298	33,067	33,477
R-squared	0.252	0.296	0.230	0.177	0.174	0.301	0.330	0.208

Omitted benchmarks: employed, housework, other_job for job status, never_married for marital status, Austria for country dummies, age50_54 for age dummies, almost_every_day for drinking habits, <1_week for sport activities. Robust standard errors in parentheses clustered at country level. *** p<0.01, ** p<0.05, * p<0.1.

Table A2a – The determinants of changes in specific illnesses

	(1) Δlongterm illness	(2) Δheart attack	(3) Δhyper tension	(4) Δstroke	(5) Δdiabetes	(6) Δasthma	(7) Δarthritis	(8) Δosteopor	(9) Δcancer	(10) Δpepticul	(11) Δparkinson	(12) Δcataracts	(13) Δfemoralfract.	(14) Δothercond.	(15) Δnoconditions
Voluntary (t-1)	-0.00274	-0.00359	0.00644	0.00122	-0.00577	0.00271	0.00307	-0.00211	-0.00511*	-0.000277	-0.000427	0.00188	0.000807	0.0110**	0.00505
	(0.0121)	(0.00361)	(0.00531)	(0.00226)	(0.00328)	(0.00207)	(0.00449)	(0.00214)	(0.00277)	(0.00240)	(0.000997)	(0.00325)	(0.00169)	(0.00498)	(0.00788)
Longtermillness (t-1)	-0.608***														
	(0.0194)														
Heartattack (t-1)		-0.503***													
		(0.0272)													
Hypertension (t-1)			-0.423***												
			(0.0190)												
Stroke (t-1)				-0.602***											
				(0.0300)											
Diabetes (t-1)					-0.249***										
					(0.0189)										
Asthma (t-1)						-0.674***									
						(0.0435)									
Arthritis (t-1)							-0.577***								
							(0.0192)								
Osteoporosis (t-1)								-0.720***							
								(0.0479)							
Cancer (t-1)									-0.672***						
									(0.0311)						
Pepticulcer (t-1)										-0.742***					
										(0.0378)					
Parkinsondisease (t-1)											-0.334***				
											(0.0471)				
Cataracts (t-1)												-0.713***			
												(0.0307)			
Femoralfracture (t-1)													-0.746***		
													(0.0232)		
Otherconditions (t-1)														-0.797***	
														(0.0215)	
Noconditions (t-1)															-0.593***
															(0.0231)
Female	-0.00763	-0.0298***	0.00606	-0.0104***	-0.0110***	0.000423	0.0707***	0.0341***	-0.00819***	0.00174	-0.00225***	0.0174***	0.00404***	0.0120*	-0.0141**
	(0.00677)	(0.00317)	(0.00457)	(0.00297)	(0.00191)	(0.00180)	(0.00976)	(0.00638)	(0.00163)	(0.00231)	(0.000629)	(0.00338)	(0.000982)	(0.00630)	(0.00538)
Age55_59 (t-1)	0.00999*	0.00816*	0.0377***	0.00330	0.00614*	0.00134	0.0243**	0.00426	-8.94e-06	0.00532	-0.000806	0.00720***	0.000755	-0.0128**	-0.0532***
	(0.00542)	(0.00432)	(0.00799)	(0.00191)	(0.00337)	(0.00225)	(0.00825)	(0.00247)	(0.00299)	(0.00349)	(0.000751)	(0.00211)	(0.00146)	(0.00493)	(0.00841)
Age60_64 (t-1)	0.0200	0.0140**	0.0598***	0.00620*	0.0144**	-0.00364	0.0464***	0.0129**	0.00365	0.00131	0.00194	0.0244***	0.000858	-0.0259**	-0.0717***
	(0.0128)	(0.00506)	(0.00918)	(0.00344)	(0.00480)	(0.00250)	(0.0120)	(0.00439)	(0.00376)	(0.00368)	(0.00117)	(0.00491)	(0.00204)	(0.00994)	(0.0102)
Age65_69 (t-1)	0.0406**	0.0330***	0.0871***	0.0112**	0.0180***	-0.00143	0.0570***	0.0215***	0.00615	0.00508	0.00185	0.0397***	0.00366*	-0.0285*	-0.106***
	(0.0160)	(0.00671)	(0.00838)	(0.00369)	(0.00558)	(0.00165)	(0.0148)	(0.00450)	(0.00552)	(0.00483)	(0.00115)	(0.00412)	(0.00180)	(0.0139)	(0.0122)
Age70_74 (t-1)	0.0434**	0.0530***	0.0966***	0.0174***	0.0128***	0.000520	0.0653***	0.0234***	0.00465	0.000800	0.000910	0.0711***	0.00959***	-0.0325**	-0.109***
	(0.0198)	(0.00724)	(0.00703)	(0.00442)	(0.00384)	(0.00280)	(0.0155)	(0.00605)	(0.00634)	(0.00485)	(0.00186)	(0.00851)	(0.00227)	(0.0111)	(0.0125)
Age75_79 (t-1)	0.0603***	0.0626***	0.0778***	0.0320***	0.0121*	-0.00365	0.0753***	0.0291***	0.0114*	0.00795	0.00585***	0.0851***	0.0145***	-0.0465***	-0.117***
	(0.0169)	(0.00521)	(0.0118)	(0.00371)	(0.00675)	(0.00294)	(0.0143)	(0.00670)	(0.00598)	(0.00547)	(0.00186)	(0.00933)	(0.00457)	(0.0135)	(0.0111)
AgeAbove_80 (t-1)	0.0660**	0.0797***	0.0507***	0.0359***	-0.00170	-0.00484	0.0827***	0.0271***	0.00279	0.00708	0.00470	0.102***	0.0402***	-0.0324**	-0.119***

	(0.0229)	(0.00975)	(0.0149)	(0.00749)	(0.00829)	(0.00399)	(0.0195)	(0.00745)	(0.00814)	(0.00592)	(0.00290)	(0.0151)	(0.00500)	(0.0140)	(0.0139)
Eduyears (t-1)	-0.00216*	-0.00143**	-0.00265***	-0.000460*	-0.000834**	-0.000709***	-0.00319**	-0.000566	0.000113	-0.000626	0.000106	0.000441	-0.000439**	-1.78e-05	0.00305***
	(0.00120)	(0.000484)	(0.000554)	(0.000223)	(0.000341)	(0.000192)	(0.00122)	(0.000498)	(0.000290)	(0.000428)	(0.000170)	(0.000406)	(0.000160)	(0.00121)	(0.000569)
N_Children (t-1)	-0.00185	0.000275	-0.000711	0.000580	0.000176	-5.47e-05	-3.16e-06	-0.00280***	-0.000933	-0.000627	0.000347	-0.00169	-8.01e-05	-0.00158	0.00352
	(0.00311)	(0.00212)	(0.00199)	(0.000888)	(0.00104)	(0.000607)	(0.00176)	(0.000818)	(0.00116)	(0.000995)	(0.000237)	(0.00174)	(0.000642)	(0.00157)	(0.00217)
N_Grandchildren (t-1)	0.00214*	0.00141**	4.50e-05	0.000260	0.000284	0.000235	0.000704	0.000926	0.000549	-0.000182	0.000175	3.84e-05	8.93e-05	0.000685	-0.00158
	(0.00115)	(0.000492)	(0.000924)	(0.000597)	(0.000482)	(0.000359)	(0.00119)	(0.000551)	(0.000526)	(0.000720)	(0.000168)	(0.000797)	(0.000342)	(0.000802)	(0.00106)
Retired (t-1)	0.0174	-0.000779	-0.00365	-0.00437	0.00414	0.00269	-0.00317	0.000518	0.00783**	0.00296	0.00141	0.0133**	-0.00173	0.0138	-0.0266***
	(0.0114)	(0.00372)	(0.00623)	(0.00323)	(0.00307)	(0.00159)	(0.00955)	(0.00507)	(0.00266)	(0.00245)	(0.00120)	(0.00533)	(0.00188)	(0.0107)	(0.00804)
Unemployed (t-1)	0.0259	-0.00740	0.00617	-0.00177	0.00323	0.00230	0.0273**	-0.00158	0.00775	0.00801	0.000960	0.00846*	-0.00227	0.00280	-0.0480***
	(0.0151)	(0.00586)	(0.00920)	(0.00339)	(0.00451)	(0.00560)	(0.00994)	(0.00431)	(0.00587)	(0.00685)	(0.00185)	(0.00456)	(0.00160)	(0.0166)	(0.0155)
Marriedpartn (t-1)	-0.00804	-0.00333	0.0169*	0.00586	-0.00474	-0.00411	-0.00361	0.00280	-0.00219	-0.000641	9.23e-06	-0.00982	0.00293	-0.0268**	0.00146
	(0.0125)	(0.00702)	(0.00908)	(0.00501)	(0.00577)	(0.00328)	(0.00795)	(0.00552)	(0.00535)	(0.00475)	(0.00156)	(0.00807)	(0.00314)	(0.00920)	(0.00908)
Divorcsepar (t-1)	0.0210	0.00248	0.00894	0.0108	-0.0106	0.000217	0.00861	0.00239	-0.00178	0.00877	-0.00178	-0.00261	0.00700	-0.00580	-0.0154
	(0.0176)	(0.00732)	(0.00990)	(0.00695)	(0.00712)	(0.00421)	(0.00773)	(0.00796)	(0.00616)	(0.00582)	(0.00236)	(0.00667)	(0.00430)	(0.0103)	(0.0133)
Widowed (t-1)	0.0121	0.000419	0.0201*	0.00178	-0.00118	0.00110	0.0202*	0.0101	-0.00152	-0.00694	-0.000174	0.00803	0.00623	-0.0216*	-0.0129
	(0.0142)	(0.00836)	(0.0102)	(0.00562)	(0.00533)	(0.00333)	(0.0102)	(0.00596)	(0.00633)	(0.00697)	(0.00189)	(0.0113)	(0.00396)	(0.0101)	(0.0108)
DRINKING (t-1)															
5or6days_week	-0.0227**	-0.00281	-0.00155	-0.00466	-0.00512	-0.00786***	0.00518	-0.00921**	-0.0123***	0.000337	0.000204	-0.00278	-0.00220	0.00593	0.00535
	(0.00843)	(0.00619)	(0.00605)	(0.00363)	(0.00507)	(0.00247)	(0.00931)	(0.00374)	(0.00320)	(0.00559)	(0.00158)	(0.00514)	(0.00257)	(0.00639)	(0.00799)
3or4days_week	-0.0372***	-0.0191***	-0.0216**	-0.00986**	-0.0111**	-0.000917	0.00273	-1.86e-05	-0.00936**	-0.00298	-0.000800	-0.00735	-0.00395	-0.00777	0.0187**
	(0.00774)	(0.00599)	(0.00864)	(0.00341)	(0.00463)	(0.00284)	(0.00515)	(0.00465)	(0.00409)	(0.00387)	(0.00131)	(0.00566)	(0.00223)	(0.00719)	(0.00636)
1or2_week	-0.0473***	-0.0178***	-0.0197***	-0.00869*	-0.0192***	-0.00561**	0.00297	-0.00765**	-0.0115***	-0.00580	-0.000215	-0.00722	-0.00263	-0.0151***	0.0252**
	(0.00622)	(0.00358)	(0.00506)	(0.00400)	(0.00542)	(0.00184)	(0.00646)	(0.00299)	(0.00323)	(0.00406)	(0.00103)	(0.00459)	(0.00232)	(0.00399)	(0.00883)
1or2_month	-0.0500***	-0.0255***	-0.0179**	-0.00837*	-0.0187***	-0.00628**	-0.00404	-0.0130**	-0.00489	-0.00763*	-0.000851	-0.0106	-0.00325	-0.0117*	0.0254*
	(0.0111)	(0.00629)	(0.00814)	(0.00405)	(0.00517)	(0.00231)	(0.00707)	(0.00447)	(0.00389)	(0.00381)	(0.00136)	(0.00743)	(0.00252)	(0.00612)	(0.0119)
<1_month	-0.0575***	-0.0370***	-0.00520	-0.00848*	-0.0257**	-0.00268	0.00568	-0.00497	-0.00275	-0.0130***	0.000718	-0.00226	-0.00143	-0.0262**	0.00526
	(0.0145)	(0.00949)	(0.00856)	(0.00437)	(0.0100)	(0.00307)	(0.0123)	(0.00830)	(0.00765)	(0.00332)	(0.00321)	(0.00585)	(0.00364)	(0.0113)	(0.0104)
0_in_3months	-0.0429***	-0.0210***	-0.00608	-0.00985***	-0.0200***	-0.00481*	0.0109	-0.00341	-0.0111**	-0.00973***	-0.00104	-0.00551	-0.00310	-0.0141**	0.00755
	(0.00805)	(0.00463)	(0.00693)	(0.00265)	(0.00483)	(0.00230)	(0.00662)	(0.00390)	(0.00432)	(0.00257)	(0.00146)	(0.00413)	(0.00208)	(0.00500)	(0.00791)
SPORT (t-1)															
1_week	0.0519***	0.00656	0.0122*	0.00544	0.00937*	-0.00150	0.0224**	0.00405	0.00300	0.00126	0.000203	0.00789	0.00518***	0.0132**	-0.0263***
	(0.00723)	(0.00613)	(0.00659)	(0.00328)	(0.00456)	(0.00211)	(0.00806)	(0.00308)	(0.00330)	(0.00189)	(0.00109)	(0.00521)	(0.00147)	(0.00519)	(0.00511)
1or3_month	0.0624***	0.0168**	0.0172**	0.00840**	0.0160**	0.00267	0.0275***	0.00672	0.0135***	-0.00185	0.000343	0.00595	0.00735***	0.0169**	-0.0401***
	(0.00816)	(0.00583)	(0.00682)	(0.00337)	(0.00592)	(0.00245)	(0.00710)	(0.00440)	(0.00289)	(0.00298)	(0.00173)	(0.00497)	(0.00238)	(0.00580)	(0.00982)
Hardlyever_never	0.104***	0.0284***	0.0239***	0.0129***	0.0188***	0.00480**	0.0421***	0.00674**	0.0109***	0.00564*	0.00332**	0.0115***	0.00907***	0.0274***	-0.0543***
	(0.00933)	(0.00646)	(0.00329)	(0.00370)	(0.00403)	(0.00184)	(0.00775)	(0.00268)	(0.00244)	(0.00268)	(0.00128)	(0.00314)	(0.00197)	(0.00411)	(0.00578)
Smoking (t-1)	0.0127	0.00473	-0.0132*	0.00408	0.00574	-0.00131	-0.00938*	0.00312	0.00418	0.00339	-0.00127*	-0.00151	0.000324	-0.00520	0.00125
	(0.00772)	(0.00432)	(0.00640)	(0.00277)	(0.00332)	(0.00145)	(0.00513)	(0.00257)	(0.00267)	(0.00303)	(0.000650)	(0.00239)	(0.000775)	(0.00501)	(0.00473)
Overweight_Obese (t-1)	0.0403***	0.00759**	0.0621***	0.00113	0.0321***	0.00150	0.0241***	-0.00830**	0.000242	0.00213	0.000593	0.00411	-0.000649	0.00443	-0.0512***
	(0.00665)	(0.00252)	(0.00579)	(0.00239)	(0.00320)	(0.000861)	(0.00457)	(0.00308)	(0.00178)	(0.00159)	(0.000860)	(0.00270)	(0.00132)	(0.00341)	(0.00526)
Lnincome (t-1)	-0.00132	0.000286	-0.00472	-0.000720	-0.00304**	0.000323	-0.00145	-0.00290	0.00581***	-0.00373**	0.000566	0.00296*	0.00189**	0.00238	0.00131
	(0.00406)	(0.00235)	(0.00270)	(0.00106)	(0.00131)	(0.00195)	(0.00268)	(0.00205)	(0.00176)	(0.00142)	(0.000604)	(0.00143)	(0.000712)	(0.00255)	(0.00316)
Reducedrinking	0.0301***	0.00964***	0.000958	0.00707**	0.00999**	0.00249	0.0103**	0.00303	0.00881**	-0.000870	0.000923	0.00297	0.000234	0.0101**	-0.0176***
	(0.00966)	(0.00306)	(0.00506)	(0.00273)	(0.00328)	(0.00183)	(0.00461)	(0.00264)	(0.00308)	(0.00195)	(0.00114)	(0.00308)	(0.00161)	(0.00406)	(0.00470)
Improvesport	-0.0999***	-0.0294***	-0.0207***	-0.00897***	-0.0136***	-0.00573***	-0.0308***	-0.00479	-0.0119***	-0.00282	-0.00276**	-0.00638	-0.00731***	-0.0243***	0.0449***
	(0.0109)	(0.00616)	(0.00566)	(0.00199)	(0.00365)	(0.00126)	(0.00710)	(0.00298)	(0.00188)	(0.00277)	(0.000959)	(0.00382)	(0.00204)	(0.00471)	(0.00591)
Gets_Divsep	0.0215	-0.00253	0.0381**	0.00241	0.0101	-0.000349	0.00983	0.00984**	-0.00201	-0.00431	-0.000655	0.00371	0.00405	-0.000815	-0.0274**
	(0.0206)	(0.00944)	(0.0172)	(0.00943)	(0.00874)	(0.00514)	(0.0147)	(0.00440)	(0.00730)	(0.00655)	(0.00342)	(0.00852)	(0.00558)	(0.0162)	(0.0125)
Gets_Retired	0.0138	0.00880	0.00185	-0.000361	-0.00470	0.00339	-0.00539	0.00308	0.00575	0.00508	0.00206	0.00184	-0.000233	0.0139	-0.0222*

	(0.0130)	(0.00598)	(0.00893)	(0.00429)	(0.00580)	(0.00204)	(0.00612)	(0.00428)	(0.00453)	(0.00346)	(0.00138)	(0.00382)	(0.00247)	(0.00976)	(0.0116)
Gets_Unemployed	0.0296	0.00528	0.0108	-0.00231	0.0105	0.00412	0.0274	0.00638	0.00302	0.0227**	-0.000712	-0.00806	-0.00466***	0.0164	-0.0182
	(0.0173)	(0.00786)	(0.0161)	(0.00512)	(0.00869)	(0.00767)	(0.0242)	(0.00576)	(0.00799)	(0.0104)	(0.000470)	(0.00544)	(0.00111)	(0.0160)	(0.0329)
Δlnincome	0.00934**	0.00192	0.00127	0.00177*	-0.000754	0.00268	0.00529**	-0.00195	0.00488**	0.000151	0.000521	0.00421*	0.00122***	0.00563**	-0.00850***
	(0.00323)	(0.00173)	(0.00157)	(0.000889)	(0.000857)	(0.00215)	(0.00225)	(0.00171)	(0.00186)	(0.00111)	(0.000436)	(0.00200)	(0.000333)	(0.00226)	(0.00236)
Gets_Grandchildren	0.00899	0.00637***	0.00215	-0.00123	-0.000760	0.00344***	0.00106	0.00467	-0.00121	0.00135	-4.62e-05	-0.00179	-0.00104	-0.000110	-0.00708
	(0.00566)	(0.00196)	(0.00386)	(0.00211)	(0.00251)	(0.000887)	(0.00416)	(0.00386)	(0.00238)	(0.00228)	(0.000681)	(0.00324)	(0.000780)	(0.00364)	(0.00614)
Gets_Unemployed	0.0296	0.00528	0.0108	-0.00231	0.0105	0.00412	0.0274	0.00638	0.00302	0.0227**	-0.000712	-0.00806	-0.00466***	0.0164	-0.0182
	(0.0173)	(0.00786)	(0.0161)	(0.00512)	(0.00869)	(0.00767)	(0.0242)	(0.00576)	(0.00799)	(0.0104)	(0.000470)	(0.00544)	(0.00111)	(0.0160)	(0.0329)
Year dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	33,834	33,830	33,830	33,830	33,830	33,830	33,830	33,830	33,830	33,830	33,830	33,830	33,830	33,830	33,830
R-squared	0.312	0.245	0.201	0.291	0.093	0.500	0.271	0.473	0.374	0.490	0.091	0.334	0.380	0.419	0.308

Omitted benchmarks: employed, housework, other_job for job status, never_married for marital status, Austria for country dummies, age50_54 for age dummies, almost_every_day for drinking habits, <1_week for sport activities. Robust standard errors in parentheses clustered at country level. *** p<0.01, ** p<0.05, * p<0.1.

Table A2b – The determinants of changes in specific illnesses (attrition-adjusted)

	(1) Δlongterm illness	(2) Δheart attack	(3) Δhyper tension	(4) Δstroke	(5) Δdiabetes	(6) Δasthma	(7) Δarthritis	(8) Δosteopor	(9) Δcancer	(10) Δpepticul	(11) Δparkinson	(12) Δcataracts	(13) Δfemoralfract.	(14) Δothercond.	(15) Δnoconditions
Voluntary (t-1)	-0.0163	-0.00298	-0.00263	0.00209	-0.00204	0.00317	0.00564	0.00398*	-0.00874**	-0.00676	0.000794	0.00727	-0.00212*	0.0158	0.00227
	(0.0140)	(0.00719)	(0.00762)	(0.00209)	(0.00305)	(0.00560)	(0.0103)	(0.00214)	(0.00319)	(0.00444)	(0.00165)	(0.00598)	(0.00113)	(0.00914)	(0.0111)
Longtermillness (t-1)	-0.608***														
	(0.0126)														
Heartattack (t-1)		-0.514***													
		(0.0416)													
Hypertension (t-1)			-0.431***												
			(0.0231)												
Stroke (t-1)				-0.582***											
				(0.0428)											
Diabetes (t-1)					-0.236***										
					(0.0207)										
Asthma (t-1)						-0.618***									
						(0.0981)									
Arthritis (t-1)							-0.592***								
							(0.0264)								
Osteoporosis (t-1)								-0.670***							
								(0.0753)							
Cancer (t-1)									-0.656***						
									(0.0337)						
Pepticulcer (t-1)										-0.744***					
										(0.0224)					
Parkinsondisease (t-1)											-0.283***				
											(0.0428)				
Cataracts (t-1)												-0.652***			
												(0.0398)			
Femoralfracture (t-1)													-0.741***		
													(0.0433)		

Otherconditions (t-1)														-0.818***	
														(0.0122)	
Noconditions (t-1)															-0.583***
															(0.0140)
Female	-0.0164	-0.0340***	0.00727*	-0.0185***	-0.00997***	-0.00180	0.0532***	0.0353***	-0.0127***	-0.00295	-0.000237	0.0146***	0.00581***	0.00261	-0.00153
	(0.0134)	(0.0104)	(0.00359)	(0.00529)	(0.00219)	(0.00183)	(0.0104)	(0.00713)	(0.00303)	(0.00344)	(0.00127)	(0.00428)	(0.00126)	(0.00836)	(0.0122)
Age55_59 (t-1)	0.00758	0.00217	0.0337**	0.00157	0.00809*	0.00326	0.0280***	-0.00270	-0.00178	0.00964	-0.00203	0.0125	0.00267	-0.0131	-0.0510***
	(0.0201)	(0.00608)	(0.0114)	(0.00176)	(0.00399)	(0.00363)	(0.00585)	(0.00309)	(0.00311)	(0.00681)	(0.00120)	(0.00714)	(0.00245)	(0.0107)	(0.00826)
Age60_64 (t-1)	0.0257*	0.00641	0.0660***	0.00647	0.0213**	-0.00779	0.0362***	0.00219	0.00457	0.00455	1.04e-05	0.0230***	-0.00143	-0.0248	-0.0729***
	(0.0132)	(0.00570)	(0.0208)	(0.00607)	(0.00742)	(0.00574)	(0.0110)	(0.00447)	(0.00290)	(0.00436)	(0.00155)	(0.00712)	(0.00351)	(0.0221)	(0.0179)
Age65_69 (t-1)	0.0262	0.0262**	0.0875***	0.00996***	0.0256***	-0.00290	0.0290*	0.0182**	0.00852	0.00740	0.00264	0.0247*	0.00429	-0.0341	-0.0962***
	(0.0258)	(0.0115)	(0.0239)	(0.00298)	(0.00693)	(0.00678)	(0.0145)	(0.00639)	(0.00582)	(0.00624)	(0.00210)	(0.0129)	(0.00302)	(0.0192)	(0.0202)
Age70_74 (t-1)	0.0293	0.0325**	0.0944***	0.0105	0.0293***	0.00235	0.0408**	0.0211***	0.00611	0.00231	-0.00170	0.0664***	0.0165***	-0.0189	-0.101***
	(0.0297)	(0.0120)	(0.0130)	(0.00913)	(0.00840)	(0.00796)	(0.0147)	(0.00531)	(0.00690)	(0.00650)	(0.00204)	(0.0143)	(0.00500)	(0.0142)	(0.0177)
Age75_79 (t-1)	0.0270	0.0677***	0.0739***	0.0199**	0.00788	-0.00586	0.0366	0.0353***	0.0151	0.0101	0.00280	0.0958***	0.0196**	-0.0567**	-0.0912***
	(0.0285)	(0.0115)	(0.0173)	(0.00905)	(0.00606)	(0.00714)	(0.0211)	(0.00800)	(0.0105)	(0.0105)	(0.00342)	(0.0131)	(0.00810)	(0.0199)	(0.0137)
AgeAbove_80 (t-1)	0.0159	0.0619***	0.0436**	0.0357*	0.0105	-0.00786	0.0265	0.0314***	0.0151	0.00782	0.00219	0.0870***	0.0447***	-0.0451**	-0.0762***
	(0.0265)	(0.0125)	(0.0149)	(0.0165)	(0.0112)	(0.0123)	(0.0240)	(0.00975)	(0.00853)	(0.00848)	(0.00379)	(0.0177)	(0.00492)	(0.0181)	(0.0163)
Eduyears (t-1)	-0.00255**	-0.000979**	-0.000952	-0.000845*	-0.000900	-0.000268	-0.00137	-0.000529	9.63e-05	-0.000201	0.000134	-0.000436	-0.000405	0.000253	0.000794
	(0.00113)	(0.000337)	(0.00148)	(0.000402)	(0.000510)	(0.000402)	(0.00138)	(0.000321)	(0.000386)	(0.000609)	(0.000138)	(0.000615)	(0.000277)	(0.00121)	(0.00144)
N_Children (t-1)	0.00299	0.000445	0.00119	0.000468	0.00229	-0.00115	-0.000404	-0.00465**	-4.00e-05	-0.000866	0.000429	-0.00300	-0.000735	-0.00204	-0.000605
	(0.00187)	(0.00396)	(0.00295)	(0.00188)	(0.00237)	(0.000803)	(0.00165)	(0.00154)	(0.00130)	(0.00207)	(0.000310)	(0.00184)	(0.00138)	(0.00262)	(0.00266)
N_Grandchildren (t-1)	0.000642	0.00172**	-0.000496	-0.000114	-7.70e-05	0.000153	0.00214	0.000245	0.000612	-0.000839	6.28e-05	0.000777	-0.000499	-0.000622	-0.000214
	(0.000999)	(0.000682)	(0.00128)	(0.000644)	(0.000452)	(0.000581)	(0.00123)	(0.000433)	(0.000493)	(0.00101)	(0.000173)	(0.00252)	(0.000322)	(0.000946)	(0.00132)
Retired (t-1)	0.0267	-0.000171	0.0112	-0.00348	-0.00483	0.00276	-0.00878	-0.00170	0.00519	0.00262	0.00140	0.0217***	0.00269	0.0165	-0.0221
	(0.0191)	(0.00655)	(0.0154)	(0.00436)	(0.00582)	(0.00494)	(0.0101)	(0.00329)	(0.00396)	(0.00325)	(0.00210)	(0.00689)	(0.00364)	(0.0183)	(0.0173)
Unemployed (t-1)	0.0197	-0.00182	-0.0167	-0.0107***	2.43e-06	0.0131	0.0397	-0.00567	0.00827	0.000196	0.000300	0.0122	0.00260	0.0391	-0.00841
	(0.0257)	(0.00504)	(0.0347)	(0.00267)	(0.00914)	(0.0188)	(0.0243)	(0.00644)	(0.00572)	(0.0102)	(0.00202)	(0.0104)	(0.00275)	(0.0395)	(0.0324)
Marriedpartn (t-1)	-0.0152	0.00852	0.0487**	0.0103***	-0.00169	0.00365	0.00755	-0.000817	-0.00776	0.0123	-1.55e-05	-0.00820	0.00761	-0.0522***	-0.0167
	(0.0115)	(0.00562)	(0.0194)	(0.00337)	(0.00531)	(0.00632)	(0.0104)	(0.00783)	(0.0102)	(0.00824)	(0.00142)	(0.00877)	(0.00733)	(0.0113)	(0.0115)
Divorcsepar (t-1)	-0.00156	0.0163*	0.0541**	0.0133**	-0.00539	0.00531	0.00563	0.00271	-0.000731	0.0121	0.000436	0.00760	0.0128	-0.0322*	-0.0456**
	(0.0199)	(0.00838)	(0.0226)	(0.00572)	(0.00705)	(0.00496)	(0.0152)	(0.00895)	(0.00324)	(0.0109)	(0.00270)	(0.0128)	(0.00907)	(0.0150)	(0.0155)
Widowed (t-1)	0.0140	0.0137***	0.0538**	0.0131	0.00569	0.00567	0.00837	0.00219	-0.00617	0.0168	-0.00113	0.0221**	0.00223	-0.0540***	-0.0432***
	(0.0133)	(0.00372)	(0.0186)	(0.00884)	(0.00565)	(0.0107)	(0.0250)	(0.0112)	(0.00890)	(0.0113)	(0.00169)	(0.00811)	(0.00477)	(0.0173)	(0.0130)
DRINKING (t-1)															
5or6days_week	-0.0301**	-0.00243	0.00890	-0.00479	-0.00614	-0.00228	0.00559	-0.00393	-0.0104	-0.00993	0.00124	-0.00374	0.00812	0.00799	0.00661
	(0.0118)	(0.00829)	(0.0173)	(0.00580)	(0.00660)	(0.00338)	(0.0151)	(0.00551)	(0.00623)	(0.00715)	(0.00144)	(0.00736)	(0.00603)	(0.00910)	(0.0167)
3or4days_week	-0.0396**	-0.0198**	-0.0114	-0.00835**	-0.00181	-0.000628	0.0151**	0.00697*	-0.000947	-0.00742*	0.000240	-0.0101	-0.00191	-0.00779	0.0254*
	(0.0137)	(0.00897)	(0.0171)	(0.00304)	(0.00712)	(0.00692)	(0.00590)	(0.00346)	(0.00591)	(0.00368)	(0.00118)	(0.00579)	(0.00145)	(0.00653)	(0.0122)
1or2_week	-0.0524***	-0.0185**	-0.0145**	-0.00781**	-0.0146**	-0.00374	0.0184**	-0.00137	-0.0101**	-0.0122*	0.00101	-0.00853**	-0.00396*	-0.0167	0.0350**
	(0.0101)	(0.00655)	(0.00659)	(0.00317)	(0.00584)	(0.00320)	(0.00842)	(0.00310)	(0.00392)	(0.00614)	(0.00121)	(0.00335)	(0.00187)	(0.0101)	(0.0127)
1or2_month	-0.0657**	-0.0266	-0.0375	-0.0118**	-0.00941	-0.00425	-0.0106	-0.00830	0.00203	-0.00992*	-0.000402	-0.0245**	-0.00640***	-0.00624	0.0559*
	(0.0275)	(0.0160)	(0.0289)	(0.00397)	(0.00820)	(0.00451)	(0.0183)	(0.00535)	(0.0112)	(0.00541)	(0.000994)	(0.00900)	(0.00197)	(0.00574)	(0.0291)
<1_month	-0.0626**	-0.0629***	-0.0386	-0.00959	-0.0259***	0.00327	0.000629	-0.000998	0.0104	-0.0180***	0.000431	-0.0107	-0.00328	-0.0610**	0.0190
	(0.0265)	(0.0190)	(0.0291)	(0.00977)	(0.00730)	(0.00883)	(0.0157)	(0.00637)	(0.0142)	(0.00277)	(0.00203)	(0.0304)	(0.00560)	(0.0253)	(0.0117)
0_in_3months	-0.0547***	-0.0235*	-0.00210	-0.0136***	-0.0152**	-0.00404	0.00625	-0.000723	-0.00307	-0.0137***	-0.00152	-0.0116**	-0.00401	-0.0330**	0.0243
	(0.0158)	(0.0118)	(0.00745)	(0.00388)	(0.00608)	(0.00370)	(0.00697)	(0.00585)	(0.00926)	(0.00338)	(0.00108)	(0.00467)	(0.00260)	(0.0148)	(0.0149)
SPORT (t-1)															
1_week	0.0599***	0.00758	0.0141	0.00920*	0.0109	-0.00329	0.0297***	0.00175	0.00297	0.00255	0.00177	-0.000953	0.00739***	0.00749	-0.0171
	(0.00565)	(0.0135)	(0.0118)	(0.00451)	(0.00657)	(0.00300)	(0.00462)	(0.00393)	(0.00614)	(0.00544)	(0.00198)	(0.0107)	(0.00152)	(0.00739)	(0.0133)

1or3_month	0.0808***	0.0295***	0.0376**	0.0207**	0.00888	0.00158	0.0464***	0.00520	0.00882**	0.00424	0.00187	0.00730	0.00862***	0.0206***	-0.0547***
	(0.0127)	(0.00870)	(0.0123)	(0.00826)	(0.00904)	(0.00336)	(0.0122)	(0.00660)	(0.00397)	(0.00423)	(0.00202)	(0.00744)	(0.00208)	(0.00480)	(0.0160)
Hardlyever_never	0.121***	0.0399**	0.0423***	0.0190***	0.0148**	0.00622	0.0663***	0.0102*	0.00581***	0.00820	0.00402***	0.00807	0.0147***	0.0393***	-0.0811***
	(0.0133)	(0.0135)	(0.00765)	(0.00457)	(0.00578)	(0.00354)	(0.0192)	(0.00536)	(0.00119)	(0.00616)	(0.00118)	(0.00674)	(0.00327)	(0.0126)	(0.00970)
Smoking (t-1)	-0.00271	-0.000491	-0.0206*	0.00448	-0.00232	-0.00623***	-0.00218	0.00622*	-0.000968	0.00747	-0.000775	-0.00306	0.00325	-0.00686**	0.0180**
	(0.00988)	(0.00420)	(0.00993)	(0.00510)	(0.00416)	(0.00190)	(0.00864)	(0.00306)	(0.00451)	(0.00648)	(0.00135)	(0.00305)	(0.00196)	(0.00297)	(0.00690)
Overweight_Obese (t-1)	0.0445***	0.00181	0.0659***	-0.00374	0.0337***	0.00614*	0.0195***	-0.0117***	0.00263	0.00211	-0.000732	-0.000333	-0.00252	0.000723	-0.0432***
	(0.0114)	(0.00748)	(0.0116)	(0.00465)	(0.00472)	(0.00326)	(0.00561)	(0.00301)	(0.00369)	(0.00253)	(0.00166)	(0.00454)	(0.00187)	(0.00762)	(0.00688)
Lnincome (t-1)	-0.00249	0.000335	-0.00134	-0.000321	-0.00108	-0.00201	-0.0125	-0.00156	0.00577**	-0.00325*	4.12e-05	0.00636**	0.00285**	-0.00720	-0.00175
	(0.00309)	(0.00514)	(0.00597)	(0.00165)	(0.00107)	(0.00115)	(0.0130)	(0.00291)	(0.00245)	(0.00153)	(0.000540)	(0.00236)	(0.00120)	(0.0130)	(0.0120)
Reducedrinking	0.0671***	0.0126***	0.00188	0.00651***	0.0200***	0.00445	0.00153	0.00459*	0.00615	-0.00219	0.00119**	0.00590	0.000934	0.0271**	-0.0333**
	(0.0191)	(0.00365)	(0.00347)	(0.00207)	(0.00458)	(0.00252)	(0.00395)	(0.00235)	(0.00770)	(0.00233)	(0.000494)	(0.00544)	(0.00491)	(0.0118)	(0.0114)
Improvesport	-0.120***	-0.0357***	-0.0293***	-0.0147*	-0.0184***	-0.00409	-0.0566**	-0.00854*	-0.0132***	-0.00582	-0.00294*	-0.00139	-0.0142***	-0.0305**	0.0631***
	(0.0140)	(0.0113)	(0.00756)	(0.00678)	(0.00314)	(0.00290)	(0.0206)	(0.00452)	(0.00242)	(0.00633)	(0.00137)	(0.00841)	(0.00410)	(0.0125)	(0.0104)
Gets_Divsep	0.0288	0.00174	0.0370	0.00935	0.00563	-0.00268	-0.00804	0.00853	0.00755	-0.00222	0.000771	-0.00957	0.00495	0.00416	0.0223
	(0.0422)	(0.0110)	(0.0216)	(0.0124)	(0.0125)	(0.00471)	(0.0320)	(0.0164)	(0.00837)	(0.00573)	(0.00264)	(0.0135)	(0.0136)	(0.0163)	(0.0300)
Gets_Retired	0.00510	0.0144	-0.00321	0.00486	-0.00107	0.00101	-0.00996	0.00412	0.00187	0.00422	0.00230*	-0.00249	0.00136	0.0174	-0.0168
	(0.0276)	(0.0144)	(0.0202)	(0.00442)	(0.00475)	(0.00290)	(0.00953)	(0.00284)	(0.00425)	(0.00450)	(0.00113)	(0.00460)	(0.00463)	(0.0181)	(0.0172)
Gets_Unemployed	-0.0190	0.0108	0.0230	-0.00413	0.00911	0.00267	0.0368	-0.00265	0.00269	0.0211**	-0.000289	-0.00432	-0.00164	0.0107	0.000640
	(0.0610)	(0.00755)	(0.0399)	(0.00939)	(0.0181)	(0.0116)	(0.0244)	(0.00563)	(0.0120)	(0.00745)	(0.000873)	(0.00539)	(0.00236)	(0.0406)	(0.0270)
∆lnincome	0.0132**	0.00308***	0.00635	0.00160**	0.00234***	-0.000847*	0.0184***	0.000140	0.00145***	0.000527**	0.000143	0.00363***	0.00153**	0.00432***	-0.0262***
	(0.00473)	(0.000406)	(0.00384)	(0.000616)	(0.000304)	(0.000389)	(0.00377)	(0.000413)	(0.000281)	(0.000204)	(0.000130)	(0.000509)	(0.000567)	(0.000941)	(0.00675)
Gets_Grandchildren	0.0121	0.000965	0.0110	-0.00184	-0.00878*	0.00178	-0.00677	0.00722*	0.00160	-0.000238	-0.000727	-0.000158	-0.000633	0.00152	-0.0173**
	(0.00679)	(0.00564)	(0.0108)	(0.00368)	(0.00463)	(0.00177)	(0.00790)	(0.00369)	(0.00346)	(0.00182)	(0.00106)	(0.00886)	(0.00157)	(0.00404)	(0.00776)
Gets_Unemployed	-0.0163	-0.00298	-0.00263	0.00209	-0.00204	0.00317	0.00564	0.00398*	-0.00874**	-0.00676	0.000794	0.00727	-0.00212*	0.0158	0.00227
	(0.0140)	(0.00719)	(0.00762)	(0.00209)	(0.00305)	(0.00560)	(0.0103)	(0.00214)	(0.00319)	(0.00444)	(0.00165)	(0.00598)	(0.00113)	(0.00914)	(0.0111)
Year dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	33,477	33,482	33,482	33,482	33,482	33,482	33,482	33,482	33,482	33,482	33,482	33,482	33,482	33,482	33,482
R-squared	0.316	0.264	0.210	0.290	0.095	0.429	0.331	0.412	0.387	0.526	0.075	0.310	0.377	0.457	0.321

Omitted benchmarks: employed, housework, other_job for job status, never_married for marital status, Austria for country dummies, age50_54 for age dummies, almost_every_day for drinking habits, <1_week for sport activities. Robust standard errors in parentheses clustered at country level. *** p<0.01, ** p<0.05, * p<0.1.

Table A3a - Determinants of changes in symptom indicators

	(1) Δjoint pain	(2) Δheart Trouble	(3) Δbreathless.	(4) Δpers. cough	(5) Δswollen legs	(6) Δsleeping problems	(7) Δfallingdown	(8) Δfear of fallingdown	(9) Δdizziness	(10) Δstomach or intestin	(12) Δother symptoms	(13) Δno symptoms
Voluntary (t-1)	-0.00552	-0.00722	0.000503	-0.00138	0.00361	-0.0152***	0.000783	-0.00427	-0.00478	0.000198	0.00259	0.00601
	(0.00744)	(0.00407)	(0.00550)	(0.00309)	(0.00421)	(0.00394)	(0.00366)	(0.00333)	(0.00324)	(0.00673)	(0.00275)	(0.00692)
Jointpain (t-1)	-0.647***											
	(0.0224)											
Hearttrouble (t-1)		-0.665***										
		(0.0313)										
Breathlessness (t-1)			-0.581***									
			(0.0182)									
Persistentcough (t-1)				-0.724***								
				(0.0210)								
Swollenlegs (t-1)					-0.629***							
					(0.0190)							
Sleepingproblems (t-1)						-0.633***						
						(0.0190)						
Fallingdown (t-1)							-0.786***					
							(0.0297)					
Fearoffallingdown (t-1)								-0.693***				
								(0.0254)				
Dizziness (t-1)									-0.710***			
									(0.0265)			
Stomachorintestin (t-1)										-0.660***		
										(0.0212)		
Othersymptoms (t-1)											-0.942***	
											(0.0137)	
Nosymptoms (t-1)												-0.673***
												(0.0271)
Female	0.0621***	-0.0151***	-0.00637***	-0.00388	0.0367***	0.0688***	0.0169***	0.0416***	0.0184***	0.0306***	-0.00399**	-0.0512***
	(0.00859)	(0.00401)	(0.00205)	(0.00278)	(0.00656)	(0.00794)	(0.00373)	(0.00592)	(0.00311)	(0.00428)	(0.00178)	(0.00512)
Age55_59 (t-1)	-0.00125	0.00311	0.00884	0.000832	0.00198	-0.00484	4.93e-05	0.00944**	-0.000860	0.00478	-0.00211	-0.00807
	(0.00858)	(0.00426)	(0.00524)	(0.00439)	(0.00328)	(0.00782)	(0.00291)	(0.00428)	(0.00354)	(0.00634)	(0.00310)	(0.00814)
Age60_64 (t-1)	0.0114	0.00790	0.00876*	0.00296	0.00692	-0.00192	0.00318	0.0216***	0.00501	0.0110*	-0.00570	-0.0140
	(0.0144)	(0.00448)	(0.00449)	(0.00574)	(0.00488)	(0.00908)	(0.00370)	(0.00616)	(0.00447)	(0.00607)	(0.00483)	(0.0136)
Age65_69 (t-1)	0.0142	0.0108*	0.0192***	-0.00469	0.0229***	0.00536	0.0107**	0.0359***	0.00793	0.0172**	-0.00553	-0.0308**
	(0.0183)	(0.00535)	(0.00527)	(0.00646)	(0.00552)	(0.00934)	(0.00415)	(0.00763)	(0.00620)	(0.00744)	(0.00371)	(0.0140)
Age70_74 (t-1)	0.0212	0.0255***	0.0382***	0.00714	0.0298***	0.00336	0.0168**	0.0617***	0.0305***	0.0266***	-0.00745**	-0.0473**
	(0.0185)	(0.00724)	(0.00757)	(0.00675)	(0.00687)	(0.0107)	(0.00567)	(0.0105)	(0.00854)	(0.00859)	(0.00320)	(0.0162)
Age75_79 (t-1)	0.0310	0.0317***	0.0312***	0.00679	0.0590***	-0.00408	0.0330***	0.0834***	0.0433***	0.0329***	-0.00876*	-0.0674***
	(0.0217)	(0.00790)	(0.00845)	(0.00726)	(0.0112)	(0.0122)	(0.00702)	(0.0101)	(0.0116)	(0.00876)	(0.00431)	(0.0160)
AgeAbove_80 (t-1)	0.0345	0.0458***	0.0458***	0.00465	0.0753***	-0.00189	0.0598***	0.161***	0.0777***	0.0257***	-0.00291	-0.0921***
	(0.0255)	(0.00802)	(0.0114)	(0.00365)	(0.00942)	(0.00993)	(0.00672)	(0.0130)	(0.00950)	(0.00595)	(0.00600)	(0.0167)

Eduyears (t-1)	-0.00339**	-0.00169***	-0.00348***	-0.00179***	-0.00299***	-0.00150**	-0.00120***	-0.00193***	-0.00177***	0.000810	0.000172	0.00337***
	(0.00128)	(0.000437)	(0.000529)	(0.000480)	(0.000538)	(0.000633)	(0.000391)	(0.000530)	(0.000576)	(0.000702)	(0.000456)	(0.000919)
N_Children (t-1)	-0.00321	0.000218	0.00203	-0.00164	0.00163	-0.000672	-0.000599	-0.000527	0.00282	-0.00230	0.00122	0.00194
	(0.00287)	(0.00135)	(0.00213)	(0.00126)	(0.00200)	(0.00222)	(0.00123)	(0.00119)	(0.00173)	(0.00150)	(0.000973)	(0.00247)
N_Grandchildren (t-1)	0.00142	0.00110	0.00180*	0.00186**	0.000360	0.00176	0.000794	0.000723	-2.53e-05	0.000811	-0.000404	-0.000546
	(0.00157)	(0.000747)	(0.000928)	(0.000815)	(0.000802)	(0.00106)	(0.000646)	(0.000857)	(0.000755)	(0.000555)	(0.000428)	(0.00102)
Retired (t-1)	0.000937	0.00701	0.00919*	-0.000686	-0.0108**	0.00146	-0.000556	-0.0119**	0.00226	0.00168	0.00305	-0.00886
	(0.00913)	(0.00475)	(0.00493)	(0.00425)	(0.00488)	(0.00688)	(0.00285)	(0.00520)	(0.00799)	(0.00466)	(0.00321)	(0.00629)
Unemployed (t-1)	0.0355***	0.00163	0.00494	0.0101	0.00768	0.0223*	-0.00814*	-0.0127	0.0132	0.0231**	0.0131**	-0.0304**
	(0.0110)	(0.00720)	(0.00821)	(0.0109)	(0.00746)	(0.0124)	(0.00424)	(0.00850)	(0.00838)	(0.00952)	(0.00469)	(0.0129)
Marriedpartn (t-1)	0.00763	-0.00558	-0.0113	-0.00722	-0.0117	0.0121	-0.00629	-0.00374	-0.00223	-0.00584	-0.00588	-0.0130
	(0.0139)	(0.00805)	(0.0104)	(0.00724)	(0.0127)	(0.0110)	(0.00424)	(0.00569)	(0.00691)	(0.00883)	(0.00401)	(0.0135)
Divorcsepar (t-1)	0.0213	-0.00576	0.00676	0.000205	-0.00319	0.0230*	0.00171	0.00698	0.0170**	0.00773	0.00387	-0.0249*
	(0.0126)	(0.00972)	(0.0135)	(0.00935)	(0.0132)	(0.0114)	(0.00600)	(0.00766)	(0.00626)	(0.0146)	(0.00375)	(0.0116)
Widowed (t-1)	0.0269*	-0.00792	2.31e-05	-0.00365	0.0157	0.0171	0.00750	0.0325***	-0.00733	0.00350	-0.00599	-0.0118
	(0.0133)	(0.0112)	(0.0104)	(0.00729)	(0.00934)	(0.0154)	(0.00565)	(0.00638)	(0.00753)	(0.0123)	(0.00378)	(0.0147)
DRINKING (t-1)												
5or6days_week	0.00170	-0.0128*	-0.0205**	9.54e-05	0.00185	-0.00471	-0.00421	-0.0135*	-0.00713	0.00861	0.00307	-0.00756
	(0.0120)	(0.00698)	(0.00807)	(0.00598)	(0.00805)	(0.00759)	(0.00485)	(0.00740)	(0.0114)	(0.00687)	(0.00487)	(0.00607)
3or4days_week	0.00679	-0.0220**	-0.0137	0.00755	-0.00782	-0.0109	-0.0117**	-0.0188**	-0.0182**	0.00395	-0.00812*	-0.00252
	(0.0139)	(0.00742)	(0.00789)	(0.00627)	(0.00604)	(0.00843)	(0.00457)	(0.00723)	(0.00621)	(0.00582)	(0.00425)	(0.00954)
1or2_week	-0.00988	-0.0221***	-0.0219***	-0.00277	-0.0161**	-0.00959	-0.00875	-0.0200**	-0.0183***	-0.00350	-0.0107***	0.00235
	(0.00990)	(0.00684)	(0.00669)	(0.00595)	(0.00724)	(0.00765)	(0.00509)	(0.00761)	(0.00569)	(0.00560)	(0.00243)	(0.00926)
1or2_month	-0.00868	-0.0279***	-0.0175*	0.00212	-0.0266***	-0.0132	-0.0101**	-0.0155*	-0.0227**	-0.00404	-0.00643	0.0130
	(0.0112)	(0.00873)	(0.00848)	(0.00554)	(0.00634)	(0.00895)	(0.00362)	(0.00749)	(0.00769)	(0.00790)	(0.00689)	(0.00949)
<1_month	0.00354	-0.0347***	-0.0136	-0.00730	-0.0250**	-0.0184	-0.00712*	-0.0222**	-0.0193*	-0.0123	-0.00117	0.00527
	(0.0103)	(0.00881)	(0.00885)	(0.00687)	(0.0102)	(0.0183)	(0.00385)	(0.00744)	(0.0102)	(0.00816)	(0.00629)	(0.0147)
0_in_3months	0.00595	-0.0237***	-0.0107	-0.00256	-0.0179*	-0.0194**	-0.00670*	-0.0165*	-0.0190***	-0.00274	-0.00472	0.000232
	(0.0116)	(0.00640)	(0.00679)	(0.00626)	(0.00907)	(0.00740)	(0.00369)	(0.00784)	(0.00500)	(0.00465)	(0.00362)	(0.00727)
SPORT (t-1)												
1_week	0.0127	0.0125**	0.0165**	0.00656	0.0240***	0.00946	0.00669**	0.0179***	0.0174***	0.00771	0.00138	-0.0206*
	(0.00966)	(0.00485)	(0.00599)	(0.00411)	(0.00440)	(0.00590)	(0.00230)	(0.00405)	(0.00500)	(0.00549)	(0.00337)	(0.0102)
1or3_month	0.0262**	0.0165***	0.0227**	0.0141***	0.0217***	0.0337***	0.0148***	0.0341***	0.0300***	0.0192***	-1.73e-05	-0.0448***
	(0.0115)	(0.00539)	(0.00896)	(0.00411)	(0.00511)	(0.00993)	(0.00348)	(0.00540)	(0.00530)	(0.00572)	(0.00325)	(0.0122)
Hardlyever_never	0.0418***	0.0362***	0.0582***	0.0243***	0.0515***	0.0403***	0.0228***	0.0549***	0.0418***	0.0229***	0.00244	-0.0564***
	(0.00911)	(0.00575)	(0.00564)	(0.00297)	(0.00490)	(0.00563)	(0.00197)	(0.00546)	(0.00496)	(0.00513)	(0.00275)	(0.00946)
Smoking (t-1)	-0.00698	-0.000936	0.0259***	0.0310***	-0.00530	0.00397	0.00262	0.00631	0.00122	0.00419	0.000598	-0.00376
	(0.00584)	(0.00333)	(0.00573)	(0.00337)	(0.00317)	(0.00597)	(0.00347)	(0.00405)	(0.00440)	(0.00351)	(0.00223)	(0.00597)
Overweight_Obese (t-1)	0.0541***	0.0114***	0.0240***	0.00258	0.0386***	0.00187	0.00435**	0.0176***	0.00708*	0.000809	-0.000150	-0.0343***
	(0.00397)	(0.00281)	(0.00431)	(0.00201)	(0.00352)	(0.00385)	(0.00189)	(0.00267)	(0.00360)	(0.00583)	(0.00223)	(0.00444)
Lnincome (t-1)	-0.00810*	-0.00362*	-0.00972***	8.95e-06	-0.00342	-0.00256	0.000352	-0.00367**	-0.00709**	-0.00104	0.000395	0.00866*
	(0.00415)	(0.00195)	(0.00258)	(0.00196)	(0.00271)	(0.00280)	(0.00154)	(0.00165)	(0.00296)	(0.00113)	(0.000882)	(0.00442)
Reducedrinking	-0.00220	0.0138**	0.00704**	-0.00409	0.00821*	0.00583	0.00521**	0.00952**	0.00902**	-0.00227	0.00244	-0.00621
	(0.00516)	(0.00502)	(0.00313)	(0.00247)	(0.00395)	(0.00644)	(0.00206)	(0.00327)	(0.00375)	(0.00473)	(0.00232)	(0.00789)
Improvesport	-0.0422***	-0.0313***	-0.0471***	-0.0236***	-0.0326***	-0.0470***	-0.0218***	-0.0473***	-0.0356***	-0.0231***	-0.00406	0.0540***

	(0.00884)	(0.00576)	(0.00360)	(0.00324)	(0.00486)	(0.00707)	(0.00146)	(0.00751)	(0.00629)	(0.00477)	(0.00248)	(0.00908)
Gets_Divsep	-0.00309	0.00333	-0.0211*	-0.0116	0.00891	0.0862***	0.00807	0.0221	0.0130	-0.00338	-0.00388	-0.0246*
	(0.0181)	(0.00724)	(0.0115)	(0.00785)	(0.0120)	(0.0189)	(0.00739)	(0.0125)	(0.0103)	(0.0146)	(0.00564)	(0.0126)
Gets_Retired	-0.00940	0.00291	0.00654	0.00132	-0.0157**	-0.0105*	0.00623***	-0.00164	-0.00244	-0.00191	0.000761	0.00873
	(0.0121)	(0.00622)	(0.00631)	(0.00410)	(0.00540)	(0.00534)	(0.00178)	(0.00657)	(0.00546)	(0.00832)	(0.00267)	(0.00688)
Gets_Unemployed	0.0128	0.00534	-0.00687	0.00777	-0.0151	0.0313*	0.00700	-0.00244	0.0122	0.0154	-0.00877	0.000881
	(0.0246)	(0.0112)	(0.0151)	(0.00792)	(0.0131)	(0.0156)	(0.00502)	(0.0144)	(0.0150)	(0.0186)	(0.0106)	(0.0241)
∆lnincome	-0.00131	-0.000775	-0.000270	0.00206*	-0.000138	0.000180	0.00188*	0.000308	-0.000475	0.00289**	-0.000740	-0.00125
	(0.00239)	(0.000887)	(0.00248)	(0.00114)	(0.00172)	(0.00268)	(0.000916)	(0.00145)	(0.00188)	(0.00111)	(0.00143)	(0.00298)
Gets_Grandchildren	0.0173**	-0.00303	-0.00609	0.00963***	-0.00540	0.00790*	0.000732	-0.00651*	-0.00239	-0.00754**	-0.00169	-0.0140**
	(0.00682)	(0.00317)	(0.00394)	(0.00313)	(0.00386)	(0.00420)	(0.00333)	(0.00327)	(0.00441)	(0.00304)	(0.00174)	(0.00491)
Year dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	33,844	33,844	33,844	33,844	33,844	33,844	33,844	33,844	33,844	33,844	33,844	33,851
R-squared	0.330	0.317	0.261	0.322	0.301	0.305	0.327	0.285	0.335	0.332	0.481	0.364

Omitted benchmarks: employed, housework, other_job for job status, never_married for marital status, Austria for country dummies, age50_54 for age dummies, almost_every_day for drinking habits, <1_week for sport activities. Robust standard errors in parentheses clustered at country level. *** p<0.01, ** p<0.05, * p<0.1

Table A3b - Determinants of changes in symptom indicators (attrition-adjusted)

	(1) ∆joint pain	(2) ∆heart Trouble	(3) ∆breathless.	(4) ∆pers. cough	(5) ∆swollen legs	(6) ∆sleeping problems	(7) ∆fallingdown	(8) ∆fear of fallingdown	(9) ∆dizziness	(10) ∆stomach or intestin	(12) ∆other symptoms	(13) ∆no symptoms
Voluntary (t-1)	-0.000353	-0.0124	-0.0115	0.00536	0.0120	-0.0280***	-0.000904	-0.0117*	-0.00155	-0.00184	0.00211	0.000866
	(0.0125)	(0.00894)	(0.00774)	(0.00747)	(0.0121)	(0.00875)	(0.00342)	(0.00545)	(0.00530)	(0.00839)	(0.00805)	(0.0108)
Jointpain (t-1)	-0.667***											
	(0.0147)											
Hearttrouble (t-1)		-0.676***										
		(0.0198)										
Breathlessness (t-1)			-0.583***									
			(0.0215)									
Persistentcough (t-1)				-0.709***								
				(0.0280)								
Swollenlegs (t-1)					-0.629***							
					(0.0187)							
Sleepingproblems (t-1)						-0.643***						
						(0.0218)						
Fallingdown (t-1)							-0.775***					
							(0.0436)					
Fearoffallingdown (t-1)								-0.719***				
								(0.0351)				
Dizziness (t-1)									-0.712***			
									(0.0308)			

Stomachorintestin (t-1)										-0.673***		
										(0.0229)		
Othersymptoms (t-1)											-0.941***	
											(0.00981)	
Nosymptoms (t-1)												-0.689***
												(0.0184)
Female	0.0523***	-0.0120	-0.0115***	0.00647	0.0262**	0.0716***	0.0110*	0.0334***	0.0198***	0.0270***	-0.00898**	-0.0472***
	(0.00744)	(0.00697)	(0.00227)	(0.00530)	(0.00935)	(0.0126)	(0.00576)	(0.00535)	(0.00448)	(0.00310)	(0.00371)	(0.00684)
Age55_59 (t-1)	-0.0127	0.0110	0.0213*	-0.00232	0.00885	-0.00596	-0.00166	0.00495	-0.00566	0.0203**	0.000573	-0.00647
	(0.0106)	(0.00827)	(0.0102)	(0.00851)	(0.00747)	(0.0121)	(0.00279)	(0.00700)	(0.00932)	(0.00877)	(0.00630)	(0.0103)
Age60_64 (t-1)	0.0253	0.0175	0.0207**	-0.00720	0.0117	0.00407	0.00388	0.0275*	0.00283	0.0267**	0.0166**	-0.0283
	(0.0306)	(0.0104)	(0.00810)	(0.0128)	(0.0105)	(0.0192)	(0.00582)	(0.0133)	(0.0130)	(0.00916)	(0.00728)	(0.0174)
Age65_69 (t-1)	0.00329	0.00988	0.0302***	-0.00510	0.0281*	-0.00412	0.00879	0.0138	-0.0121	0.0328***	-0.000821	-0.0254
	(0.0392)	(0.0142)	(0.00882)	(0.0128)	(0.0135)	(0.0185)	(0.00495)	(0.0124)	(0.0160)	(0.0101)	(0.00881)	(0.0195)
Age70_74 (t-1)	0.0136	0.0254*	0.0537***	0.00347	0.0328*	-0.0236	0.0133	0.0524***	0.00736	0.0375***	0.00681	-0.0577**
	(0.0298)	(0.0127)	(0.00985)	(0.0123)	(0.0168)	(0.0236)	(0.00890)	(0.00937)	(0.0122)	(0.0111)	(0.00616)	(0.0215)
Age75_79 (t-1)	0.0128	0.0477**	0.0355**	-0.0104	0.0643***	-0.0169	0.0440***	0.0633***	0.0268*	0.0639***	-0.000207	-0.0462*
	(0.0303)	(0.0159)	(0.0137)	(0.0169)	(0.0188)	(0.0171)	(0.00799)	(0.0123)	(0.0142)	(0.0207)	(0.0104)	(0.0238)
AgeAbove_80 (t-1)	-0.0142	0.0291***	0.0432***	-0.0114	0.0457**	0.0361	0.0662***	0.137***	0.0581**	0.0606***	0.00237	-0.0621***
	(0.0335)	(0.00771)	(0.00653)	(0.0213)	(0.0158)	(0.0213)	(0.00767)	(0.0144)	(0.0192)	(0.0164)	(0.0102)	(0.0182)
Eduyears (t-1)	-0.00157	-0.00117	-0.00360***	-0.00170***	-0.000699	-0.00299*	-0.00174***	-0.00254***	-0.00289***	0.00161*	0.000156	0.00274*
	(0.00167)	(0.000731)	(0.000527)	(0.000286)	(0.00112)	(0.00147)	(0.000550)	(0.000603)	(0.000596)	(0.000826)	(0.000392)	(0.00152)
N_Children (t-1)	-0.00409	0.00215	0.00690	-0.00331	0.00333	0.00240	0.00105	0.000362	0.00281	0.000166	0.00111	-0.00292
	(0.00346)	(0.00300)	(0.00418)	(0.00366)	(0.00215)	(0.00381)	(0.00198)	(0.00164)	(0.00194)	(0.00360)	(0.000972)	(0.00344)
N_Grandchildren (t-1)	0.00112	0.000999	0.000722	0.00192**	0.00112	0.000304	5.28e-05	0.000547	0.000403	-0.00175	-0.000299	0.00103
	(0.00198)	(0.000738)	(0.00151)	(0.000753)	(0.00142)	(0.00238)	(0.000808)	(0.00100)	(0.000907)	(0.00134)	(0.000976)	(0.000760)
Retired (t-1)	0.0108	0.00552	0.00286	0.00132	-0.0202***	0.00346	0.00326	0.00147	0.0144	0.000296	-0.00286	-0.00656
	(0.0261)	(0.00843)	(0.00621)	(0.00285)	(0.00571)	(0.00512)	(0.00381)	(0.00781)	(0.0154)	(0.00682)	(0.00892)	(0.0171)
Unemployed (t-1)	0.0156	0.00566	0.0110	0.0152	-0.00267	-0.0131	-0.0151***	-0.0197*	-0.0169**	0.0234*	0.0195	-0.0218
	(0.0244)	(0.0120)	(0.0148)	(0.0146)	(0.0209)	(0.0157)	(0.00314)	(0.0104)	(0.00677)	(0.0127)	(0.0164)	(0.0222)
Marriedpartn (t-1)	0.0153	0.0155*	-0.0444***	0.00704	-0.00660	0.0328*	0.00517	0.00864	-0.00714	-0.0131	0.00883	-0.0110
	(0.0145)	(0.00725)	(0.0141)	(0.0180)	(0.0111)	(0.0183)	(0.00609)	(0.0129)	(0.00966)	(0.0215)	(0.0114)	(0.0127)
Divorcsepar (t-1)	0.0142	0.0109	-0.0233	0.0191	0.0117	0.0388**	0.00496	0.0312	0.0257	-0.00384	0.0162	-0.0185
	(0.0176)	(0.0104)	(0.0251)	(0.0193)	(0.0131)	(0.0145)	(0.00598)	(0.0207)	(0.0249)	(0.0365)	(0.0134)	(0.0141)
Widowed (t-1)	0.0164	0.0295	-0.0276	0.0132	0.0380*	0.0110	0.00479	0.0297**	-0.0153	-0.0158	0.00287	0.000622
	(0.0198)	(0.0167)	(0.0164)	(0.0268)	(0.0177)	(0.0253)	(0.00602)	(0.0101)	(0.00865)	(0.0255)	(0.0133)	(0.0204)
DRINKING (t-1)												
5or6days_week	-0.00789	-0.00968	0.00199	0.000473	0.0192***	0.00252	0.000355	-0.00327	0.000788	0.0152**	-0.00110	-0.0176**
	(0.0223)	(0.00889)	(0.0206)	(0.0109)	(0.00585)	(0.0202)	(0.0142)	(0.0176)	(0.0136)	(0.00614)	(0.00928)	(0.00730)
3or4days_week	0.0176	-0.00978	0.00625	0.000557	0.00198	-0.00851	-0.00728	-0.0259***	-0.00833	-0.00872	-0.0111**	-0.00710
	(0.0107)	(0.0126)	(0.00916)	(0.00735)	(0.00706)	(0.0144)	(0.00667)	(0.00782)	(0.00742)	(0.00625)	(0.00481)	(0.00756)
1or2_week	-0.00526	-0.0172***	-0.00847	0.00286	-0.00157	-0.0105	-0.0116**	-0.0186*	-0.0102	0.00112	-0.0153**	-0.00895
	(0.0106)	(0.00522)	(0.00838)	(0.00478)	(0.00802)	(0.0141)	(0.00521)	(0.00947)	(0.0127)	(0.00614)	(0.00538)	(0.00912)
1or2_month	-0.0439	-0.0292**	-0.00561	-0.00514	-0.0101	-0.0178	-0.0145**	-0.0363***	-0.0267***	-0.0140	-0.000184	0.0324
	(0.0442)	(0.0111)	(0.0112)	(0.0108)	(0.00754)	(0.0204)	(0.00536)	(0.00747)	(0.00765)	(0.0108)	(0.0158)	(0.0275)

<1_month	-0.0219	-0.0415*	0.000614	-0.000223	-0.0313**	-0.0162	-0.0167***	-0.0257**	-0.0256	-0.0381**	-0.0178	0.00108
	(0.0175)	(0.0223)	(0.0222)	(0.0121)	(0.0126)	(0.0198)	(0.00418)	(0.0100)	(0.0146)	(0.0129)	(0.0136)	(0.0118)
0_in_3months	-0.00266	-0.0212**	-0.00416	-0.00909	-0.0155	-0.0190	-0.0102**	-0.0166**	-0.0104	-0.00940	-0.0143***	0.00671
	(0.0148)	(0.00855)	(0.00806)	(0.00846)	(0.00914)	(0.0126)	(0.00467)	(0.00749)	(0.00783)	(0.00665)	(0.00435)	(0.00889)
SPORT (t-1)												
1_week	0.0184	0.0198***	0.00133	0.0163*	0.0273***	-0.0125	0.00776*	0.0204***	0.0159	0.0106	-0.00103	-0.00928
	(0.0116)	(0.00621)	(0.0137)	(0.00832)	(0.00872)	(0.00718)	(0.00404)	(0.00560)	(0.0101)	(0.00656)	(0.00614)	(0.0101)
1or3_month	0.0334**	0.0295*	0.0104	0.0168*	0.0150	0.0145	0.0199***	0.0416***	0.0303***	0.0219***	-0.00584	-0.0572***
	(0.0118)	(0.0147)	(0.0146)	(0.00836)	(0.0125)	(0.0153)	(0.00434)	(0.00473)	(0.00970)	(0.00679)	(0.00540)	(0.0140)
Hardlyever_never	0.0508***	0.0485***	0.0501**	0.0252***	0.0584***	0.0235***	0.0222***	0.0680***	0.0412***	0.0228***	0.00585	-0.0667***
	(0.0108)	(0.0117)	(0.0169)	(0.00361)	(0.0136)	(0.00340)	(0.00362)	(0.00793)	(0.0102)	(0.00611)	(0.00409)	(0.00687)
Smoking (t-1)	-0.0169*	-0.00446	0.0174	0.0206***	-0.00981**	-0.00563	0.00758	0.00534	0.00608	0.00989	-0.00596	0.0190*
	(0.00792)	(0.00472)	(0.0102)	(0.00496)	(0.00334)	(0.0113)	(0.00749)	(0.00583)	(0.00881)	(0.00663)	(0.00348)	(0.00900)
Overweight_Obese (t-1)	0.0541***	0.00545	0.0296***	-0.000667	0.0313***	0.00407	0.00246	0.00846*	0.000977	-0.00408	-0.00651*	-0.0233**
	(0.00711)	(0.00539)	(0.00818)	(0.00476)	(0.00646)	(0.00607)	(0.00329)	(0.00404)	(0.00535)	(0.00870)	(0.00359)	(0.00767)
Lnincome (t-1)	-0.0171**	-0.00363	-0.0193**	0.00324	-0.00653	-0.00560	-0.000369	-0.000330	-0.00329	-0.00666	-0.00133	0.0164**
	(0.00591)	(0.00256)	(0.00859)	(0.00323)	(0.00543)	(0.00888)	(0.00161)	(0.00127)	(0.00285)	(0.00505)	(0.00424)	(0.00625)
Reducedrinking	-0.00299	0.0171	0.00392	0.00295	-0.00160	0.000983	-0.00366	0.0158**	0.00765	-0.00687	0.0139*	-0.00502
	(0.00405)	(0.0114)	(0.00825)	(0.00335)	(0.00642)	(0.00807)	(0.00418)	(0.00720)	(0.00508)	(0.00493)	(0.00679)	(0.0107)
Improvesport	-0.0650***	-0.0419**	-0.0537***	-0.0317***	-0.0302***	-0.0479***	-0.0282***	-0.0630***	-0.0368***	-0.00993	-0.00526	0.0689***
	(0.0130)	(0.0163)	(0.00540)	(0.00602)	(0.00923)	(0.0134)	(0.00416)	(0.00801)	(0.00970)	(0.0102)	(0.00513)	(0.00611)
Gets_Divsep	0.0137	0.0158	-0.0249	-0.0472*	-0.0510**	0.154***	-0.0126	0.00420	0.0128	-0.0144	-0.0159	-0.0108
	(0.0299)	(0.00892)	(0.0208)	(0.0239)	(0.0195)	(0.0391)	(0.00784)	(0.00832)	(0.0103)	(0.00932)	(0.0105)	(0.0291)
Gets_Retired	-0.0222	0.00533	0.000261	0.00663	-0.0216*	-0.0395*	-0.000263	-0.0128	-0.00451	0.00273	0.000639	0.0180
	(0.0317)	(0.00669)	(0.0159)	(0.00528)	(0.0110)	(0.0209)	(0.00480)	(0.0144)	(0.0135)	(0.0148)	(0.00713)	(0.0264)
Gets_Unemployed	0.0377*	0.0109	-0.0107	-0.00434	-0.00200	0.0276*	-0.000685	-0.0104	0.0894***	-0.0150	-0.0111	-0.0473*
	(0.0185)	(0.0164)	(0.0351)	(0.0176)	(0.0123)	(0.0151)	(0.00570)	(0.0202)	(0.0266)	(0.0246)	(0.0185)	(0.0228)
∆lnincome	-0.00874***	0.00493***	0.00307***	-0.00209	-0.000638	-0.0143**	0.00345***	0.00628***	0.00420***	0.00333***	0.000680	0.00411
	(0.00282)	(0.000818)	(0.000637)	(0.00364)	(0.00383)	(0.00635)	(0.000711)	(0.00132)	(0.00101)	(0.000383)	(0.000507)	(0.00346)
Gets_Grandchildren	0.00740	-0.00800	-0.00774**	0.0221*	-0.00174	0.00963	-0.000696	-0.00434	0.00622	-0.00435	-0.00740**	-0.0104
	(0.0100)	(0.00812)	(0.00336)	(0.0103)	(0.00548)	(0.00877)	(0.00308)	(0.00412)	(0.00510)	(0.00429)	(0.00314)	(0.00836)
Year dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	33,490	33,490	33,490	33,490	33,490	33,490	33,490	33,490	33,490	33,490	33,490	33,490
R-squared	0.342	0.345	0.278	0.337	0.317	0.349	0.318	0.309	0.353	0.346	0.466	0.376

Omitted benchmarks: employed, housework, other_job for job status, never_married for marital status, Austria for country dummies, age50_54 for age dummies, almost_every_day for drinking habits, <1_week for sport activities. Robust standard errors in parentheses clustered at country level. *** p<0.01, ** p<0.05, * p<0.1

Table A4 – The determinants of Health (IV estimates)

	(1)	(2)	(3)	(4)	(5)	(6)
	cancer		n_wordsrecalled		sleepingproblems	
VARIABLES	Δcancer	Voluntary (t-1)	Δn_words recalled	Voluntary (t-1)	Δsleep. prob.	Voluntary (t-1)
Voluntary (t-1)	-0.0138***		-0.725		-0.0871**	
	(0.00402)		(0.597)		(0.0413)	
$\overline{\text{Voluntary\_Work}}_{i,-r,t-1}$		0.773**		0.837**		0.779**
		(0.315)		(0.349)		(0.324)
$\overline{\text{Voluntary\_Work}}_{-i,r,t-1}$		3.957***		3.671***		3.938***
		(0.332)		(0.441)		(0.337)
Cancer (t-1)	-0.672***	-0.0320				
	(0.0310)	(0.0433)				
N_Wordsrecalled (t-1)			-0.657***	0.0605***		
			(0.0145)	(0.00958)		
Sleepingproblems (t-1)					-0.634***	-0.0496**
					(0.0191)	(0.0208)
Female	-0.00823***	-0.0217	0.274***	-0.0561*	0.0686***	-0.0179
	(0.00165)	(0.0300)	(0.0319)	(0.0302)	(0.00766)	(0.0296)
Age55_59 (t-1)	-9.58e-06	0.00270	-0.0747***	0.00427	-0.00485	0.00408
	(0.00299)	(0.0352)	(0.0234)	(0.0345)	(0.00795)	(0.0354)
Age60_64 (t-1)	0.00382	0.0755*	-0.159***	0.0832**	-0.000563	0.0755*
	(0.00378)	(0.0399)	(0.0259)	(0.0407)	(0.00917)	(0.0402)
Age65_69 (t-1)	0.00626	0.0362	-0.423***	0.0567	0.00626	0.0352
	(0.00555)	(0.0434)	(0.0351)	(0.0423)	(0.00919)	(0.0443)
Age70_74 (t-1)	0.00468	-0.00692	-0.634***	0.0295	0.00361	-0.00793
	(0.00635)	(0.0479)	(0.0461)	(0.0394)	(0.0107)	(0.0477)
Age75_79 (t-1)	0.0112*	-0.139**	-0.974***	-0.0848	-0.00572	-0.140**
	(0.00596)	(0.0639)	(0.0646)	(0.0572)	(0.0126)	(0.0641)
AgeAbove_80 (t-1)	0.00218	-0.430***	-1.331***	-0.361***	-0.00690	-0.431***
	(0.00805)	(0.0686)	(0.102)	(0.0687)	(0.0114)	(0.0697)
Eduyears (t-1)	0.000195	0.0435***	0.0671***	0.0386***	-0.000822	0.0434***
	(0.000289)	(0.00524)	(0.00955)	(0.00518)	(0.000780)	(0.00518)
N_Children (t-1)	-0.000892	0.0200**	-0.00173	0.0182*	-0.000332	0.0203**
	(0.00116)	(0.00940)	(0.0147)	(0.00948)	(0.00231)	(0.00938)
N_Grandchildren (t-1)	0.000558	0.00354	-0.00271	0.00383	0.00184*	0.00381
	(0.000531)	(0.00458)	(0.00472)	(0.00462)	(0.00107)	(0.00463)
Retired (t-1)	0.00809***	0.154***	0.0594	0.148***	0.00355	0.156***
	(0.00266)	(0.0270)	(0.0377)	(0.0292)	(0.00655)	(0.0265)
Unemployed (t-1)	0.00791	0.108**	0.0245	0.105**	0.0236*	0.110**
	(0.00587)	(0.0471)	(0.0516)	(0.0486)	(0.0128)	(0.0470)
Marriedpartn (t-1)	-0.00216	0.0118	0.0298	0.00288	0.0123	0.0105
	(0.00526)	(0.0690)	(0.0499)	(0.0657)	(0.0109)	(0.0688)
Divorcsepar (t-1)	-0.00188	-0.0485	0.0331	-0.0502	0.0221*	-0.0474
	(0.00610)	(0.0804)	(0.0489)	(0.0775)	(0.0119)	(0.0799)
Widowed (t-1)	-0.00151	0.00177	0.00310	0.00894	0.0172	0.00462
	(0.00624)	(0.0629)	(0.0429)	(0.0569)	(0.0153)	(0.0626)
Lnincome (t-1)	0.00580***	-0.00554	0.0952***	-0.0124	-0.00266	-0.00583
	(0.00176)	(0.0141)	(0.0203)	(0.0143)	(0.00280)	(0.0143)
DRINKING (t-1)						
5or6days_week	-0.0123***		0.167***		-0.00490	
	(0.00320)		(0.0421)		(0.00765)	
3or4days_week	-0.00939**		0.134***		-0.0112	
	(0.00409)		(0.0313)		(0.00852)	
1or2_week	-0.0115***		0.159***		-0.00981	
	(0.00323)		(0.0327)		(0.00767)	
1or2_month	-0.00487		0.181***		-0.0130	

	(0.00388)		(0.0442)		(0.00895)	
<1_month	-0.00276		0.300***		-0.0185	
	(0.00764)		(0.0650)		(0.0184)	
0_in_3months	-0.0111**		0.144***		-0.0195***	
	(0.00432)		(0.0393)		(0.00739)	
SPORT (t-1)						
1_week	0.00298		-0.0301		0.00932	
	(0.00329)		(0.0249)		(0.00591)	
1or3_month	0.0135***		-0.0782*		0.0335***	
	(0.00289)		(0.0399)		(0.00987)	
Hardlyever_never	0.0109***		-0.177***		0.0400***	
	(0.00244)		(0.0326)		(0.00556)	
Smoking (t-1)	0.00416		-0.0374		0.00382	
	(0.00267)		(0.0299)		(0.00598)	
Overweight_Obese (t-1)	0.000224		-0.0189		0.00173	
	(0.00178)		(0.0183)		(0.00386)	
Reducedrinking	0.00880***		-0.0509		0.00568	
	(0.00307)		(0.0374)		(0.00645)	
Improvesport	-0.0119***		0.176***		-0.0469***	
	(0.00188)		(0.0317)		(0.00704)	
Gets_Divsep	-0.00203		-0.0935*		0.0860***	
	(0.00732)		(0.0485)		(0.0189)	
Gets_Retired	0.00574		-0.0105		-0.0106**	
	(0.00452)		(0.0261)		(0.00534)	
Gets_Unemployed	0.00304		-0.0435		0.0314**	
	(0.00798)		(0.0746)		(0.0156)	
∆lnincome	0.00487***		0.0395**		0.000163	
	(0.00185)		(0.0188)		(0.00267)	
Gets_Grandchildren	-0.00119		0.00228		0.00804*	
	(0.00237)		(0.0173)		(0.00421)	
Year Dummies	YES	NO	YES	NO	YES	NO
Country Dummies	YES	NO	YES	NO	YES	NO
Observations	35,361	35,361	35,249	35,249	35,372	35,372

Omitted benchmarks: employed, housework, other_job for job status, never_married for marital status, Austria for country dummies, age50_54 for age dummies, almost_every_day for drinking habits, <1_week for sport activities. Robust standard errors in parentheses clustered at country level. *** p<0.01, ** p<0.05, * p<0.1.

Table A5 – The determinants of health indicators (robustness checks - attrition adjusted)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Δcancer			Δn_words_recalled			Δsleepingproblems		
	family background	*only soc. excluded*	*only retired*	*family background*	*only soc. excluded*	*only retired*	*family background*	*only soc. excluded*	*only retired*
Voluntary (t-1)	0.139***	0.163***	-0.0131**	-0.0117**	-0.0104**	0.130**	-0.0268**	-0.0255**	-0.0416***
	(0.0379)	(0.0326)	(0.00465)	(0.00387)	(0.00424)	(0.0563)	(0.0113)	(0.0101)	(0.0108)
N_Wordsrecalled (t-1)	-0.674***	-0.654***							
	(0.0219)	(0.0169)							
Cancer (t-1)			-0.661***	-0.664***	-0.654***	-0.664***			
			(0.0285)	(0.0322)	(0.0322)	(0.0197)			
Sleepingproblems (t-1)							-0.633***	-0.636***	-0.643***
							(0.0251)	(0.0254)	(0.0248)
Female	0.308***	0.332***	-0.0174***	-0.00969***	-0.0140***	0.376***	0.0749***	0.0702***	0.0747***
	(0.0654)	(0.0556)	(0.00339)	(0.00299)	(0.00348)	(0.0801)	(0.0132)	(0.0158)	(0.0148)
Age55_59 (t-1)	-0.0104	-0.0813	-0.0125	-0.00343	-0.00283	-0.00681	-0.0129	-0.0123	-0.0772
	(0.0284)	(0.0458)	(0.0194)	(0.00335)	(0.00326)	(0.133)	(0.0156)	(0.0176)	(0.0468)
Age60_64 (t-1)	-0.149***	-0.225***	-0.00407	0.00149	-0.00296	-0.156	0.00951	-0.00451	-0.0392
	(0.0353)	(0.0342)	(0.0180)	(0.00355)	(0.00501)	(0.135)	(0.0179)	(0.0136)	(0.0461)
Age65_69 (t-1)	-0.366***	-0.505***	0.000428	0.00469	0.00333	-0.441**	-0.00930	-0.00897	-0.0526
	(0.0654)	(0.0493)	(0.0180)	(0.00586)	(0.00556)	(0.151)	(0.0171)	(0.0174)	(0.0499)
Age70_74 (t-1)	-0.519***	-0.625***	-0.00295	0.00514	0.00136	-0.562***	-0.0223	-0.0291	-0.0654
	(0.0571)	(0.0392)	(0.0188)	(0.00848)	(0.00668)	(0.156)	(0.0233)	(0.0283)	(0.0550)
Age75_79 (t-1)	-0.839***	-0.993***	0.00964	0.0183	0.00961	-0.929***	-0.0146	-0.0239	-0.0654
	(0.0608)	(0.0892)	(0.0153)	(0.0136)	(0.00987)	(0.146)	(0.0138)	(0.0220)	(0.0459)
AgeAbove_80 (t-1)	-1.253***	-1.373***	0.0112	0.0191*	0.0102	-1.328***	0.0529**	0.0289	-0.0236
	(0.0722)	(0.0817)	(0.0183)	(0.00996)	(0.00788)	(0.155)	(0.0201)	(0.0202)	(0.0471)
Mathpos_At10	-0.0922***			-0.00160			0.00838**		
	(0.0241)			(0.00231)			(0.00358)		
N_Books_At10	0.0546***			0.00120			0.00644		
	(0.0165)			(0.00167)			(0.00613)		
Eduyears (t-1)	0.0650***	0.0702***	-7.43e-05	-6.98e-05	0.000246	0.0697***	-0.00323	-0.00353**	-0.00308**
	(0.0130)	(0.00832)	(0.000568)	(0.000605)	(0.000456)	(0.00958)	(0.00199)	(0.00151)	(0.00103)
N_Children (t-1)	-0.00610	-0.00144	-0.000373	-0.000183	-0.000644	-0.0205	0.00459	0.00266	0.00530
	(0.0216)	(0.0212)	(0.00161)	(0.00112)	(0.00185)	(0.0243)	(0.00406)	(0.00532)	(0.00442)
N_Grandchildren (t-1)	-0.00413	0.000360	0.000761	-2.42e-05	0.000619	0.00697	-0.000630	8.68e-05	-0.00158
	(0.00463)	(0.00616)	(0.00107)	(0.000636)	(0.000799)	(0.00680)	(0.00240)	(0.00238)	(0.00220)
Retired (t-1)	0.0265	0.121***	0.00378	0.00770	0.0107**	0.109**	0.00453	0.00341	0.0395**
	(0.0597)	(0.0284)	(0.00454)	(0.00524)	(0.00480)	(0.0433)	(0.00597)	(0.00829)	(0.0178)

Unemployed (t-1)	0.00411	0.105	0.0201*	0.00599*	0.0101	-0.289	-0.0314*	-0.0126	-0.0217
	(0.119)	(0.111)	(0.00987)	(0.00325)	(0.00741)	(0.201)	(0.0146)	(0.0194)	(0.0253)
Marriedpartn (t-1)	0.00248	0.0147	-0.0164	-0.00553	-0.00883	0.0511	0.0106	0.0294*	0.0322**
	(0.0714)	(0.0726)	(0.0190)	(0.0132)	(0.0104)	(0.0750)	(0.0296)	(0.0164)	(0.0113)
Divorcsepar (t-1)	-0.0321	-0.00411	0.000343	-0.0113	-0.000491	0.0604	0.0244	0.0370***	0.0294
	(0.109)	(0.123)	(0.0109)	(0.00997)	(0.00359)	(0.149)	(0.0243)	(0.0119)	(0.0182)
Widowed (t-1)	-0.0262	-0.0218	-0.00871	-0.00939	-0.00477	0.0120	-0.00253	0.0100	0.00717
	(0.0696)	(0.0536)	(0.0139)	(0.0135)	(0.00963)	(0.0609)	(0.0348)	(0.0217)	(0.0193)
DRINKING (t-1)									
5or6days_week	0.156***	0.207**	-0.0100	-0.0107*	-0.0126	0.159	-0.0109	-0.000417	0.00168
	(0.0336)	(0.0762)	(0.00933)	(0.00585)	(0.00802)	(0.0975)	(0.0139)	(0.0214)	(0.0268)
3or4days_week	0.166***	0.179***	0.00247	0.00269	0.000234	0.215***	-0.0164	-0.00493	-0.00788
	(0.0497)	(0.0430)	(0.00755)	(0.00799)	(0.00576)	(0.0533)	(0.0116)	(0.0173)	(0.0205)
1or2_week	0.156***	0.200***	-0.00997**	-0.0108***	-0.00927*	0.174***	-0.0252**	-0.00321	0.00145
	(0.0489)	(0.0400)	(0.00414)	(0.00322)	(0.00474)	(0.0545)	(0.00968)	(0.0158)	(0.0182)
1or2_month	0.172*	0.222***	-9.69e-05	0.000527	0.000125	0.194***	-0.0217*	-0.00910	-0.0184
	(0.0806)	(0.0594)	(0.0156)	(0.0124)	(0.0138)	(0.0605)	(0.0109)	(0.0178)	(0.0184)
<1_month	0.223*	0.200	0.0226	0.00456	0.0159	0.362***	-0.0205	-0.0192	-0.0358
	(0.124)	(0.152)	(0.0248)	(0.00835)	(0.0201)	(0.0572)	(0.0223)	(0.0192)	(0.0320)
0_in_3months	0.175**	0.183**	0.00139	-0.00554	-0.00319	0.216***	-0.0273**	-0.0180	-0.0105
	(0.0742)	(0.0606)	(0.0110)	(0.00823)	(0.0104)	(0.0491)	(0.00912)	(0.0143)	(0.0109)
SPORT (t-1)									
1_week	-0.0414	-0.0779	-0.00167	-0.00159	-0.00226	-0.0816	-0.00374	-0.0123	-0.00761
	(0.0367)	(0.0521)	(0.00475)	(0.00418)	(0.00560)	(0.0807)	(0.00949)	(0.00767)	(0.0126)
1or3_month	-0.0896	-0.132	0.00906	0.00477	0.00496	-0.123	0.0267*	0.0159	0.0165
	(0.0667)	(0.0782)	(0.00569)	(0.00585)	(0.00408)	(0.0712)	(0.0146)	(0.0145)	(0.0177)
Hardlyever_never	-0.121**	-0.197***	0.000588	0.00304*	0.00174	-0.218**	0.0200***	0.0150**	0.0196**
	(0.0456)	(0.0478)	(0.00394)	(0.00157)	(0.00291)	(0.0724)	(0.00558)	(0.00594)	(0.00790)
Smoking (t-1)	-0.0426	-0.0460	-0.00721	0.000301	-0.00367	-0.0511	-0.0191	-0.00812	-0.00290
	(0.0337)	(0.0514)	(0.00749)	(0.00511)	(0.00427)	(0.0676)	(0.0118)	(0.0127)	(0.0118)
Overweight_Obese (t-1)	0.00982	-0.0109	0.00388	0.000730	0.00218	0.00829	-0.00179	0.000848	-0.00147
	(0.0342)	(0.0280)	(0.00410)	(0.00473)	(0.00409)	(0.0247)	(0.00706)	(0.0100)	(0.00918)
Lnincome (t-1)	-0.00336	0.00295	0.0104*	0.00423*	0.00586**	0.0755***	-0.00587	-0.00430	-0.0133*
	(0.0294)	(0.0353)	(0.00515)	(0.00213)	(0.00261)	(0.0206)	(0.00911)	(0.0100)	(0.00645)
Reducedrinking	-0.0715	-0.118*	0.00686	0.00858	0.00483	-0.0984***	0.00995	0.00279	-0.00186
	(0.0485)	(0.0581)	(0.00966)	(0.00627)	(0.00890)	(0.0321)	(0.00834)	(0.00988)	(0.0158)
Improvesport	0.0693**	0.161**	-0.0124***	-0.00908**	-0.0124***	0.139*	-0.0424**	-0.0467**	-0.0466***
	(0.0297)	(0.0556)	(0.00281)	(0.00313)	(0.00198)	(0.0709)	(0.0162)	(0.0157)	(0.0145)
Gets_Divsep	-0.110	-0.168**	0.00693	-0.00136	0.0123	-0.0893	0.188***	0.180***	0.127*
	(0.0978)	(0.0666)	(0.00624)	(0.00812)	(0.0111)	(0.0773)	(0.0570)	(0.0553)	(0.0582)
Gets_Retired	-0.0662	-0.0717**		0.00682	0.00799		-0.0373*	-0.0328	

	(0.0418)	(0.0289)		(0.00505)	(0.00704)		(0.0201)	(0.0325)	
Gets_Unemployed	-0.267**	-0.278		0.0137	-0.0149*		0.0289	-0.0108	
	(0.110)	(0.237)		(0.0189)	(0.00690)		(0.0229)	(0.0192)	
∆lnincome	0.000492	-0.00198	0.00172***	0.00126***	0.00163***	0.00683	-0.0130*	-0.0141**	-0.0199***
	(0.00766)	(0.00499)	(0.000305)	(0.000355)	(0.000394)	(0.00457)	(0.00637)	(0.00644)	(0.00581)
Gets_Grandchildren	0.0313	-0.00690	0.00500	0.00213	0.00597	-0.0240	0.0112	0.0121	0.0165*
	(0.0190)	(0.0235)	(0.00531)	(0.00450)	(0.00455)	(0.0263)	(0.0106)	(0.00721)	(0.00911)
Country dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	26,721	26,575	19,365	26,974	26,911	19,112	26,979	26,918	19,370
R-squared	0.333	0.323	0.383	0.400	0.389	0.327	0.355	0.353	0.380

Omitted benchmarks: employed, housework, other_job for job status, never_married for marital status, Austria for country dummies, age50_54 for age dummies, almost_every_day for drinking habits, <1_week for sport activities. Robust standard errors in parentheses clustered at country level. *** p<0.01, ** p<0.05, * p<0.1.

Table A6 - Determinants of Subjective Well-Being

POOLED OLS	(1) Life_sat	(2) Life_sat	(3) Life_sat	(4) Life_sat	(5) Life_sat
Lnincome	0.0370*	0.0380*	0.0376*	0.0383**	0.0430**
	(0.0190)	(0.0177)	(0.0180)	(0.0161)	(0.0171)
Adla	-0.272***	-0.232***			
	(0.0445)	(0.0397)			
Iadla	-0.156**	-0.148**			
	(0.0656)	(0.0580)			
N_Doctorvisits	-0.0148***	-0.0114***			
	(0.00181)	(0.00166)			
N_Chronicdeseases	-0.104***	-0.0400***			
	(0.00748)	(0.00925)			
Numeracy	0.0301	0.0248	0.0789*	0.0656*	0.0601
	(0.0321)	(0.0297)	(0.0365)	(0.0324)	(0.0356)
N_Wordsrecalled	0.0604***	0.0603***			0.0786***
	(0.0108)	(0.0109)			(0.0120)
Mobilityind	-0.232***	-0.160***			
	(0.0225)	(0.0252)			
Heartattack			-0.304***	-0.0820**	
			(0.0244)	(0.0367)	
Highbloodpressureorhypertension			-0.0789**	-0.0293	
			(0.0263)	(0.0187)	
Highbloodcholesterol			-0.0325	0.0145	
			(0.0342)	(0.0361)	
Stroke			-0.390***	-0.261***	
			(0.0912)	(0.0797)	
Diabetesorhighbloodsugar			-0.195***	-0.135***	
			(0.0446)	(0.0361)	
Chroniclungdisease			-0.316***	-0.152	
			(0.0825)	(0.0948)	
Asthma			-0.156**	-0.0406	
			(0.0512)	(0.0415)	
Arthritis			-0.290***	-0.113***	
			(0.0300)	(0.0194)	
Osteoporosis			-0.309***	-0.155**	
			(0.0758)	(0.0615)	
Stomachorduodenalorpepticulcer			-0.280***	-0.0994	
			(0.0727)	(0.0783)	
Parkinsondisease			-0.842***	-0.642***	
			(0.145)	(0.141)	
Cataracts			-0.0980	-0.0129	
			(0.0573)	(0.0554)	
Hipfractureorfemoralfracture			-0.291***	-0.136**	
			(0.0511)	(0.0478)	
Otherconditions			-0.314***	-0.183***	
			(0.0359)	(0.0337)	
Cancer			-0.230**	-0.160*	-0.221**
			(0.0943)	(0.0853)	(0.0953)
Jointpain		-0.137***		-0.160***	
		(0.0258)		(0.0290)	
Hearttrouble		-0.254***		-0.326***	
		(0.0501)		(0.0600)	
Breathlessness		-0.0699		-0.142**	
		(0.0412)		(0.0624)	
Persistentcough		-0.00416		-0.0207	
		(0.0333)		(0.0466)	
Swollenlegs		-0.102**		-0.174***	

			(0.0355)		(0.0397)	
Sleepingproblems			-0.372***		-0.391***	-0.612***
			(0.0259)		(0.0280)	(0.0378)
Fallingdown			-0.132**		-0.263***	
			(0.0580)		(0.0644)	
Fearoffallingdown			-0.115		-0.258***	
			(0.0676)		(0.0683)	
Dizzinessfaintsorblackouts			-0.137***		-0.164***	
			(0.0428)		(0.0393)	
Stomachorintestineproblems			-0.0993***		-0.0879***	
			(0.0238)		(0.0253)	
Incontinence			-0.170***		-0.241***	
			(0.0473)		(0.0417)	
Othersymptoms			-0.168***		-0.187***	
			(0.0407)		(0.0403)	
Voluntary		0.100**	0.114**	0.130**	0.137**	0.129**
		(0.0429)	(0.0462)	(0.0443)	(0.0475)	(0.0504)
Female		0.0601***	0.118***	0.106***	0.171***	0.102***
		(0.0185)	(0.0185)	(0.0202)	(0.0203)	(0.0273)
Age55_59		0.0743**	0.0799***	0.0711**	0.0772***	0.0541**
		(0.0259)	(0.0213)	(0.0256)	(0.0219)	(0.0241)
Age60_64		0.146***	0.130***	0.128***	0.115***	0.0835**
		(0.0280)	(0.0272)	(0.0307)	(0.0292)	(0.0297)
Age65_69		0.208***	0.181***	0.182***	0.156***	0.121**
		(0.0499)	(0.0456)	(0.0502)	(0.0458)	(0.0503)
Age70_74		0.280***	0.249***	0.227***	0.205***	0.148**
		(0.0554)	(0.0523)	(0.0586)	(0.0544)	(0.0593)
Age75_79		0.339***	0.309***	0.252***	0.240***	0.153*
		(0.0677)	(0.0652)	(0.0760)	(0.0726)	(0.0733)
AgeAbove_80		0.454***	0.429***	0.256***	0.286***	0.165**
		(0.0815)	(0.0749)	(0.0771)	(0.0715)	(0.0713)
Eduyears		0.00924	0.00821	0.0157*	0.0134	0.0119
		(0.00716)	(0.00711)	(0.00748)	(0.00753)	(0.00774)
Widowed		0.111	0.109	0.0875	0.0968	0.0830
		(0.0730)	(0.0694)	(0.0783)	(0.0728)	(0.0736)
Divorcsepar		0.00274	0.0118	0.0135	0.0200	-0.0277
		(0.105)	(0.0998)	(0.109)	(0.102)	(0.0929)
Marriedpartn		0.475***	0.463***	0.488***	0.472***	0.474***
		(0.0733)	(0.0705)	(0.0786)	(0.0751)	(0.0682)
Retired		-0.0168	-0.0129	-0.00421	-0.00594	-0.0137
		(0.0308)	(0.0276)	(0.0359)	(0.0311)	(0.0368)
Unemployed		-0.709***	-0.693***	-0.678***	-0.678***	-0.691***
		(0.103)	(0.0982)	(0.0996)	(0.0957)	(0.113)
N_Grandchildren		0.0136**	0.0156**	0.0132***	0.0155***	0.0112**
		(0.00539)	(0.00550)	(0.00428)	(0.00482)	(0.00414)
N_Children		0.0124	0.0124	0.0118	0.0129	0.0140*
		(0.00823)	(0.00804)	(0.00751)	(0.00799)	(0.00751)
DRINKING (t-1)						
	5or6days_week	0.0304	0.0458	0.0955*	0.0949**	0.0912*
		(0.0429)	(0.0400)	(0.0449)	(0.0413)	(0.0425)
	3or4days_week	0.0881*	0.0875	0.156***	0.132**	0.173**
		(0.0480)	(0.0561)	(0.0499)	(0.0589)	(0.0652)
	1or2_week	0.107***	0.112***	0.194***	0.175***	0.207***
		(0.0268)	(0.0246)	(0.0316)	(0.0297)	(0.0360)
	1or2_month	0.155***	0.146**	0.218***	0.189***	0.243***
		(0.0477)	(0.0515)	(0.0530)	(0.0569)	(0.0693)
	<1_month	0.102*	0.0853	0.181***	0.137**	0.190***
		(0.0486)	(0.0533)	(0.0444)	(0.0526)	(0.0603)
	0_in_3months	0.144***	0.145***	0.235***	0.207***	0.247***
		(0.0337)	(0.0325)	(0.0358)	(0.0356)	(0.0335)

SPORT (t-1)						
	1_week	-0.0278	-0.0286	-0.0383	-0.0360	-0.0333
		(0.0319)	(0.0319)	(0.0311)	(0.0330)	(0.0301)
	1or3_month	-0.00706	0.00170	-0.0149	-0.000940	-0.0317
		(0.0213)	(0.0196)	(0.0243)	(0.0238)	(0.0205)
	Hardlyever_never	-0.169***	-0.154***	-0.289***	-0.236***	-0.337***
		(0.0478)	(0.0494)	(0.0391)	(0.0421)	(0.0417)
Smoking		-0.147***	-0.146***	-0.156***	-0.149***	-0.151***
		(0.0299)	(0.0328)	(0.0353)	(0.0378)	(0.0316)
Overweight_Obese		0.0365*	0.0311*	0.00756	0.0242*	-0.0401**
		(0.0178)	(0.0168)	(0.0139)	(0.0136)	(0.0163)
Year dummies		YES	YES	YES	YES	YES
Country dummies		YES	YES	YES	YES	YES
Observations		51,362	51,362	51,743	51,743	51,556
R-squared		0.213	0.231	0.185	0.213	0.182

Omitted benchmarks: employed, housework, other_job for job status, never_married for marital status, Austria for country dummies, age50_54 for age dummies, almost_every_day for drinking habits, <1_week for sport activities. Robust standard errors in parentheses clustered at country level. *** p<0.01, ** p<0.05, * p<0.1.

Table A7a - Determinants of Subjective Well-Being (simultaneous eq./IV estimates)

POOLED OLS (simultaneous eq.)	(1) Baseline	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
		NO IV				IV				
	life_sat	life_sat	n_wordsrecalled	cancer	sleepingproblems	life_sat	n_wordsrecalled	cancer	sleepingproblems	voluntary (t-1)
Lnincome	0.0565**	0.0986***				0.0985***				
	(0.0188)	(0.0178)				(0.0178)				
Lnincome (t-1)			0.100***	0.00575***	-0.00369		0.102***	0.00572***	-0.00368	-0.00327
			(0.0203)	(0.00171)	(0.00274)		(0.0203)	(0.00170)	(0.00275)	(0.00353)
N_Wordsrecalled	0.0827***	0.181***				0.183***				
	(0.0179)	(0.0448)				(0.0462)				
N_Wordsrecalled (t-1)			0.332***				0.323***			0.0104***
			(0.0148)				(0.0162)			(0.00262)
Voluntary (t-1)			0.170***	-0.00509*	-0.0148***		0.976**	-0.0832**	-0.0279	
			(0.0166)	(0.00277)	(0.00404)		(0.410)	(0.0421)	(0.0823)	
Voluntary	0.156***	0.129***				0.134***				
	(0.0309)	(0.0359)				(0.0374)				
Cancer	-0.239***	-0.520***				-0.517***				
	(0.0406)	(0.103)				(0.104)				
Cancer (t-1)				0.328***				0.327***		-0.00634
				(0.0311)				(0.0307)		(0.0101)
Sleepingproblems	-0.669***	-1.139***				-1.136***				
	(0.0532)	(0.0832)				(0.0827)				
Sleepingproblems (t-1)					0.365***				0.365***	-0.0131***
					(0.0191)				(0.0193)	(0.00382)
$\overline{\text{Voluntary\_Work}}_{i,-r}$										0.849***
										(0.0902)
$\overline{\text{Voluntary\_Work}}_{-i,r}$										0.0133
										(0.0665)
Observations	51,556	34,076	34,076	34,076	34,076	35,521	35,521	35,521	35,521	35,521
R-squared	0.183									

Omitted benchmarks: employed, housework, other_job for job status, never_married for marital status, Austria for country dummies, age50_54 for age dummies, almost_every_day for drinking habits, <1_week for sport activities. Robust standard errors in parentheses clustered at country level. *** p<0.01, ** p<0.05, * p<0.1.

Table A7b - Determinants of Subjective Well-Being (simultaneous eq./IV estimates – attrition-adjusted)

POOLED OLS (simultaneous eq.)	(1) Baseline	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
		NO IV				IV				
	life_sat	life_sat	n_wordsrecalled	cancer	sleepingproblems	life_sat	n_wordsrecalled	cancer	sleepingproblems	voluntary (t-1)
Lnincome	0.0430**	0.0816***				0.0812***				
	(0.0171)	(0.0149)				(0.0145)				
Lnincome (t-1)			0.0186	0.00556**	-0.00759		0.0234	0.00524**	-0.00782	-0.00473*
			(0.0343)	(0.00234)	(0.00856)		(0.0317)	(0.00215)	(0.00804)	(0.00279)
N_Wordsrecalled	0.0786***	0.188***				0.188***				
	(0.0120)	(0.0442)				(0.0451)				
N_Wordsrecalled (t-1)			0.334***				0.325***			0.00895***
			(0.0181)				(0.0235)			(0.00250)
Voluntary (t-1)			0.162***	-0.00882***	-0.0288***		1.179**	-0.104***	-0.107	
			(0.0329)	(0.00332)	(0.00945)		(0.575)	(0.0345)	(0.131)	
Voluntary	0.129**	0.132**				0.114*				
	(0.0504)	(0.0591)				(0.0606)				
Cancer	-0.221**	-0.432***				-0.438***				
	(0.0953)	(0.107)				(0.111)				
Cancer (t-1)				0.343***				0.343***		0.00466
				(0.0338)				(0.0330)		(0.00861)
Sleepingproblems	-0.612***	-1.120***				-1.113***				
	(0.0378)	(0.0989)				(0.100)				
Sleepingproblems (t-1)					0.355***				0.354***	-0.0171**
					(0.0225)				(0.0233)	(0.00724)
$\overline{\text{Voluntary\_Work}}_{-i,r,t-1}$										0.878***
										(0.0668)
$\overline{\text{Voluntary\_Work}}_{i,-r,t-1}$										0.0122
										(0.0526)
Observations	51,556	33,719	33,719	33,719	33,719	34,048	34,048	34,048	34,048	34,048
R-squared	0.182									

Omitted benchmarks: employed, housework, other_job for job status, never_married for marital status, Austria for country dummies, age50_54 for age dummies, almost_every_day for drinking habits, <1_week for sport activities. Robust standard errors in parentheses clustered at country level. *** p<0.01, ** p<0.05, * p<0.1.