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Mediating Influence of Affectivity

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Abstract

This paper evaluates the relationship between job satisfaction and measures of health of workers over 50 using the Swiss Household Panel (SHP) and cross-sectional data from the Survey on Health, Ageing and Retirement in Europe (SHARE). Methodologically, it addresses two important design problems encountered frequently in the literature: (a) cross-sectional causality problems and (b) absence of objective measures of physical health and intellectual ability that complement self-reported measures of health status. Not only does using the SHP panel structure with job satisfaction lagged mitigate the simultaneity bias, employing the objective health measures in the SHARE dataset addresses measurement problems resulting from respondents' affective states. For all datasets, we find a positive link between job satisfaction and self-report health measures; that is, employees with higher job satisfaction levels feel healthier, are less depressed, and report fewer impediments in their daily activities. However, once objective measures of physical health are employed, we observe no such link. Rather, the only positive relationship is for intellectual abilities. These primary findings are then tested using additional controls for working conditions, prior health state and affective mental state. The results indicate that job satisfaction partly serves as a transmission channel.

Keywords

job satisfaction, health, panel data analysis

JEL Classification

I18, I19, J28

1. Introduction

Some research evidence suggests that the average workplace in several industrialized countries has become less stable and more insecure and that, in general, employment conditions have deteriorated (e.g., Schmidt, 1999; Swinnerton and Wial, 1995). Research also indicates that levels of job satisfaction have declined in the past decades (Hamermesh, 2001; Sousa-Poza and Sousa-Poza, 2003). Suggested reasons for this apparent trend include globalization, flexible employment, technological advancements (IT coverage), higher mobility, and in many countries, a deep recession in the 1990s. Even though to some extent such worries may be inflated (Wanner, 1999; Winkelmann and Zimmermann, 1998), the public at large is somewhat concerned that deteriorating job conditions and the resulting decline in job satisfaction may influence worker health. Thus, understanding the effects of job dissatisfaction (or stress) on an individual's health is important not only from a medical but also from an economic perspective. For example, while job satisfaction plays an important role at the employee level as a determinant of individual well-being, at the aggregate level, it equally affects worker productivity and retirement decisions, and ultimately, a society's economic prosperity (Faragher et al., 2005; Henneberger and Sousa-Poza, in press). Knowing how such components of subjective well-being affect individual health can thus provide valuable information on key policy issues like the rise in healthcare costs (especially in conjunction with mental illnesses) and the economic performance in many industrialized nations. Therefore, this study tests whether job satisfaction determines worker health.

Because of the topic's obvious relevance and importance, a large body of literature has already evolved on the relationship between employee job satisfaction and ill health (see Faragher et al., 2005, for a metaanalysis of over 450 studies). Arguments for the existence of such a link are many and varied. For example, recent research by organizational psychologists suggests that job satisfaction may have an indirect influence on health through employment conditions like workplace safety, lightening, quality of air, harassment, hierarchical position,

responsibility, degree of automatization, work stress, and job security. In this case, the level of job satisfaction, by reflecting actual work conditions, serves only as a mediating, not as causal factor. Therefore, to remedy previous failure to identify a true causal relation, we also test for a direct impact of job satisfaction on worker health. We anticipate that such an impact may result from immeasurable and unobserved feelings of being in the right place and liking the job, and may even compensate for some harmful employment conditions.¹

In addition, much of the vast literature on the subjective well-being–health link is hampered by methodological and design problems (Spector, 1997), including the use of cross-sectional data, unrepresentative datasets (e.g., > 30 employees), and unreliable measures of health status like simple correlation coefficients. Whereas simple correlations fail to take into account the impact of other potential determinants of health, regression analyses on cross-sectional data allow no conclusion of causality because of the potential endogeneity bias that health problems could affect individual well-being in the workplace (rather than vice versa). Moreover, as most studies only analyze specific populations, it is often impossible to generalize results to the entire working/active population. Finally, most studies rely on self-reports rather than objective health measures, so the finding that job satisfaction is conducive to subjective health may be driven by ‘third factors’ like working conditions or even personality traits like neuroticism, hardiness, extrovertism, or negative affectivity (Brief et al., 1988; Watson et al., 1988). For example, individuals high in negative affectivity² tend, all else being equal, to be more discontented at work and equally more likely to assess their subjective health problems negatively.

Thus, this paper contributes to the research stream by examining the relationship between health and job satisfaction—a specific subjective measure of well-being—in a manner that remedies the shortcomings of previous research in four respects. First, our use of regression

¹ For example, many scientists may have a high level of job satisfaction despite being underpaid for the high workload and under constant pressure to publish.

² The personality trait of negative affectivity reflects a person’s tendency to experience negative emotions like anxiety or depression across a wide variety of situations (Spector, p. 52).

analysis partially eliminates the impact of other potential worker health determinants that may correlate with job satisfaction. Second, our use of panel data from the Swiss Household Panel (SHP) to test for causality between job satisfaction and health permits the lagging of job satisfaction, thereby enabling more convincing conclusions on causality. Third, employing objective health measures from the Survey of Health, Ageing and Retirement in Europe (SHARE) should yield more reliable results than using subjective measures of health alone, especially as both datasets contain a representative sample of the underlying population. Fourth, for both datasets, we explicitly test the ‘third variable hypothesis’ on working conditions, past health state, and affective state of mind. In addition, since the SHARE dataset includes only persons over 50, we restrict the analyses for both datasets to this age group.³ The remainder of the paper is organized as follows. Section 2 discusses the empirical literature relating to job satisfaction and health. Section 3 introduces the model and data, and describes the estimation techniques. Section 4 discusses the estimation results and presents the robustness test, after which Section 5 summarizes the findings and concludes the paper.

2. Previous Research

To date, economists have concentrated primarily on analyzing the determinants of job satisfaction (for an overview, see Sousa-Poza and Sousa-Poza, 2000b), which are influenced by many facets including gender (Clark, 1997; Clark and Oswald, 1996; Sousa-Poza and Sousa Poza, 2000a), age (Clark et al., 1995), and education (Clark and Oswald, 1996; Tsang et al., 1991). However, job satisfaction as an explanatory variable appears infrequently in the economic literature, with the notable exception of research on the job satisfaction’s effect on

³ Using a sample of older individuals also has methodological advantages. First, younger workers’ job satisfaction levels tend to be more volatile than those of older workers but generally take a relatively short time to stabilize (i.e., for expectations and aspiration levels to adapt). This observation gives rise to the well-know phenomenon that job satisfaction is U-shaped with age (see Clark et al., 1995). In contrast, the job satisfaction levels of older workers are less volatile and health status may be more sensitive to changes in job satisfaction, which justifies both the focus on older workers and the use of cross-sectional data. The former aspect is particularly important because older workers are generally less likely and less able than younger workers to change jobs when discontented.

quitting behavior and retirement decisions. Nonetheless, limited recent empirical evidence does exist that current job satisfaction influences future labor turnover (see, e.g., Clark, 2001; Clark et al., 1998; Freeman, 1978).

In contrast, the relation between job satisfaction and health has been extensively studied by health scientists and organizational psychologists. For example, one comprehensive metaanalysis of 485 predominantly cross-sectional studies with mostly small sample sizes (although with a combined sample size of 267,995 individuals) based on self-report measures of both job satisfaction and health show an overall correlation across all health measures of 0.312 (Faragher et al., 2005). Even though this analysis shows a strong correlation between job satisfaction and psychological problems like burnout ($r = 0.478$), self-esteem issues ($r = 0.429$), depression ($r = 0.428$), and anxiety ($r = 0.420$); correlations with subjective evaluations of physical illness are much smaller ($r = 0.287$). Attempts to reveal a relationship between more objective measures of health and job satisfaction have been less fruitful (Spector, 1997, p. 67).

3. Data and Methodology

To analyze the relation between job satisfaction and health, we employ two different datasets: the Swiss Household Panel (SHP), and the Survey of Health, Ageing and Retirement in Europe (SHARE). The SHP, a longitudinal panel survey for which representative data for Switzerland have been gathered annually since 1999, covers the personal, economic, social, and political aspects of the respondent and family.⁴ To estimate our model for Switzerland, we use four SHP waves: the first wave of 1999, which measures job satisfaction on a 10-point scale (from 0, “not at all satisfied” to 10, “completely satisfied”), and the 2001 to 2003 waves, which include the subsequently observed health outcomes. The international cross-sectional

⁴ All interviews for the SHP are conducted using CATI.

dataset SHARE covers persons over 50 in 10 European countries⁵ for the year 2004. Similar in its theme coverage to SHP, this dataset also examines retirement, retirement pensions, health, and social life. In addition, the SHARE relates the job satisfaction variable, measured on a 4-point scale, to respondent satisfaction with the current job.⁶ Therefore, we use this dataset to estimate both an international cross-section (covering all 10 European countries) and a model for Switzerland exclusively.

To ensure comparability with the SHARE data, we restrict the SHP dataset to people aged 50 or older.⁷ Within that subset, we include only employed persons that answered the job-satisfaction question. Also deleted are observations with missing values on the remaining explanatory variables except for missing household income variables, which can be imputed.⁸ The final samples for both datasets are comparable in their age distribution: in the SHP (SHARE) sample, mean age is 59 (57), with a standard deviation of 5.5 (5.6) years.⁹ Additionally, most health measures are recoded so that the higher values represent a better health status (see Tables A1 and A2 of the Appendix for the actual variable definitions). In the SHARE dataset, equivalent income is based on the modified OECD equivalence scale,¹⁰ whereas the SHP uses the equivalence scale developed by the Swiss Conference for Public Assistance (SKOS). The SHP dataset has an unbalanced panel of about 2,500 observations for

⁵ Austria, Germany, Sweden, the Netherlands, Spain, Italy, France, Denmark, Greece, and Switzerland.

⁶ This variable is measured by the prompt, “All things considered, I am satisfied with my job. Would you say you strongly agree, agree, disagree, or strongly disagree?”

⁷ In the case of the SHP, a person must have been 50 years or older in the 1999 wave to be retained in the sample.

⁸ The net equivalence income for the SHP is imputed using Stata’s “impute” command (Stata 8.2). To take into account cultural differences within Switzerland, the analysis includes information on age, gender, type of occupation, type of household, and official household language. In the case of the SHARE data, imputed and PPP-adjusted household income values were provided by the research team that collected the data (see www.share-project.org).

⁹ Test-retest correlations cannot be computed for either dataset owing to their specific designs: each person was interviewed only once (per year, for the SHP).

¹⁰ This scale assigns a value of 1.0 to the first adult in the household and 0.5 for each subsequent adult, “adult” being defined as persons aged 15 or older. A child is given the value of 0.3 (OECD, 2004). Information on equivalence income is available in the SHP dataset but had to be deflated to the year 2000; equivalence income for the SHARE cross-section was calculated by the authors.

Switzerland,¹¹ while the SHARE dataset has about 7,000 observations for Europe and about 470 for Switzerland.¹²

Both the SHARE and SHP datasets contain various self-report measures of health, which all form our set of dependent variables. In particular, they include assessments of individual general health status or improvement in health, as well as items relating to more specific health problems such as back problems, number of chronic diseases, or impediments to daily activities. Both datasets also provide information on personal recall of hospital stays and doctor visits, which are both good indicators of more severe health problems among respondents. In addition, both datasets contain evaluations of a respondent's mental health, particularly with respect to the frequency and existence of depression in its various manifestations. As subjective measures of health, we employ all available health variables in the SHP data and then select comparable indicators in the SHARE data, thereby covering the widest range possible to ensure the robustness of our results.

Most important for this study, unlike the many surveys that contain only subjective health assessments, the SHARE dataset includes objective measures of interviewee's physical and intellectual abilities obtained using specific tests conducted by the interviewer at the time of the interview. Specifically, these tests measure the ability to walk or use both hands; proficiency in mathematics, recalling information, time orientation; and verbal fluency.¹³ Descriptive statistics for the corresponding regressors and regressands are given in Tables A3 and A4 of the Appendix.

¹¹ In a balanced panel, the identical individual is observed over a fixed number of periods. In an unbalanced panel, the number of observation periods varies by individual, the minimum being one period.

¹² Because of different outcome variables, the number of missing observations varies among the various regression models.

¹³ Walking speed is the time that it takes a person to walk 2.5 meters. The strength of the respondent's handgrip was measured with a handgrip dynamometer, and the number of hands that could actively be used was also recorded. Mathematical proficiency was evaluated based on four simple calculations related to daily issues. Recall proficiency was tested using a list of ten words read aloud that respondents were first asked to recall immediately and then again after a delay. Time orientation was assessed by asking the interviewee to state the day of the week and the exact date. Finally, verbal fluency was measured by asking the respondent to name as many different animals as possible within one minute. For more details, see SHARE (2004).

We test the hypothesis that job satisfaction affects health status for both samples using the following model:

$$Y_{ti} = \beta x_{ti} + \chi' g_{ti} + \varepsilon_{ti} \text{ with } \varepsilon_{ti} = v_{ti} + \omega_i$$

where Y_{ti} denotes individual i 's health state at time t , x is the variable of interest (i.e., job satisfaction), g_{ti} is a vector of additional control variables, and ε_{ti} and v_i are the time-variant and time-invariant components, respectively, of the error term. As dependent variables, we employ a wide range of subjective and objective health measures, both general and more specific, both to ensure the robustness of our results and to differentiate between a general health impact and a specific health problem. The vector of additional control variables, although somewhat specific to the corresponding dataset, is *identical* for all estimated models. Based on typical empirical models of happiness, retirement, and health research, it not only includes information on gender, age, job type (according to Goldthorpe's class scheme), citizenship, household type, relative and mean equivalent income, voluntary activities, religion, physical activities, and community type but also integrates a cultural control variable (e.g. Frey and Stutzer 2002, Dorn et al, in press).¹⁴

In the case of the SHP panel data, which allows lagging of job satisfaction (the variable of interest), we estimate the following equation:

$$Y_{ti} = \beta x_{1999i} + \chi' g_{ti} + v_{ti} + \omega_i + t_t \text{ with } t = 2001 \text{ through } 2003$$

where the regressand, the error terms (individual and idiosyncratic), and most explanatory variables are from the 2001, 2002, and 2003 waves, measured contemporaneously with the

¹⁴ Because of size discrepancies between the total SHARE dataset and its Swiss subsample, slight differences occur in the variable set and definitions. A list of the complete set of explanatory variables and explanands, as well as their data sources, is provided in Tables A1 and A2 in the Appendix.

health measure regressand (Y_{it}). The job satisfaction variable, however, is taken from the earlier 1999 wave to mitigate potential endogeneity.¹⁵ Thus, for each interviewee we obtain an unbalanced panel in which the individual's health outcomes are observed for a maximum of three consecutive years.¹⁶ We also include time dummies to account for shared patterns that vary over time but not between countries; for example, the state of the global economy, world climate, and global fears of terrorist attacks. The choice of different time points for the variables reduces the endogeneity problem with respect to the health variable. In addition, using a panel allows estimation of appropriate random effect models that take into account unobserved heterogeneity in the individual-specific residuals. Such a model requires the unobserved individual-specific and time-invariant characteristics to be uncorrelated with any of the explanatory variables. On the other hand, owing to the time invariance of the job satisfaction variable, measured only in 1999, a fixed effects estimation technique would be inappropriate.

For the 2004 SHARE cross-section, the equation above is reduced as follows:

$$Y_{it} = \beta x_{it} + \chi' g_{it} + \varepsilon_{it} \quad \text{with } t = 2004$$

where both the regressors and the regressand are measured at the same point in time. The disadvantages of such a model are not only that it fails to take into account unobserved heterogeneity between individuals but also that some explanatory variables are subject to a potential endogeneity that might bias the coefficient vector. The estimation techniques, selected according to the type of dependent variable, are OLS, logit, tobit, or ordered probit

¹⁵ To prevent endogeneity, the following regressors are also based on the 1999 wave: the measure of physical activity, the job type according to Goldthorpe's classification, and the dummy for voluntary work. All remaining exogenous variables are from 2001, 2002, or 2003. See also Table A2 of the Appendix.

¹⁶ See footnote 9.

regression. When the estimation command allows, estimations are performed with heteroscedasticity-corrected robust standard errors.¹⁷

4. Empirical results

4.1. Subjective measure of physical health

Table 1 reports the estimated coefficients for various measures of subjective health, both the general state of health and specific health problems. This table also includes the marginal effects for any category for which a categorical regressand reflects the best health state, and for the outcome of 1 in the case of a dichotomous regressand. Results are given for the SHP, the whole SHARE dataset, and the Swiss subsample of the SHARE data.

In all three datasets, a significant increase in job satisfaction leads to a better subjective health status (at the 1 and 5 percent significance levels). For the SHARE dataset, this observation is made for two different health scales: one used in the U.S., the second in Europe.¹⁸ As suggested by previous studies, forming a dichotomous variable based on the categorical health-state variable for whether respondents consider their own health good yields a similar result for both Swiss and European samples. Most interesting, the impact of job satisfaction seems—in terms of direction of influence and significance of coefficient—quite independent of whether it is lagged by between two to four years, as in the SHP, or measured contemporaneously, as in SHARE. Thus, we can conclude that job satisfaction does improve subjective health status and that, at least for a sample of persons aged 50 or older, simultaneity bias in prior findings based on cross-sections alone is minimal.

Nonetheless, some proxies for a subjective evaluation of general health do not occur in all three datasets. For example, the SHP provides information on individual satisfaction with

¹⁷ Robust standard errors are applied to the estimation of the ordered probit, the logit, and the linear models but not to the tobit model. For the panel estimations, no such correction is available.

¹⁸ In the SHARE questionnaire, the question on health state was posed at the beginning and end of the physical health part in both the U.S. and European version of the scale (the position of the question having been chosen randomly). Running regressions on the two subsamples (according to when each question was asked) does not change the results.

health and perceived health improvements within the last 12 months, whereas the SHARE dataset includes a question on life expectation. Measured according to all these alternative self-reported measures of health, workers who are more satisfied with their job (currently and in the past) also report a significantly better health status (at the 1 and 5 percent significance levels).

 Insert Table 1 about here

Table 2 presents the coefficients (and marginal effects) of the job satisfaction variable for more specific self-report health problems. Only two measures of specific health problems are comparable among the three datasets. First, in both the SHP panel and the complete SHARE dataset, more satisfied people tend to have significantly fewer back pains (SHP) or other bone-related problems (SHARE) (at the 1 percent level). However, no such observation is made for the Swiss subsample of SHARE, even though the sign of the coefficient points in the predicted direction. Similarly, in both the overall SHARE and SHP datasets, those with higher job satisfaction also tend to report considerably fewer severe impediments to daily activities, with significances at the 1 percent level. However, in the Swiss subsample of SHARE, the coefficient of job satisfaction reaches significance only at the 10 percent level, even though it does have the expected sign.

In the complete SHARE dataset, a higher level of job satisfaction also decreases the probability of long-term illness, the number of chronic diseases, the number of disease symptoms, and the number of limitations on physical mobility. Interestingly, job satisfaction appears to negatively affect the number of limitations on daily activities (at the 5 percent level) but not instrumental activities.¹⁹ Thus, persons with a higher level of job satisfaction

¹⁹ The two types of limitations differ in that the first relates to performing basic activities like eating, dressing, and washing, while the second relates to those activities that make the latter possible (e.g., cooking and shopping). Persons with the first type of limitation must be sent to nursing homes, whereas persons with the second type can continue an independent life with the help of some external aid.

seemingly enjoy more robust health, which permits daily living without external aid.

Similarly, in the SHP dataset, an increase in job satisfaction significantly reduces the number of days with health problems (at the 5 percent level).

In many instances, the coefficients of job satisfaction in the Swiss subsample are not significant at conventional levels, even though the model specification is the same as for the general health satisfaction variable given in Table 1. The exceptions are the regressands for number of symptoms and number of mobility limitations (at the 5 and 10 percent levels, respectively). In both these cases, consistent with the results for the complete SHARE dataset, an increase in job satisfaction decreases the probability of such (self-reported) health problems.

Insert Tables 2 and 3 about here

Table 3 displays the results for the mental health measures, particularly those relating to depression. Respondents in all datasets were questioned on the occurrence of both depression and the symptoms often used as proxies for depression, including sleeping problems, lack of energy, and feelings of weakness. In general, the outcomes are similar for both the SHP and the international SHARE dataset. For all measures of depression, a higher level of job satisfaction is associated with a lower frequency of symptoms or a lower likelihood of being depressed. As observed earlier, almost no significant coefficients exist in the Swiss subsample of the SHARE data, even though the signs point in the predicted direction. Nonetheless, in the Swiss subsample, the coefficient on job satisfaction is significant at the 10 percent level for sleeping problems, and the coefficient for the variable capturing frequency of depression narrowly misses the 10 percent significance level. Again, job satisfaction appears to influence mental health in the same way in Switzerland as in other Western European countries.

As regards self-reported contacts with the healthcare system as regressands, Table 4 reports estimation results for contact with doctors and hospitals, which may proxy the presence of severe illness. In the SHP, job satisfaction has a weak impact on health improvement, as measured by the number of times medical advice was sought (at the 10 percent level). However, this effect is stronger in the complete SHARE sample (at the 1 percent level), in which a higher level of job satisfaction decreases the likelihood, number, and length of stay in hospitals (two at the 10 percent and one at the 1 percent level, respectively). Such exact measures were unavailable in the SHP, but the simple dichotomous measure “likelihood of consultation with a doctor” seems unaffected by job satisfaction. For the Swiss SHARE subsample, we once again detect only insignificant coefficients for the various regressands, except for the number of times a doctor was consulted, whose coefficient shows the expected sign and just misses significance at the 10 percent level.

To conclude, in European countries overall, more satisfied persons aged 50 or older tend to make less use of the healthcare system, a result that is not so apparent in Switzerland.²⁰ Although this finding of lesser contact with the healthcare system seemingly supports a health-improving impact of job satisfaction, these results still rely on self-reported measures that might be affected by the respondent’s affective state.

 Insert Table 4 about here

4.2. Objective measures of health

These results, based on subjective measures of health, correspond well to the findings of previous studies. Moreover, the fact that we obtain very significant effects for job satisfaction on health even in a panel setting implies that simultaneity bias is minimal in cross-sections.

²⁰ One possible explanation might be the difference healthcare financing. In Switzerland, because the insured must pay a high fixed excess charge, the incentive to reduce costly contacts with the healthcare system may be equally strong for satisfied and dissatisfied persons.

Nonetheless, because this analysis is based only on self-reports of both job satisfaction and symptoms that could be biased by affective disposition (i.e., people satisfied with their jobs may systematically view their health state more positively), the results imply no true causal link between job satisfaction and health. Therefore, the relation between job satisfaction and health must be tested using objective (more direct) measures of health, which the SHARE dataset provides.

The results for the objective health measures from the SHARE dataset, including the measures of both physical and intellectual ability, are reported in Table 5. The tests of physical ability include walking speed, maximum handgrip strength, hand dexterity, and Body Mass Index (BMI) ranking. According to SHARE (2004, p. 38 ff.), these tests of physical ability serve not only as indicators of current age and extent of impairment in daily activities, but equally as predictors of future healthcare system use and expected mortality among older persons. For example, a weak handgrip prevents people from raising their own body weight, and a slow walking speed indicates a higher probability of falling and related injuries (SHARE, 2004, p. 44). The regressions outcomes indicate that job satisfaction apparently has no effect on any measure of physical health, a finding that holds true for both the complete SHARE sample and the Swiss subsample. Thus, we conclude that the health-improving impact of job satisfaction found in the subjective health assessments (see Tables 1 through 4), are not mirrored by the corresponding objective measures of physical health (Table 5).

Insert Table 5 about here

Most interesting, however, are the estimation results for objective measures of intellectual ability, which include mathematical performance, recall ability, time orientation, and verbal fluency (Table 5). In the complete SHARE data, we observe that a higher level of job satisfaction substantially increases mathematical performance, immediate and delayed recall

ability, and verbal fluency (all at the 1 percent level), although no impact is apparent on time orientation. This finding is generally corroborated by the estimation results for the Swiss subsample, particularly for mathematical performance and immediate recall of ten words.

Based on the interpretations of the used measures given in SHARE (2004, p. 36 ff.), people with higher job satisfaction show better verbal learning abilities but no better general memory (as measured by the question on time and date recollection). In addition, the brains of such respondents apparently work more swiftly (as indicated by the verbal fluency score) and are more apt to execute mathematical tasks related to everyday situations.²¹ In other words, the mental abilities necessary for performing daily activities appear positively affected by job satisfaction.

The finding that job satisfaction is associated with a better subjective physical and mental health state (Table 1) but affects intellectual abilities rather than physical health if measured objectively (Table 5) gives rise to a puzzle. More specifically, this observation speaks to the already mentioned problem of previous reliance on subjective measures of job satisfaction and health, either of which may be affected by unobserved third factors like employment conditions, past health status, or personality traits.

4.3 Working conditions, previous health status, and personality traits

The observed relation between job satisfaction and health might be spurious if driven by unobserved third factors like working conditions, previous health status, or hidden worker characteristics. First, employment conditions such as work hours, good relations with colleagues, or appropriate compensation might explain why, over time, workers develop both good health and high job satisfaction. Second, current job satisfaction might be influenced by past health problems that may also affect today's health status. Third, mood and general life perspective may equally well determine perception of one's own health and work-derived

²¹ These mathematical tasks included stating the amount of money in one's own savings account and calculating fractions, which are necessary for such activities as comparing prices or checking change.

feelings of well-being. If any one is the case, job satisfaction would work as a transmission channel that proxies these other determinants but exerts no independent impact of its own.

In the case that working conditions are affecting worker job satisfaction and health equally, job satisfaction would constitute a mediating factor that has no direct impact on health. Fortunately, the SHARE and SHP datasets provide indicators for myriad variables that allow employment conditions to be controlled for, including type of contract (short term/long term), firm sector (public/private), workload, freedom to make decisions, career prospects, sufficiency of remuneration, job security, and working hours.²² To test for such a third factor, we include these variables into the baseline model used in Tables 1 through 5, which already takes into account degree of managerial power, number of supervisees, and type of job (blue collar/white collar) measured by the Goldthorpe classification. Being cross-sectional, the SHARE working conditions data are measured contemporaneously with health and job satisfaction; however, the SHP environmental variables (and job satisfaction) are lagged and measured as of 1999 to mitigate simultaneity bias. For comparability of results across datasets, we also narrow the analysis to those subjective health measures contained in both datasets, together with the objective measures available only in the SHARE data. The estimation results for the job satisfaction variable and the additional working condition determinants for both datasets are reported in Tables 6a, 6b, and 7.

As Tables 6a and 7 illustrate, even when working conditions are controlled for, job satisfaction still exerts a significant health-improving impact on most subjective measures of health, including health status, measures of depression, impediments to daily activities, and number of visits to physicians.²³ This finding lends support to our conjecture that actual or past job satisfaction exerts a direct impact on subjective perception of health that is not mediated through actual or past work conditions. Similarly, Table 6b shows that, as in the

²² In the SHARE data, these working condition variables are available only for employees and civil servants; however, such is not the case for the SHP data.

²³ In the SHARE data, significance prevails in eight out of nine regression models; and in the SHP, in six out of seven cases. Exceptions pertain to sleeping problems (SHARE) and feelings of weakness (SHP).

earlier analysis, objective measures of intellectual ability (verbal fluency, word recall, mathematical performance) remain positively impacted by higher levels of job satisfaction. However, in contrast to previous results job satisfaction is now also associated with a more normal body weight (as measured by the BMI), while other objective indicators of physical health like handgrip strength and number of usable hands remain unaffected.

A comparison of the size of the marginal effects in the extended model (Tables 6a and 6b) with those obtained in the baseline model (Tables 1 through 5) reveals the extent to which job satisfaction functions as a transmission channel of employment conditions. The similarity of the coefficients indicates that general health assessment and intellectual ability are only somewhat affected by the inclusion or exclusion of employment condition determinants. However, on more specific health problems (back problems, impediments to daily activities, depression) the effect of job satisfaction is about twice as large in the baseline model as in the extended model, indicating that the job environment channel is at work.

Insert Tables 6a, 6b, and 7 about here

Whereas the current state of health may well be conditioned primarily by recent health status, health problems may also restrict job choice, lead to difficulties keeping a job, and lower the life satisfaction of which job satisfaction may form a substantial part. Thus, both current health and job satisfaction may have past health as a common cause. If so, the observed impact of lagged job satisfaction on present health (see Tables 1 through 5) may be spurious; that is, job satisfaction may simply serve as a transmission channel or proxy of prior health state without exerting any direct influence of its own. To test this possibility, we make use of the SHP's panel structure by including the lagged dependent variable (i.e., the various indicators of subjective health) as an additional regressor to the extended model. As a result, we obtain an unbalanced panel of the explanatory variables "past health," "past job

satisfaction,” and “past working conditions” measured in 1999 and “present health outcome” from 2001 onward as dependent variable. In other words, this model regresses past job satisfaction on changes in subjective health state.²⁴

The results in Table 8 show that in all regressions, the health indicators measured in 1999 are significant predictors of identical health measures in 2001 and beyond, at the 1 percent level. That is, even with a gap of two years or more, good health in the past is positively associated with good health in the present for all SHP health indicators. Most important, job satisfaction, however, still exerts a significant impact on a worker’s present subjective health assessment in 8 out of 13 regressions. In particular, even when past health is controlled for, the causal link between past job satisfaction and present subjective health persists for the following self-reported measures: general health status, frequency of depression or weakness, back problems, and number of days with health problems. In contrast, even though most signs of the coefficient point in the right direction, this finding breaks down for two potential symptoms of depressions—sleeping problems and headaches—and for impediments to daily activities and visits to the doctor. Given that these health problems frequently fall into the category of long-term and chronic illness, the available four-year maximum lag of past health may be insufficient for present health conditions likely to be determined to a greater degree by past job satisfaction rather than a history of the same disease, particularly given respondents’ mature ages. In the same way, past contacts with doctors might proxy such a history of disease.

Insert Table 8 about here

²⁴ This approach is only applicable to those cases in which the identical health measure was recorded both in 1999 and subsequently, which restricts the choice of dependent variable.

Worker characteristics like personality traits may also play some role in explaining the relation between job satisfaction and health, in particular, the traits identified by Cheng and Furnham (2001). Of these, perhaps the most relevant is negative affectivity, which has been shown to impact self-report measures of well-being (e.g., happiness, health worries) and even increase the number of visits to physicians (Almada et al., 1999; Brebner et al.; 1995; Francis et al., 1998; Watson and Pennebaker, 1989). Similarly, Cramer (1991) finds a positive effect of negative affectivity on self-reported coronary heart disease, while Kohler et al. (1993) and Costa (1987) fail to find a connection with objective health conditions such as blood pressure reading or coronary heart disease mortality.²⁵ Equally, Watson and Pennebaker (1989) show that, although negative affectivity is correlated with health complaint scales, it is neither strongly nor consistently related to actual long-term health status. They therefore conclude that “correlations between such (subjective) measures likely overestimate the true association between stress and health” (p. 234; see also, Brief et al., 1988; Burke et al., 1993). Thus, the causal link between job satisfaction and self-reported health in Tables 1 through 5 may also be spurious and the relationship driven rather by personality traits.

As indicators of the negative and positive affectivity identified by psychologists, Watson and Clark (1994) use a large number of adjectives that exclusively identify either mood factor.²⁶ For example, “afraid, scared, nervous, jittery, irritable, hostile, guilty, ashamed, upset, and distressed,” which can be grouped into the broader categories “fear,” “hostility,” “guilt,” and “sadness,” typify negative affectivity. Similarly, “active, alert, attentive, determined, enthusiastic, excited, inspired, interested, proud, and strong,” classifiable into “joviality,” “self-assurance,” and “attentiveness,” exemplify positive affectivity.²⁷ Other

²⁵ Nonetheless, these studies also suffer methodologically from being cross-sectional.

²⁶ The loading factor for the trait to be measured is greater than 0.4 and that for the alternative trait is smaller than 0.125.

²⁷ It should be noted that sleepiness and fatigue, which are often considered proxies for depression, do not form part of the basic negative emotions but rather fall into an independent “fatigue” category of affective states.

sources claim that positive affectivity leads to systematically higher levels of various types of satisfaction (e.g. lifesatisfaction).

Psychological questionnaires developed to test positive and negative affectivity ask subjects about the frequency of feelings corresponding to the adjectives above (the so-called PANAS/PANAS-X questionnaires). Yet, states of negative and positive affectivity do not constitute exclusive states of mind, that is, they show only a low correlation with each other (Watson et al., 1988). In other words, individuals may exhibit traits of both states or neither. Thus, the potentially mediating effect of job satisfaction with regards to both affective states can be tested by their simultaneous inclusion in our regression model.

Even though neither the SHARE nor the SHP survey incorporates the above descriptors, the mental health section of the SHARE survey does include a considerable range of loosely comparable questions. Specifically, the items on feelings of depression and expressions of guilt and self-blaming can proxy for negative affectivity, while ability to concentrate, having hopes for the future, and enjoying activities can proxy for positive affectivity. Therefore, we use these SHARE items to construct factor scores for each type of affective state (see Table 5A).²⁸ However, given that the number of questions available in the SHARE data is by far lower than the usual 40 to 120 adjectives employed in the PANAS questionnaires, our constructed affectivity measures are most probably less reliable.

Tables 9a and 9b present the results for the baseline model SHARE data when measures of negative and positive affectivity are included with the working condition determinants. As predicted, in most regressions, individuals with negative affect report significantly less satisfaction with their health status and more specific health problems, while positive affective persons behave in the opposite way. Moreover, affective state appears equally

²⁸ The variables for the factor analysis were chosen based on Watson and Clark (1994). Factor analysis for two factors was carried out using an iterated principal-factor method and oblique rotation that allows factors to be correlated. In the final model, the loadings for negative affectivity ranged between 0.31 and 0.71 and those for positive affectivity, between 0.25 and 0.71. Factor scores for the two types were predicted using the Bartlett method, which produces unbiased estimates. The correlation between the final factor scores is -0.1614.

correlated with objective measures of health, in particular with all intellectual abilities indicators (word recall, verbal fluency), as well as with measures of physical health. Most important, not only does the impact of job satisfaction on subjective health variables (see Table 9a) in most regressions not qualitatively change from that in the working conditions only model (Table 6a), but this observation holds for almost all objective measures of health (Tables 9b and 6b).²⁹ Thus, contrary to expectations, job satisfaction still appears to directly influence subjective health as well as intellectual ability beyond the impact of an individual's affective state and work conditions.

Nonetheless, the marginal effects reported in Tables 6a and 6b (reprinted in the last rows of Tables 9a and 9b) decrease in size when personal mood factors are added to the model. Although this effect is more prominent for subjective than objective health indicators, it indicates that job satisfaction does serve as a transmission channel of affectivity – at least to some extent. Interestingly, the differences in marginal effects are largest for frequency of depression, which confirms the suggested strong connection between affective state and mental health (e.g., Watson et al., 1988; Lonigan et al., 1994). Finally, comparing the marginal effect across the three estimated models and calculating differences reveals that the contribution of working conditions to the impact of job satisfaction on general health assessment is roughly comparable to that of affectivity, while the first contributes more than does the latter particularly for more specific health measures (depression, back problems, daily impediments).

 Insert Table 9 about here

²⁹ One exception is that, in contrast to the results in Tables 6a and 6b, inclusion of affective states leads to a loss of significance for self-reported back problems, sleep, and the ability to recall ten words immediately.

In contrast to the SHARE data, the SHP data allow past health status to be controlled for before health outcomes are measured but, on the other hand, provide fewer indicators of positive and negative affectivity. Again, based on Watson and Clark (1994), we construct factor scores for each affective state and add them to our model.³⁰ Thus, our final model is comprised of the baseline variables (as in Tables 1 to 4), further characteristics of working conditions (as in Table 7), lagged health status (as in Table 8), and the newly included measures of negative and positive affectivity. Again, the choice of dependent health outcomes in 2001 to 2003 hinges on the availability of the identical measure in the 1999 wave.

As Table 10 shows, compared to previous results (replicated in Table 10, last row) the inclusion of affectivity measures causes the job satisfaction coefficient to lose its significance completely, particularly for the self-reported measures of general health (satisfaction with health status, being in good health, health improvement), and lowers statistical significance for the two depression measures “frequency of depression” and “feelings of weakness” from a strong 1 percent level in Table 8 down to a rather wobbly 10 percent level. Also, as expected, both positive and negative affectivity to impact measures of subjective health in the expected direction (up to the 0.1 percent level).

Nonetheless, inclusion of affective measures does not affect the causal link between job satisfaction and back problems, number of days with health problems (at the 5 percent level), or frequency and symptoms of depressions (albeit weak). As argued before, it may well be that these illnesses are rather long term and therefore not fully caused by the mental state or job satisfaction measured two to four years previously.

Overall, these findings suggest that the influence of affectivity is fully mediated through job satisfaction for general health perception, but only partly so for the assessment of more

³⁰ We measure negative affectivity by the fear of being burglarized or attacked, feelings of anxiety, and frequency of depressions, with factor loadings ranging between 0.34 and 0.73. Scores of positive affectivity are constructed using variables that measure satisfaction with differentiated items and interest in politics (see Table A6). Factor loadings range from 0.11 to 0.64. The -0.1578 correlation between the two measures of affectivity is sufficiently low to justify their simultaneous inclusion.

specific isolated, potentially persistent health problems. Thus, on the one hand, the more specific the health questions asked, the more the mediating effect of job satisfaction may diminish, which would make satisfaction an important determinant in its own right. On the other hand, the scarcity of the SHP data with respect to number of available waves, objective measures of health, and indicators of moods prevents a final generalization of our estimation results.

5. Conclusion

This paper analyzes the impact of job satisfaction on the health of persons 50 or older using a national Swiss panel dataset and an international cross-section. The initial analysis in search of a link between health status and job satisfaction is based on subjective measures; the second, on objective measures.

Using data from the Swiss Household Panel, we show that self-reported measures of health in the years 2001 to 2003 are positively influenced by the job satisfaction reported in 1999. Lagging job satisfaction reveals an unambiguously increasing effect of job satisfaction on health; that is, any bias due to endogeneity is at least mitigated. The close correspondence of our findings with those of previous cross-sectional studies indicates that the (likelihood of an) endogeneity bias in cross-sectional studies of workers aged 50 or older is minimal. We also identify a similar link between subjective health and job satisfaction using an international cross-section. With respect to more specific health problems, job satisfaction appears to decrease the number of self-reported impediments to daily activities and self-reported frequency of depression as measured by various symptoms. Equally, job satisfaction does appear to decrease the occurrence of recalled medical treatment as measured by the self-report number of doctor visits or hospital stays, or the length of time in hospital.

Based on the objective measures in the SHARE dataset for physical health and mental abilities, we find no statistically significant link between job satisfaction and performances in

tests of physical health. Moreover, with respect to intellectual abilities, individuals who are more satisfied with their jobs are also intellectually more capable, particularly in mathematics, precise recall of words, and verbal fluency.

Thus, not only do our results for subjective measures of health imply a causal relationship between self-reported measures of employee health and job satisfaction, but a robustness test reveals that this effect of job satisfaction goes beyond the influence of working conditions and therefore does not fully mediate them. Moreover, for self-reported general health assessment and symptoms of depression, we show that the health-improving impact of job satisfaction pertains not only to levels of health but also to changes in health. In contrast, results for the SHP data show that chronic and long-lasting diseases are more likely to be determined by past health status than by past job satisfaction.

Admittedly, even though knowing what affects self-reported health is important (Burke et al., 1993), this relation may be partly driven by personal traits like negative affectivity. If so, this problem would probably be best tackled by using objective measures of health or taking mood factors directly into account. Indeed, in the SHARE dataset, when affectivity is controlled for, our results indicate almost no correlation between job satisfaction and directly observable physical health, even though job satisfaction remains strongly linked to intellectual abilities. Unfortunately, the SHARE dataset, being cross-sectional, does not allow automatic inference of a causal relationship between any variables. However, also in the comprehensive model estimated with SHP panel data, the link between past job satisfaction and current subjective general health assessment breaks down with the inclusion of positive and negative affectivity. Nonetheless, for self-reported measures of more specific health problems and some symptoms of depressions, a relation with job satisfaction is evident that goes beyond working conditions, prior health state, and affectivity.

In addition, any causal relation between job satisfaction and worker health can be expected to diminish as the time gap between it and the objective health state measurement

increases. Thus, the nature of this relation may be revealed by exploiting the panel structure when future waves of the SHARE survey become available. A continuously weaker relation between lagged job satisfaction and measures of health would support a causal relation between the two, while a time-invariant, equally strong linkage would call for an alternative explanation such as the negative affectivity hypothesis.

Until the issue of causality is resolved, policy recommendations can only be preliminary. Nonetheless, our finding in the cross-sectional analysis that through the job satisfaction channel working conditions contribute to general worker health almost as much as affectivity goes against common assumption. Clearly, improvements in working conditions would be conducive to improving the health perception whose impact on worker well-being and productivity is already widely discussed. However, our panel data results indicate that it is past health and mood factors that make workers perceive themselves to be in ill health.

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Appendix

Table A1: Description of the Variables from the SHARE Dataset

Variable	Definition	Based on/source
Health variables		
Health status (EU)	Self-perceived health measured in 4 categories—European version; original categories 4 and 5 combined: (−1) = “very good,” (−2) = “good,” (−3) = “fair,” and (−4) = “bad” or “very bad”	(−1) if spheu = 1 (−2) if spheu = 2 (−3) if spheu = 3 (−4) if spheu = 4 or 5 (generated health variables)
Health status (US)	Self-perceived health measured in 5 categories—U.S. American version: (−1) = “excellent,” (−2) = “very good,” (−3) = “good,” (−4) = “fair” and (−5) = “poor”	(−1) if sphus = 1 (−2) if sphus = 2 (−3) if sphus = 3 (−4) if sphus = 4 (−5) if sphus = 5 (generated health variables)
Good health (EU)	1 if subjective state of health is good or very good; 0 otherwise	spheu2 based on spheu (generated health variables)
Good health (US)	1 if subjective state of health is very good or excellent; 0 otherwise	sphus2, based on sphus (generated health variables)
Subjective life expectancy	Expected number of years to live; continuous variable ranging from 0 to 100	ex009_
Problems with back, hips, or knees	1 if interviewee is bothered by pain in his/her back, hips, knees or other joint bones; 0 otherwise	ph010d01
Impediment to daily activities	Self-assessment of limitations to activities, measured by three categories: (−1) = “severely limited,” (−2) = “limited, but not severely,” and (−3) = “not limited”	ph005_
Long-term illnesses	1 if interviewee suffers from a long-term illness; 0 otherwise	ph004_ = 1
Number of chronic diseases	Number of chronic diseases reported by the interviewee; because original categories 6 and 7 were combined; range is from 0 to 6	chronic (generated health variables)
Number of symptoms	Number of symptoms reported by the individual; because original categories 6 and 7 were combined; range is from 0 to 6	symptom (generated health variables)
Mobility assessment: number of limitations	Number of limitations of mobility, arm functions and fine motor function reported by the interviewee; range is from 0 to 9	mobility (generated health variables)
Daily activities: number of limitations	Number of limitations on activities of daily living: includes dressing, walking, bathing, eating, getting in and out of bed, and using the toilet	ADL (generated health variables)
Daily instrumental activities: number of limitations	Number of limitations on instrumental activities of daily living; includes using a map for orientation, preparing a hot meal, shopping for groceries, making a call, taking medications, doing housework, and managing money	IADL (generated health variables)

Table A1: Description of the Variables from the SHARE dataset (cont.)

Variable	Definition	Based on/source
Frequency of depression	EURO-D scale of depression; original categories 9 and 10 have been combined: 0 = “not depressed,” then depression level ranges up to a value of 9	Eurod (generated health variables)
Lack of energy	1 if individual experiences feeling of fatigue; 0 otherwise	mh013
Sleeping problems	1 if individual feels bothered by sleeping problems; 0 otherwise	ph010d06
Feeling of weakness	1 if individual feels bothered by weakness, dizziness, and /or blackouts; 0 otherwise	ph010d09
Number of times doctor consulted	Number of visits to or talks with medical doctors in the last 12 months; the lower three categories have been combined, resulting in a continuous variable ranging from 2 to 98	hc002
Hospital stays during last 12 months	1 if interviewee stayed in hospital during the last 12 months; 0 otherwise	hc012_
Times patient has been hospitalized	Number of times interviewee has been a hospital patient; range is 0 to 5 times	hc013_
Total nights in hospital	Number of nights interviewee stayed in a hospital; continuous variable from 0 to 321	hc014_
Walking speed	Average speed of two walking tests in the interviewee’s home	wspeed (generated health variables)
Maximum grip strength	At the interview, the strength of the grip of either hand was measured twice with a dynamometer; the variable indicates the maximum grip of both hands or one hand	maxgrip (generated health variables)
Number of usable hands	Categorical variable measuring the use of either hand; original categories 2 and 3 have been combined: (–1) = “respondent has the use of both hands,” (–2) = “respondent has the use of one hand,” and (–4) = “respondent is unable to use either hand”	gs002
Body Mass Index	Categorical variable based on calculation of the BMI with original categories 1 and 3 combined: (–2) = “normal weight,” (–3) = “overweight or underweight,” and (–4) = “obese”	BMI2 (generated health variables)
Orientation to date, month, year, and day	4 categories measuring orientation to date, month, year, and day of the week, based on four separate questions, with original categories 0 and 1 forming the lowest category: 0 indicates “bad” and 4, “good”	orienti (generated health variables)
Mathematical performance	5 categories measuring mathematical performance tested with four different questions: 1 indicates “bad” and 5, “good”	numeracy (generated health variables)
Recalling words from a 10-word list; immediate	Number of words remembered from a list of 10 immediately after presentation; original categories 9 and 10 form the highest category	cf008tot
Recalling words from a 10-word list; delayed	Number of words remembered from a list of 10 some time after presentation (8 questions later); 9 and 10 form the highest category	cf016tot
Verbal fluency score	Interviewer’s subjective assessment of the interviewee’s verbal fluency	cf010

Table A1: Description of the Variables from the SHARE Dataset (cont.)

Variable	Definition	Based on/source
<i>Explanatory variables</i>		
Job satisfaction	4 categories measuring satisfaction with main job in general: 1 = “strongly disagree,” 2 = “disagree,” 3 = “agree,” and 4 = “strongly agree”	4 if ep026 = 1 3 if ep026 = 2 2 if ep026 = 3 1 if ep026 = 4
Religious service	1 if interviewee participates in a religious service at least almost every week; 0 otherwise	ac003_6 = 1 or 2
Prayer	Frequency of praying, measured in 4 categories: 0 = “never” or “missing,” 1 = “less than once a week,” 2 = “once a week” or “a couple of times a week,” and 3 = “once daily or almost daily” or “more than once a day”	0 = if q35 = 9, 6 or missing 1 = if q35 = 5 2 = if q35 = 4 or 3 3 = if q35 = 2 or 1
Age 50–59	1 if age at time of interview is between 50 and 59; 0 otherwise	age0
Age 60–69	1 if age at time of interview is between 60 and 69; 0 otherwise	age
Age >70 (base category)	1 if age at time of interview is higher than 70; 0 otherwise	age
Female	1 if individual is female; 0 otherwise	gender = 2
Foreigner	1 if individual resides in his/her country of birth; 0 otherwise	dn004 = 5
Middle education	1 if individual completed secondary II education (iscd-97 code 2 or 3); 0 otherwise	edu = 2 edu = 3
Higher education	1 if individual completed a tertiary education (iscd-97 code 4 or higher)	edu > 3
Single woman	1 if a single is female; 0 otherwise	hhtype = 1 & gender = 2
Single man	1 if a single is male; 0 otherwise	hhtype = 1 & gender = 1
Couple with children	1 if a couple with young or younger and older children lives in the same household; 0 otherwise	hhtype = 4 or 6
Single parent	1 if a single parent with child(ren) lives in this household; 0 otherwise	hhtype = 3
Other private household	1 if living in a household: single or couple with their parents, or other type of household	hhtype 9 or = 7
Collective household or couple with kids (base category)	1 if household is a collective household or a couple without child(ren) or with older children; 0 otherwise	hhtype = 2 or 5
Mean income	Monthly national PPP-adjusted weighted average gross income of the households in the full sample, divided by the modified equivalence scale of the OECD; income imputed	$(yhhp1 + yhhp2 + yhhp3 + yhhp4 + yhhp5) / (5 \cdot 12 \cdot 1000)$
Difference income	Difference between personal household equivalent income and national mean income (see above)	
Positive difference income, squared	Positive difference, squared	

Table A1: Description of the Variables from the SHARE Dataset (cont.)

Variable	Definition	Based on/source
Negative difference income, squared	Negative difference, squared	
Higher controller in current year (base category)	1 if a higher controller in the current year in his/her main job, 0 otherwise; Goldthorpe's class schema approximated	controller = 1 & ep022_1 >=4 & ep022_1 !=99
Low controller (auxiliary variable)	1 if a low controller; 0 otherwise	controller = 1 & ep022_1 <4
Controller (auxiliary variable)	1 if a controller; 0 otherwise	ep009_1 = 1 & physdemand = 0 & ep022_1 <97 or ep009_1 = 2 & physdemand = 0 & ep022_1 <97
Physical demand	1 if individual has a physically demanding job; 0 otherwise	ep027_1 = 1 or 2
Routine worker	1 if individual was a routine nonmanual worker in 1999; 0 otherwise	ep009_1 = 1 & physdemand = 0 & ep022_1 = .
Self-employed types 1 and 2	1 if individual is self-employed with or without employees; 0 otherwise	ep009_1 = 3
Manual supervision	1 if individual is a manual worker but supervises at least 1 to 5 other persons; 0 otherwise	ep009_1 = 1 & physdemand = 1 & ep022_1 < 97
Manual	1 if individual is a non-supervising manual worker; 0 otherwise	ep009_1 = 1 & physdemand = 1 & ep022_1 = .
Voluntary work in current year	1 if individual was engaged in voluntary or charity work last month; 0 otherwise	ac002d1=1
Frequency of sports participation in current year	4 categories of frequency of sports or activities that are vigorous as a leisure activity in the current year: 1 = "more than once a week," 2 = "once a week," 3 = "one to three times a month," 4 = "hardly ever or never" or "no answer"	br015 0 if br015 = . or > 95
German, Mediterranean, or other world region	Two dichotomous variables indicating the cultural region of the country; other/Scandinavian is the base category	country

Table A1: Description of the Variables from the SHARE Dataset (cont.)

Variable	Definition	Based on/source
<i>Explanatory variables related to work conditions</i>		
Physical	1 if individual strongly agrees or agrees that job is physically demanding; 0 otherwise	ep027 = 1 or 2
Time pressure	1 if individual strongly agrees or suffers from time pressure on the job due to a heavy workload; 0 otherwise	ep028 = 1 or 2
Little freedom	1 if individual strongly agrees or agrees that s/he has little freedom to decide how to do the job; 0 otherwise	ep029 = 1 or 2
New skills	1 if individual strongly agrees or agrees that the job offers opportunities to develop new skills; 0 otherwise	ep030 = 1 or 2
Support	1 if individual strongly agrees or agrees that s/he receives support in difficult situations on the job; 0 otherwise	ep031 = 1 or 2
Recognition	1 if individual strongly agrees or agrees that s/he receives recognition for work done on the job; 0 otherwise	ep032 = 1 or 2
Adequate salary	1 if individual strongly agrees or agrees that salaries and earning are adequate in job; 0 otherwise	ep033 = 1 or 2
Poor career possibilities	1 if individual strongly agrees or agrees that job advancement prospects are poor; 0 otherwise	ep034 = 1 or 2
No job security	1 if individual strongly agrees or agrees that job security is poor; 0 otherwise	ep035 = 1 or 2
Short term	1 if duration of work contract is three years or less; 0 otherwise	ep011_1 = 1
Public	1 if individual was employed in the public sector; 0 otherwise	ep019_1 = 1

Table A2: Description of the Variables from the Swiss Household Panel

Variable	Definition	Based on/source
Health variables		
Health status	Subjective assessment of health status, 4 categories: (–1) indicates “very well,” (–2) “well,” (–3) “so-so,” and (–4) “not very well” or “not well at all”	–1 if p0Xc01 = 1 –2 if p0Xc01 = 2 –3 if p0Xc01 = 3 –4 if p0Xc01 = 4, 5
Good health	1 if subjective state of health is good; 0 otherwise	1 if p0Xc01 < 3
Satisfaction with health status	8 categories, with original categories 0, 1, 2, and 3 forming the lowest: 10 = “not at all satisfied” and 0 = “completely satisfied”	p0Xc02
Health improvement	9 categories, with original categories 0, 1, and 2 forming the lowest: 0 = “greatly worsened” and 10 = “greatly improved”	p0Xc03
Back problems	1 if individual has experienced back problems in the last 12 months; 0 otherwise	p0Xc04
Impediment to daily activities	10 categories indicating the extension of health impediments to daily activities, with original categories 0 and 1 forming the lowest: 0 = “not at all” and 10 = “a great deal”	p0Xc08
Headaches	1 if individual has experienced headaches or facial pains in the last 12 months; 0 otherwise	p0Xc07
Number of days with health problems	Continuous variable from 0 to 365 measuring the number of days affected by health problems during the last 12 months: 0 = “never”	p0Xc11
Frequency of depression	8 categories measuring the frequency of depression, blues or anxiety, with original categories 7, 8, 9 and 10 forming the highest category: 0 = “never” and 10 = “always”	p0Xc17
Frequency of energy	9 categories indicating the frequency of energy and optimism, with original categories 0, 1 and 2 forming the lowest category: 0 = “never” and 10 = “always”	p0Xc18
Sleeping problems	1 if individual has experienced sleeping problems in the last 12 months; 0 otherwise	p0Xc06
Feeling of weakness	1 if individual has experienced signs of weakness or weariness in the last 12 months; 0 otherwise	p0Xc05
Consultation with doctor	1 if individual has consulted a medical doctor in the last 12 months; 0 otherwise	p0Xc12
Number of times a doctor consulted	Continuous variable from 2 to 120 measuring the number of doctor consultations; original categories of 0, 1 and 2 have been combined	p0Xc15

Table A2: Description of the Variables from the Swiss Household Panel (cont.)

Variable	Definition	Based on/source
<i>Explanatory variables</i>		
Religious service	1 if interviewee participates in a religious service at least every two weeks; 0 otherwise	p0Xr04 >=7
Prayer	Frequency of praying apart from church or religious community, measured in 4 categories: 0 = “never,” 1 = “a few times a year” or “about once a month,” 2 = “at least once a week,” and 3 = “daily or almost daily”	0 = if p0Xr05 = < 1 1 = if p0Xr05 = 2,3 2 = if p0Xr05 = 4 3 = if p0Xr05 = 5
Age 50–59	1 if age at time of interview was between 50 and 59; 0 otherwise	age0X
Age 60–69	1 if age at time of interview was between 60 and 69; 0 otherwise	age0X
Age >70 (base category)	1 if age at time of interview was over 70; 0 otherwise	
Female	1 if individual is female; 0 otherwise	sex0X = 2
Foreigner	1 if individual is a foreigner; 0 otherwise (single, double or triple citizenship)	nat_1_X, nat_2_X, and nat_3_X
Middle education	1 if individual completed secondary II education; 0 otherwise	educat0X = 4, 5, 6, or 8
Higher education	1 if individual completed a tertiary education (university, university of applied science, Higher Master Craftsman’s Diploma)	educat0X = 7, 9, 10
Single woman	1 if a single is female; 0 otherwise	hldtyp0X = 1, 2 or 3 & sex = 2
Single man	1 if a single is male; 0 otherwise	hldtyp0X = 1, 2 or 3 & sex = 1
Couple with children	1 if a couple with children lives in the same household; 0 otherwise	hldtyp0X = 8, 9, 10 or 11
Single parent	1 if a single parent with child(ren) lives in this household; 0 otherwise	hldtyp0X = 4 or 5
Other private household	1 if living in a household: adults with parents, parents with adult children, non-family household with or without relatives	hldtyp0X = 12
Collective household or couple with kids (base category)	1 if household is a collective household or a couple without child(ren); 0 otherwise	hldtyp0X = 13, 6, 7
Mean income	Monthly cantonal weighted average net income of the households in the full SHP sample, deflated to the reference year 2000 with the GDP deflator, divided by the equivalence scale of the Swiss Conference for Public Assistance (SKOS); income partly imputed	i0Xeqsn /12*inflation index
Difference income	Difference between personal household equivalent income and cantonal mean income (see above)	
Positive difference income, squared	Positive difference, squared	
Negative difference income, squared	Negative difference, squared	

Table A2: Description of the Variables from the Swiss Household Panel (cont.)

Variable	Definition	Based on/source
Higher controller in 1999 (base category)	1 if individual was a higher controller in 1999 in his/her main job as defined by Goldthorpe's class schema; 0 otherwise	gldmaj99 = 1
Low controller in 1999	1 if individual was a low controller or carried out manual supervision in 1999; 0 otherwise	gldmaj99 = 2, 7
Routine worker in 1999	1 if individual was a routine non-manual worker in 1999; 0 otherwise	gldmaj99 = 3
Self-employed type 1 in 1999	1 if individual was self-employed with employees in 1999; 0 otherwise	gldmaj99 = 4
Self-employed type 2 in 1999	1 if individual was self-employed without employees in 1999; 0 otherwise	gldmaj99 = 5
Manual in 1999	1 if individual was a (semi-/skilled) manual worker in 1999; 0 otherwise	gldmaj99 = 8, 9
Farmer	1 if individual was a farm labourer or self-employed on a farm in 1999; 0 otherwise	gldmaj99 = 10, 11
Voluntary work in current year	1 if individual is engaged in voluntary work; 0 otherwise	p0Xn35 = 1
Voluntary work in year 1999	1 if individual was engaged in voluntary work in 1999; 0 otherwise	p99n35 = 1
Frequency of sports participation in 1999	4 categories of frequency of sports as a leisure activity in year 1999: 1 = "every day," 2 = "at least once a week," 3 = "at least once a month," 4 = "less than once a month," "never" or "no answer"	1 if p99a15 = 1 2 if p99a15 = 2 3 if p99a15 = 3 4 if p99a15 = 4, 5 or not reported
French, Italian or German household language	2 dichotomous variables indicating the interview language of household questionnaire; German is the base category	hlingu0X (1 = French, 2 = German, 3 = Italian)
French, Italian or German cantonal language	2 dichotomous variables indicating the cantonal main language; German is the base category	Federal Statistical Office
Type of community	8 dichotomous variables indicating the type of community the individual lives in; type 1 is base category; types 3 and 4 form one category	com2_0X
Year dummies	2 dichotomous variables indicating the year 2002 or 2001, respectively; 2003 is the base year	
Imputation	1 if household income has been imputed; 0 otherwise	

Explanatory variables related to work conditions

No job change	1 if employer or job had not been changed within the last 12 months in 1999; 0 otherwise	p99w18 = 4
Public company	1 if employer was a federal government public company in 1999; 0 otherwise	P99w33 = 2
Part time	1 if employee worked part time in 1999; 0 otherwise	P99w39 = 1

Table A2: Description of the Variables from the Swiss Household Panel (cont.)

Variable	Definition	Based on/source
Short-term contract	1 if duration of contract was shorter than three years in 1999; 0 otherwise	P99w38 >= 1 & p99w38 <= 5
No overtime compensation	1 if employee was not compensated for overtime work in 1999; 0 otherwise	P99w79 = 1
Work at night	1 if employee also worked at night in 1999; 0 otherwise.	P99w216 = 1
Work in evening	1 if employee also worked in the evenings in 1999; 0 otherwise	P99w217 = 1
Work on weekend	1 if employee also worked on Saturdays and/or Sundays in 1999; 0 otherwise	P99w218 = 1
Fixed hours	1 if employee had fixed working hours in 1999; 0 otherwise	P99w71 = 1
Commuter	1 if employee commuted more than 60 minutes to work per day in 1999; 0 otherwise	P99w84 > = 60
No job security	1 if employee viewed the job as at least a bit insecure in 1999; 0 otherwise	P99w86 > = 3
Good career prospects	1 if respondent evaluated the chances of promotion as at least 6 points on a 10-point scale ranging from “no chance”(0) to “definitely” (10)	P99w222 >= 6
Good company development	1 if respondent evaluates the chances of development of her employer’s company within the next 12 months with at least 6 points on a 10-point scale ranging from “no chance”(0) to “definitely” (10)	P99w223 > = 6
High workload	1 if employee could autonomously decrease the workload in 1999; 0 otherwise	P99w226 = 3
No decision-making involvement	1 if employee had a job with no participation in decision-making in 1999; 0 otherwise	P99w91 = 3,
Satisfaction with income	1 if respondent assessed income satisfaction as being at least 8 points on a 10-point scale ranging from “not at all satisfied” (0) to “completely satisfied” (10)	P99w92 > = 8
Risk of unemployment	1 if respondent assessed the risk of becoming unemployed within the next 12 months as being at least 8 points on a 10-point scale ranging from “no risk at all” (0) to “a real risk” (10)	P99w101 > = 8
<p>X represents the year in which the individual or household was interviewed (X = 0, 1, or 2; i.e. 2001, 2002, or 2003); p is personal questionnaire and h is household questionnaire. Detailed information on the nomenclature used in the SHP surveys can be found at http://www.swisspanel.ch/shpdata/var_nom.php?lang=en&pid=25 (18.08.2005)</p>		

Table A3: Descriptive Statistics for the SHARE Data

Variable	Obs.	Mean	Std. dev.	Min.	Max.
<i>Health variables</i>					
Health status (EU)	7042	−1.9337	0.7592	−4	−1
Health status (US)	7042	−2.4966	0.9716	−5	−1
Good health (EU)	7042	0.7974	0.4020	0	1
Good health (US)	7042	0.4713	0.4992	0	1
Subjective life expectancy	6719	71.0906	24.1768	0	100
Problems with back, hips, or knees	7042	0.4246	0.4943	0	1
Impediments to daily activities	7041	−2.6702	0.5785	−3	−1
Long-term illnesses	7042	0.3625	0.4808	0	1
Number of chronic diseases	7036	0.9575	1.0744	0	6
Number of symptoms	7041	1.0070	1.1722	0	6
Mobility assessment: number of limitations	7038	0.5902	1.2123	0	9
Daily activities: number of limitations	7039	0.0382	0.2710	0	6
Daily instrumental activities: number of limitations	7039	0.0571	0.3196	0	7
Frequency of depression	6992	1.7213	1.8287	0	9
Lack of energy	7014	0.2374	0.4255	0	1
Sleeping problems	7042	0.1429	0.3500	0	1
Feeling of weakness	7042	0.0454	0.2083	0	1
Number of times doctor consulted	7035	4.4931	6.3728	2	98
Hospital stays in last 12 months	7042	0.0815	0.2736	0	1
Times hospitalized	7042	0.1092	0.4315	0	5
Total nights stayed in hospital	7040	0.7419	6.7467	0	321
Walking speed	102	0.7570	0.3424	0.1316	2.3810
Maximum grip strength	6766	40.0418	12.3416	4	92
Number of usable hands	6998	−1.0274	0.2399	−4	−1
Body Mass Index	6986	−2.7242	0.6999	−4	−2
Orientation to date, month, year, and day	7038	3.8811	0.4376	0	4
Mathematical performance	7029	3.7357	1.0436	1	5
Recalling words from a 10-word list: immediate	6978	5.5110	1.6872	0	9
Recalling words from a 10-word-list: delayed	6981	4.1377	1.8935	0	9
Verbal fluency score	6971	21.5359	7.4017	0	80

Table A3: Descriptive Statistics of the SHARE Data (cont.)

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
<i>Explanatory variables</i>					
Job satisfaction	7042	3.3855	0.6670	1	4
Religious service	7042	0.0621	0.2413	0	1
Prayer	7042	0.8039	1.1126	0	3
Age 50–59	7042	0.7467	0.4350	0	1
Age 60–69	7042	0.2119	0.4087	0	1
Female	7042	0.4550	0.4980	0	1
Foreigner	7042	0.0795	0.2706	0	1
Middle education	7042	0.5067	0.5000	0	1
Higher education	7042	0.3395	0.4736	0	1
Single woman	7042	0.0808	0.2725	0	1
Single man	7042	0.0606	0.2387	0	1
Couple with children	7042	0.1000	0.3000	0	1
Single parent	7042	0.0402	0.1964	0	1
Other private household	7042	0.0178	0.1321	0	1
Mean income	7042	55.2445	156.8109	1.3226	536.7414
Difference income	7042	43.3110	5777.7190	–536.7414	436965
Positive difference income, squared	7042	33400000	2330000000	0	1.91E+11
Negative difference income, squared	7042	27059.8000	83423.2900	0	288091.3
Low controller	7042	0.1186	0.3233	0	1
Routine worker	7042	0.2941	0.4557	0	1
Self-employed types 1 and 2	7042	0.2114	0.4084	0	1
Manual supervision	7042	0.0755	0.2643	0	1
Manual	7042	0.2276	0.4193	0	1
Voluntary work during current year	7042	0.1431	0.3502	0	1
Frequency of sports participation during current year	7042	2.0260	1.2346	1	4
German-speaking region	7042	0.2721	0.4451	0	1
Mediterranean region	7042	0.3077	0.4616	0	1
Summary statistics based on observations that form the regression sample of the first health state regression in Table 1.					

Table A4: Descriptive Statistics for the SHP Data

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
<i>Health variables</i>					
Health status	2474	−1.9806	0.6507	−4	−1
Good health	2474	0.8262	0.3790	0	1
Satisfaction with health status	2474	7.8909	1.6359	3	10
Health improvement	2473	5.0295	0.9332	2	10
Back problems	2474	0.4095	0.4918	0	1
Impediments to daily activities	2470	1.5911	2.4065	0	9
Headaches	2473	0.2301	0.4210	0	1
Number of days with health problems	2451	7.9592	30.4512	0	365
Frequency of depression	2474	1.7486	2.0580	0	8
Frequency of energy	2473	7.5261	1.7507	2	10
Sleeping problems	2474	0.2967	0.4569	0	1
Feeling of weakness	2474	0.2708	0.4445	0	1
Consultation with doctor	2472	0.7973	0.4021	0	1
Number of times a doctor consulted	2315	4.9801	7.0908	2	120
<i>Explanatory variables</i>					
Job satisfaction in 1999	2474	8.5279	1.5105	4	10
Religious service	2474	0.1694	0.3751	0	1
Prayer	2474	1.6386	1.2283	0	3
Age 50–59	2474	0.6002	0.4899	0	1
Age 60–69	2474	0.3432	0.4749	0	1
Female	2474	0.5259	0.4994	0	1
Foreigner	2474	0.0728	0.2598	0	1
Middle education	2474	0.5679	0.4955	0	1
Higher education	2474	0.2417	0.4282	0	1

Table A4: Descriptive Statistics for the SHP Data (cont.)

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
Single woman	2474	0.1124	0.3159	0	1
Single man	2474	0.0938	0.2916	0	1
Couple with children	2474	0.2332	0.4230	0	1
Single parent	2474	0.0384	0.1922	0	1
Other private household	2474	0.0214	0.1448	0	1
Mean income	2474	4.5411	0.4498	3.4690	6.2982
Difference income	2474	0.7526	3.6017	-4.0594	96.0828
Positive difference income, squared	2474	12.5310	203.2885	0	9231.902
Negative difference income, squared	2474	1.0025	2.1528	0	16.4788
Low controller in 1999	2474	0.2732	0.4457	0	1
Routine worker in 1999	2474	0.2021	0.4016	0	1
Self-employed type 1 in 1999	2474	0.0202	0.1407	0	1
Self-employed type 2 in 1999	2474	0.0982	0.2977	0	1
Manual in 1999	2474	0.1431	0.3502	0	1
Farmer in 1999	2474	0.0473	0.2123	0	1
Voluntary work in current year	2474	0.3872	0.4872	0	1
Voluntary work in 1999	2474	0.4281	0.4949	0	1
Frequency of sports participation in 1999	2474	2.7187	1.1033	1	4
Italian-speaking canton	2474	0.0348	0.1832	0	1
French-speaking canton	2474	0.2555	0.4362	0	1
Italian-speaking household	2474	0.0380	0.1912	0	1
French-speaking household	2474	0.2611	0.4393	0	1
Community type 2	2474	0.2910	0.4543	0	1
Community type 3	2474	0.1568	0.3637	0	1
Community type 4	2474	0.0675	0.2509	0	1
Community type 5	2474	0.1095	0.3124	0	1
Community type 6	2474	0.0663	0.2488	0	1
Community type 7	2474	0.0117	0.1077	0	1
Community type 8	2474	0.0218	0.1461	0	1
Dummy for year 2002	2474	0.3270	0.4692	0	1
Dummy for year 2001	2474	0.3735	0.4838	0	1
Dummy for imputed income variable	2474	0.1564	0.3633	0	1
Summary statistics based on observations that form the regression sample of the first health state regression in Table 1.					

Table A5: SHARE Data: Variables Linked to Negative and Positive Affectivity

Question	Scale	Proxy for affectivity component
Questions related to negative affectivity		
In the last month, have you been sad or depressed (synonyms: miserable, in low spirits, or blue)?	Yes / no	Sadness
In the last month, have you felt that you would rather be dead?	Yes / no	Sadness
Do you tend to blame yourself or feel guilty about anything?	Yes / no	Guilt
If so, for what do you blame yourself? (Test of excessive guilt)	Yes / no	Guilt
Have you been irritable recently?	Yes / no	Hostility
In the last month, have you cried at all?	Yes / no	Sadness
Has there been a time or times in your life when you suffered from symptoms of depression which lasted at least two weeks?	Yes / no	Sadness
Questions related to positive affectivity		
What are your hopes for the future? (Does respondent mention any hopes)	Yes / no	Self-assurance
How is your concentration? For example, can you concentrate on a television or radio program or a film?	Difficulty / no difficulty	Attentiveness
Can you concentrate on something you read?	Difficulty / no difficulty	Attentiveness
What have you enjoyed doing recently? (Is any activity mentioned)	Yes / no	Joviality

Table A6: SHP Data: Variables Linked to Negative and Positive Affectivity

Question	Scale	Proxy for affectivity component
Questions related to negative affectivity		
Health problems: feelings of anxiety within last 12 months	Yes / no	Fear
Frequency of symptoms of depression	0–10	Sadness
Victimization: fear of threat or attack	0–10	Fear
Victimization: fear of burglary at home	0–10	Fear
Questions related to positive affectivity		
Satisfaction with financial situation	0–10	Joviality
Satisfaction with democracy	0–10	Joviality
Satisfaction with free time	0–10	Joviality
Satisfaction with leisure time	0–10	Joviality
Satisfaction with living alone or together with other household members	0–10	Joviality
Interest in politics	0–10	Attentiveness

Tables

Table 1: Subjective Measures of General Health State

Dependent variables	SHP		SHARE intl. dataset		SHARE Swiss subsample		Estimation technique
	Coeff.	Marg. effects	Coeff.	Marg. effect	Coeff.	Marg. effect	
Health status SHARE (EU)	0.068** (2.41) (2474)		0.244*** (11.46) (7042)	0.085*** (11.40)	0.262*** (4.63) (472)	0.098*** (4.79)	Ordered probit
Health status SHARE (US)			0.261*** (13.01) (7042)	0.075*** (11.60)	0.213*** (3.86) (472)	0.081*** (3.64)	Ordered probit
Good health SHARE (EU)	0.144** (2.07) (2474)		0.409*** (8.83) (7043)	0.064*** (6.60)	0.508*** (3.18) (472)	0.007 (1.55)	Logit
Good health SHARE (US)			0.471*** (11.54) (7043)	0.118*** (11.62)	0.431*** (4.01) (472)	0.083*** (4.03)	Logit
Satisfaction with health status	0.126*** (3.99) (2474)						Ordered probit
Health improvement	0.047** (2.24) (2473)						Ordered probit
Subjective life expectancy			4.180*** (7.22) (6719)		3.406** (2.28) (453)		Tobit

RE ordered probit, RE logit, RE tobit, or GLS regression (SHP). Ordered probit, logit, tobit, and OLS regression (SHARE). All estimations are performed with robust standard errors where technically possible. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. Absolute values of t-statistics are reported in round brackets and number of observations, in square brackets. Predicted outcome for a dichotomous variable is 1 and for a categorical variable, the lowest or highest category that reflects the best health state. Where possible, marginal effects are calculated at the median value of the control variables of all observations retained in the regression sample.

Table 2: Subjective Measures of Specific Health Problems

Dependent variables	SHP		SHARE intl. dataset		SHARE Swiss subsample		Estimation technique
	Coeff.	Marg. effects	Coeff.	Marg. effect	Coeff.	Marg. effect	
Problems with the back (SHP), hips, or knees (SHARE)	−0.199*** (2.96) (2474)		−0.221*** (5.82) (7043)	−0.054*** (5.82)	−0.138 (1.32) (472)	−0.027 (1.38)	Logit
Impediments to daily activities	−0.094*** (3.07) (2470)		−0.186*** (7.55) (7042)	0.067*** (7.13)	−0.203* (1.72) (472)	−0.021* (1.75)	Ordered probit
Headaches	−0.060 (0.73) (2473)						Logit
Number of days with health problems	−1.209** (2.47) (2451)						Tobit
Long-term illnesses			−0.218*** (5.57) (7043)	−0.049*** (5.31)	0.018 (0.17) (472)	0.004 (0.17)	Logit
Number of chronic diseases			−0.087*** (4.31) (7037)	0.034*** (4.33)	−0.144 (1.61) (472)		Ordered probit
Number of symptoms			−0.159*** (7.99) (7042)	0.063*** (8.06)	−0.142** (2.54) (472)	0.051*** (2.68)	Ordered probit
Mobility assessment: number of limitations			−0.442*** (6.71) (7039)		−0.435*** (2.66) (472)		Tobit
Daily activities: number of limitations			−0.312** (2.01) (7040)		−0.396 (1.25) (472)		Tobit
Daily instrumental activities: number of limitations			−0.164 (1.49) (7040)		−0.350 (1.09) (472)		Tobit

RE ordered probit, RE logit, RE tobit, or GLS regression (SHP). Ordered probit, logit, tobit, and OLS regression (SHARE). All estimations are performed with robust standard errors where technically possible. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. Absolute values of t-statistics are reported in round brackets and number of observations, in square brackets. Predicted outcome for a dichotomous variable is 1 and for categorical variables, the lowest or highest category that reflects the best health state. Where possible, marginal effects are calculated at the median value of the control variables of all observations retained in the regression sample.

Table 3: Subjective Measures of Mental Health (Depression)

Dependent variables	SHP		SHARE intl. dataset		SHARE Swiss subsample		Estimation technique
	Coeff.	Marg. effects	Coeff.	Marg. effect	Coeff.	Marg. effect	
Frequency of depression	−0.156*** (4.65) (2474)		−0.242*** (12.01) (6993)	0.094*** (12.13)	−0.088 (1.64) (472)	0.035* (1.65)	Ordered probit
Frequency of energy (SHP)	0.190*** (7.52) (2473)						Ordered probit
Lack of energy (SHARE)			−0.354*** (8.09) (7015)	−0.060*** (6.49)	−0.164 (1.29) (472)	−0.016 (1.41)	Logit
Sleeping problems ³¹	−0.172* (1.91) (2474)		−0.288*** (5.49) (7043)	−0.025*** (4.11)	−0.260* (1.71) (472)	−0.014 (1.69)	Logit
Feeling of weakness	−0.325*** (4.78) (2474)		−0.200** (2.28) (7043)	−0.005* (1.85)	Insufficient number of observations		Logit

RE ordered probit, RE logit, RE tobit, or GLS regression (SHP). Ordered probit, logit, tobit, and OLS regression (SHARE). All estimations are performed with robust standard errors where technically possible. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. Absolute values of t-statistics are reported in round brackets and number of observations, in square brackets. Predicted outcome for a dichotomous variable is 1 and for categorical variables, the lowest or highest category that reflects the best health state. Where possible, marginal effects are calculated at the median value of the control variables of all observations retained in the regression sample.

³¹ In the SHARE dataset, the question on sleeping problems was posed twice: once as part of the mental health questionnaire and once as part of the physical health assessment. The results for both variables are similar. The results reported here are from the physical health questionnaire.

Table 4: Subjective Measures of Health Status: Contact with Doctors or Hospitals

Dependent variables	SHP		SHARE intl. dataset		SHARE Swiss subsample		Estimation technique
	Coeff.	Marg. effects	Coeff.	Marg. effects	Coeff.	Marg. effects	
Consultation with doctor	0.003 (0.05) (2472)						Logit
Number of times a doctor consulted	−0.432* (1.82) (2315)		−1.154*** (5.19) (7036)		−1.20 (1.61) (472)		Tobit
Hospital stays during last 12 months			−0.113* (1.66) (7043)	−0.007 (1.56)	0.065 (0.39) (472)	0.004 (0.36)	Logit
Times hospitalized			−0.153* (1.76) (7043)		0.141 (0.65) (472)		Tobit
Total nights in hospital			−2.79*** (2.80) (7041)		1.252 (0.50) (472)		Tobit

RE ordered probit, RE logit, RE tobit, or GLS regression (SHP). Ordered probit, logit, tobit, and OLS regression (SHARE). All estimations are performed with robust standard errors where technically possible. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. Absolute values of t-statistics are reported in round brackets and number of observations, in square brackets. Predicted outcome for a dichotomous variable is 1 and for categorical variables, the lowest or highest category that reflects the best health state. Where possible, marginal effects are calculated at the median value of the control variables of all observations retained in the regression sample.

Table 5: Measures of Objective Health Status for the SHARE Dataset

	SHARE int. dataset		SHARE Swiss subsample		Estimation technique
	Coeff.	Marg. effect	Coeff.	Marg. effect	
<i>Physical health</i>					
Walking speed ³² (tests 1 and 2)	−0.142 (0.76) (102)	See left	Insufficient number of obs.		OLS
Maximum grip strength ³³	0.008 (0.05) (6767)	See left	0.335 (0.92) (462)	See left	OLS
Number of usable hands	0.087 (1.56) (6999)	0.005 (1.35)	Insufficient number of obs.		Ordered probit
Body Mass Index (3 categories)	−0.000 (0.00) (6987)	−5.71e-06 (0.00)	0.018 (0.31) (467)	0.007 (0.31)	Ordered probit
<i>Intellectual ability</i>					
Orientation to date, month, year, and day of the week ³⁴	0.020 (0.62) (7039)	0.004 (0.61)	0.031 (0.20) (472)	0.002 (0.21)	Ordered probit
Mathematical performance	0.052*** (2.63) (7030)	0.020*** (2.65)	0.200*** (3.73) (472)	0.079*** (3.80)	Ordered probit
Recalling words from a 10-word list: immediate	0.068*** (3.51) (6979)	0.005*** (3.37)	0.107** (2.17) (471)	0.024 * (1.87)	Ordered probit
Recalling words from a 10-word list: delayed	0.085*** (4.41) (6982)	0.003*** (3.87)	0.040 (0.79) (471)	0.009 (0.76)	Ordered probit
Verbal fluency score	0.546*** (4.54) (6972)	See left	0.439 (1.81) (471)	See left	OLS
Ordered probit, logit, tobit, and OLS regression (SHARE). All estimations are performed with robust standard errors where technically possible. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. Absolute values of t-statistics are reported in round brackets and number of observations, in square brackets. Predicted outcome for a dichotomous variable is 1 and for categorical variables, the lowest or highest category that reflects the best health state. Where possible, marginal effects are calculated at the median value of the control variables of all observations retained in the regression sample.					

³² The same insignificant result is obtained for the time of walking tests 1 and 2 separately as dependent variables, as well as for the subjective assessment of difficulties walking 100 metres (ph048d01). Owing to the small number of observations, the set of control variables had to be adjusted.

³³ A similar outcome is obtained for the first and second measurement of the right and left hands separately.

³⁴ Identical results are obtained for all questions with which this index is constructed.

Table 6a: Job Satisfaction, Working Conditions, and Subjective Measures of Health—SHARE

	Health status (EU)	Health status (US)	Problems with back, knees, or hips	Impediments to daily activities	Depression (frequency)	Sleeping problems	Feeling of weakness	Number of doctor consultations
Baseline reported in	Table 1	Table 1	Table 2	Table 2	Table 3	Table 3	Table 3	Table 4
Job satisfaction	0.178*** (6.78)	0.193*** (7.69)	−0.107** (2.28)	−0.123*** (4.16)	−0.149*** (6.00)	−0.191*** (3.01)	−0.107 (0.93)	−0.841*** (3.02)
Marginal effect	0.071***	0.071***	−0.026**	0.032***	0.059***	−0.015**	−0.002	
Marginal effect baseline model	0.085***	0.075****	−0.054***	0.067***	0.094***	−0.025***	−0.005*	
Time pressure	−0.066** (2.05)	−0.02 (0.65)	0.095 (1.61)	0.048 (1.27)	0.066** (2.16)	0.089 (1.06)	0.412*** (2.72)	0.532 (1.48)
Physical labour	−0.491*** (4.51)	−0.485*** (4.51)	0.390** (1.96)	0.399*** (3.04)	0.079 (0.76)	−0.103 (0.37)	0.673 (1.31)	2.819** (2.41)
Little freedom	0.043 (1.16)	−0.016 (0.46)	−0.100 (1.49)	−0.02 (0.47)	−0.012 (0.33)	−0.007 (0.08)	0.131 (0.86)	−0.277 (0.69)
New skills	0.126*** (3.36)	0.096*** (2.65)	−0.124* (1.80)	−0.094** (2.14)	−0.04 (1.09)	−0.155 (1.63)	−0.057 (0.36)	−0.168 (0.41)
Support	0.055 (1.43)	0.048 (1.29)	−0.181** (2.53)	−0.114*** (2.59)	−0.184*** (5.03)	−0.400*** (4.20)	−0.019 (0.11)	−0.651 (1.51)
Recognition	0.055 (1.41)	0.047 (1.23)	−0.047 (0.64)	−0.063 (1.39)	−0.148*** (3.90)	−0.035 (0.36)	−0.004 (0.03)	−0.852* (1.94)
Adequate salary	0.190*** (5.68)	0.084*** (2.64)	−0.226*** (3.72)	−0.122*** (3.15)	−0.102*** (3.19)	−0.122 (1.41)	−0.321** (2.20)	−0.408 (1.10)
Poor career possibilities	0.011 (0.34)	−0.016 (0.51)	0.082 (1.32)	0.06 (1.47)	0.002 (0.07)	−0.016 (0.18)	−0.209 (1.36)	0.352 (0.94)
No job security	−0.072* (1.90)	−0.078** (2.09)	0.064 (0.91)	0.047 (1.07)	0.128*** (3.55)	0.234** (2.46)	0.293* (1.87)	1.021** (2.44)
Short-term contract	0.003 (0.06)	0.064 (1.21)	0.01 (0.10)	−0.006 (0.09)	−0.03 (0.58)	−0.175 (1.26)	0.206 (1.03)	−0.779 (1.31)
Public sector	0.033 (0.90)	0.042 (1.20)	0.005 (0.07)	0.092** (2.20)	0.036 (1.06)	−0.007 (0.08)	0.017 (0.10)	0.138 (0.34)
Baseline model	included	included	included	included	included	included	included	included
Observations	5538	5538	5539	5538	5502	5539	5539	5536

Table 6b: Job Satisfaction, Work Conditions, and Objective Measures of Health—SHARE

	Maximum grip strength	Number of usable hands	Body Mass Index	Mathematical performance	Orientation	Recall 1st time	Recall delayed	Verbal fluency
Baseline reported in Job satisfaction	Table 5 0.090 (0.49)	Table 5 0.095 (1.39)	Table 5 −0.066** (2.52)	Table 5 0.049** (2.02)	Table 5 −0.025 (0.63)	Table 5 0.046* (1.94)	Table 5 0.065*** (2.70)	Table 5 0.519*** (3.51)
Marginal effect	0.090	0.001	−0.026**	0.020**	−0.002	0.003(*)	0.003**	0.519***
Marginal effect baseline model	0.008	0.005	0.000	0.020***	0.004	0.005***	0.003***	0.546***
Time pressure	0.018 (0.08)	−0.351*** (3.70)	−0.019 (0.57)	0.123*** (3.99)	0.115** (2.20)	0.096*** (3.29)	0.096*** (3.25)	0.472** (2.56)
Physical labour	−1.309* (1.78)	−0.900** (2.37)	0.005 (0.05)	−0.274*** (2.59)	−0.432** (2.23)	0.043 (0.42)	−0.047 (0.49)	−0.862 (1.27)
Little freedom	−0.675** (2.57)	0.068 (0.70)	−0.002 (0.07)	−0.007 (0.19)	−0.026 (0.44)	−0.126*** (3.71)	−0.074** (2.17)	−0.578*** (2.59)
New skills	0.864*** (3.18)	0.049 (0.52)	0.092** (2.37)	0.118*** (3.34)	0.062 (1.11)	0.109*** (3.17)	0.148*** (4.30)	0.749*** (3.53)
Support	−0.203 (0.73)	−0.088 (0.76)	0.113*** (2.83)	−0.012 (0.32)	0.100 (1.62)	−0.01 (0.27)	0.024 (0.67)	−0.208 (0.91)
Recognition	−0.359 (1.30)	−0.142 (1.24)	0.036 (0.88)	−0.031 (0.80)	0.012 (0.19)	−0.013 (0.34)	−0.054 (1.50)	−0.578** (2.54)
Adequate salary	0.176 (0.76)	0.112 (1.21)	0.018 (0.53)	0.124*** (3.90)	0.041 (0.76)	0.078*** (2.60)	0.101*** (3.34)	0.002 (0.01)
Poor career possibilities	−0.239 (1.02)	0.189** (2.06)	0.037 (1.05)	0.140*** (4.27)	0.095* (1.77)	0.063** (2.04)	0.077** (2.49)	0.638*** (3.15)
No job security	−0.06 (0.22)	−0.072 (0.68)	−0.032 (0.81)	−0.076** (2.05)	−0.05 (0.87)	−0.006 (0.17)	−0.009 (0.26)	−0.758*** (3.42)
Short term contract	0.104 (0.28)	0.064 (0.40)	0.022 (0.40)	−0.014 (0.28)	−0.101 (1.33)	−0.113** (2.43)	−0.064 (1.30)	0.25 (0.87)
Public sector	−0.071 (0.28)	−0.200** (2.02)	−0.045 (1.16)	−0.087** (2.47)	−0.094 (1.63)	−0.041 (1.22)	−0.03 (0.91)	0.074 (0.36)
Baseline model	included	included	included	included	included	included	included	included
Observations	5323	5508	5494	5530	5536	5489	5491	5489

Table 7: Past Job Satisfaction and Work Conditions—SHP Data

	Health status	Problems with back	Impediments to daily activities	Depression (frequency)	Sleeping problems	Weakness	Number of doctor consultations
Job satisfaction in 1999	0.065** (2.19)	−0.168*** (2.70)	−0.080** (2.47)	−0.124*** (3.58)	−0.082 (1.19)	−0.246*** (3.92)	−0.249* (1.67)
<i>Work conditions of 1999</i>							
No job change	−0.086 (0.45)	−0.066 (0.16)	0.274 (1.31)	0.035 (0.16)	0.179 (0.40)	0.254 (0.63)	−0.891 (0.95)
Public company	0.333* (1.66)	−0.993** (2.29)	−0.119 (0.55)	−0.141 (0.61)	−0.491 (1.01)	−0.485 (1.10)	−0.145 (0.14)
Part time	−0.038 (0.41)	0.131 (0.67)	0.152 (1.50)	0.339*** (3.12)	0.384* (1.76)	0.463** (2.32)	0.709 (1.51)
Short-term contract	0.382 (1.26)	−0.219 (0.36)	−0.202 (0.62)	−0.514 (1.46)	−1.031 (1.42)	−1.464** (2.09)	−2.446 (1.62)
No overtime compensation	−0.023 (0.17)	0.531* (1.81)	0.037 (0.24)	0.049 (0.30)	−0.075 (0.22)	0.035 (0.11)	2.548*** (3.63)
Work at night	0.082 (0.55)	0.719** (2.30)	0.121 (0.76)	−0.18 (1.03)	−0.707* (1.96)	−0.453 (1.40)	0.493 (0.66)
Work in evening	−0.173* (1.72)	−0.188 (0.89)	0.118 (1.08)	0.058 (0.50)	0.460* (1.96)	0.530** (2.46)	0.896* (1.77)
Work on weekend	−0.106 (1.09)	0.27 (1.33)	0.037 (0.35)	0.139 (1.24)	0.384* (1.70)	0.23 (1.11)	−0.406 (0.83)
Fixed hours	−0.073 (0.79)	0.019 (0.10)	−0.057 (0.58)	0.012 (0.12)	0.259 (1.20)	0.349* (1.79)	0.125 (0.27)
Commuter	−0.005 (0.05)	−0.087 (0.40)	0.12 (1.07)	0.177 (1.47)	0.152 (0.63)	0.102 (0.46)	−0.900* (1.71)
No job security	−0.01 (0.08)	−0.108 (0.40)	0.112 (0.81)	0.23 (1.55)	0.091 (0.30)	0.367 (1.36)	0.762 (1.18)
Good career prospects	−0.031 (0.12)	−0.561 (1.05)	0.164 (0.61)	0.148 (0.51)	−0.061 (0.11)	−0.168 (0.32)	−0.071 (0.06)
Good company development	−0.013 (0.08)	−0.315 (0.91)	0.092 (0.51)	0.043 (0.22)	−0.669* (1.65)	−0.008 (0.02)	−0.108 (0.13)
High workload	0.034 (0.36)	0.187 (0.96)	0.035 (0.34)	−0.045 (0.42)	−0.352 (1.59)	0.101 (0.51)	0.451 (0.96)
No decision	−0.143 (1.24)	0.222 (0.93)	0.102 (0.82)	0.240* (1.80)	0.631** (2.38)	0.445* (1.81)	−0.062 (0.11)
Satisfaction with income	0.101 (1.12)	−0.15 (0.79)	−0.091 (0.93)	−0.239** (2.27)	−0.532** (2.50)	−0.528*** (2.74)	0.044 (0.10)
Risk of unemployment	−0.004 (0.02)	−0.039 (0.09)	0.294 (1.28)	0.497** (2.00)	1.367*** (2.81)	0.852* (1.89)	3.660*** (3.54)
Baseline model	included	included	included	included	included	included	included
Observations	2474	2474	2470	2474	2474	2474	2315

Table 8: Past Job Satisfaction, Health, and Work Conditions—SHP data

	Health status	Back problems	Impediments to daily activities	Depression (frequency)	Sleeping problems	Feeling of weakness	Number of doctor consultations
Job satisfaction in 1999	0.046* (1.76)	-0.173*** (2.98)	-0.037 (1.27)	-0.081*** (2.76)	-0.037 (0.55)	-0.198*** (3.36)	-0.180 (1.23)
Dependent variable in 1999	0.881*** (15.46)	3.085*** (15.82)	0.229*** (12.87)	0.361*** (16.19)	3.422*** (14.56)	2.588*** (11.65)	0.408*** (14.19)
Past work conditions	included	included	included	included	included	included	included
Baseline model	included	included	included	included	included	included	Included
Observations	2474	2471	2465	2474	2474	2468	2306

	Good health	Satisfaction with health status	Health improvement	Headaches	Consultations with doctor	Number of days with health problems
Job satisfaction In 1999	0.110* (1.78)	0.080*** (2.92)	0.048** (2.17)	-0.041 (0.62)	0.034 (0.55)	-1.432*** (3.58)
Dependent variable in 1999	2.499*** (11.45)	0.429*** (18.13)	0.080*** (3.40)	3.553*** (14.84)	2.219*** (10.47)	0.243*** (12.26)
Past work conditions	included	included	included	included	included	included
Baseline model	included	included	included	included	included	included
Observations	2474	2474	2473	2473	2472	2432

Table 9a: Negative and Positive Affectivity and Subjective Measures of Health—SHARE

	Health status (EU)	Health status (US)	Problems with back, knees, or hips	Impediments to daily activities	Depression (frequency)	Sleeping problems	Feeling of weakness	Number of doctor consultations
Job satisfaction	0.154*** (5.77)	0.169*** (6.63)	−0.067 (1.40)	−0.096*** (3.22)	−0.076*** (2.87)	−0.105 (1.59)	−0.043 (0.39)	−0.562** (2.03)
Marginal effect	0.061***	0.062***	−0.016	0.025**	0.028**	−0.008	−0.001	
Negative affectivity	−0.174*** (11.80)	−0.178*** (12.39)	0.233*** (8.70)	0.185*** (11.34)	1.462*** (67.28)	0.508*** (14.81)	0.393*** (7.11)	1.543*** (10.02)
Positive affectivity	0.114*** (6.43)	0.116*** (6.57)	−0.098*** (3.14)	−0.109*** (5.77)	−0.705*** (33.93)	−0.196*** (5.17)	−0.168*** (2.85)	−0.865*** (4.88)
Constant			0.45 (1.42)			−1.207*** (2.74)	−2.971*** (3.88)	−0.477 (0.26)
Observations	5494	5494	5495	5494	5491	5495	5495	5492
Baseline model	included	included	included	included	included	included	included	included
Work conditions	included	included	included	included	included	included	included	included
Marginal effect Table 6	0.071***	0.071***	−0.026**	0.032***	0.059***	−0.015**	−0.002	

Table 9b: Negative and Positive Affectivity and Objective Measures of Health—SHARE

	Maximum grip strength	Number of usable hands	Body Mass Index	Mathematical performance	Orientation	Recall 1st time	Recall delayed	Verbal fluency
Job satisfaction	0.030 (0.16)	0.077 (1.13)	−0.074*** (2.82)	0.043* (1.76)	−0.02 (0.50)	0.039 (1.61)	0.058** (2.40)	0.507*** (3.41)
Marginal effect	0.077	0.001	−0.029**	0.017*	−0.001	0.003	0.003**	0.507***
Negative affectivity	−0.286*** (2.90)	−0.04 (1.12)	−0.038** (2.48)	−0.044*** (3.20)	−0.049** (2.23)	0.022 (1.60)	−0.004 (0.29)	0.249*** (3.02)
Positive affectivity	0.163 (1.30)	0.100*** (2.86)	0.003 (0.16)	0.095*** (5.87)	0.039 (1.56)	0.118*** (7.86)	0.111*** (6.77)	0.678*** (7.17)
Observations	5302	5478	5450	5486	5492	5465	5466	5467
Baseline model	included	included	included	included	included	included	included	included
Work conditions	included	included	included	included	included	included	included	included
Marginal effect Table 6	0.090	0.001	−0.026**	0.020**	−0.002	0.003(*)	0.003**	0.519***

Table 10: Negative and Positive Affectivity—SHP

	Health status	Problems with back	Impediments to daily activities	Depression (frequency)	Sleeping problems	Feeling of weakness	Number of doctor consultations
Job satisfaction	0.008 (0.29)	−0.175*** (2.87)	0.006 (0.19)	−0.049* (1.66)	0.012 (0.17)	−0.104* (1.68)	−0.003 (0.02)
Dependent variable in 1999	0.816*** (14.05)	3.091*** (15.56)	0.218*** (12.17)	0.318*** (12.79)	3.418*** (14.23)	2.285*** (10.08)	0.395*** (13.41)
Negative affectivity	−0.082** (2.57)	0.217*** (2.97)	0.078** (2.25)	0.086** (2.19)	0.167** (2.00)	0.230*** (3.22)	0.463** (2.56)
Positive affectivity	0.143*** (4.40)	0.040 (0.55)	−0.141*** (4.00)	−0.141*** (3.90)	−0.205** (2.40)	−0.393*** (5.27)	−0.695*** (3.80)
Baseline model	included	included	included	included	included	included	included
Past conditions of work	included	included	included	included	included	included	included
Observations	2409	2406	2400	2409	2409	2403	2242
Significance level of job satisfaction variable in Table 8	*	***	—	***	—	***	—

	Good health	Satisfaction with health status	Health improvement	Headaches	Consultation with doctor	Number of days with health problems
Job satisfaction	0.028 (0.43)	0.04 (1.40)	0.034 (1.49)	0.041 (0.58)	0.096 (1.54)	−1.080*** (2.58)
Dependent variable in 1999	2.292*** (10.36)	0.401*** (16.21)	0.072*** (2.99)	3.528*** (14.49)	2.231*** (10.71)	0.238*** (11.95)
Negative affectivity	−0.168** (2.26)	−0.012 (0.37)	−0.04 (1.46)	0.212*** (2.64)	0.052 (0.67)	−0.241 (0.48)
Positive affectivity	0.358*** (4.70)	0.185*** (5.35)	0.057** (2.08)	−0.270*** (3.27)	−0.185** (2.35)	−1.766*** (3.53)
Baseline model	included	included	included	included	included	included
Past conditions of work	included	included	included	included	included	included
Observations	2409	2409	2408	2408	2407	2368
Significance level of job satisfaction variable in Table 8	*	***	**	—	—	***