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Working Paper
WP 2017-372

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Péter Hudomiet, Michael D. Hurd, Susann Rohwedder, and Robert J. Willis

MRRC

Project #: R-UM17-10

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Péter Hudomiet
RAND

Michael D. Hurd
RAND, NBER, NETSPAR

Susann Rohwedder
RAND, NETSPAR

Robert J. Willis
University of Michigan and NBER

October 2017

Michigan Retirement Research Center
University of Michigan
P.O. Box 1248
Ann Arbor, MI 48104
www.mrrc.isr.umich.edu
(734) 615-0422

Acknowledgements
The research reported herein was performed pursuant to a grant from the U.S. Social Security Administration (SSA) funded as part of the Retirement Research Consortium through the University of Michigan Retirement Research Center Award RRC08098401-09. The opinions and conclusions expressed are solely those of the author(s) and do not represent the opinions or policy of SSA or any agency of the federal government. Neither the United States government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of the contents of this report. Reference herein to any specific commercial product, process or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply endorsement, recommendation or favoring by the United States government or any agency thereof.

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Abstract

As workers age, their physical and cognitive abilities tend to decline. This could lead to a mismatch between workers' resources and the demands of their jobs, restricting future work. We use longitudinal data from the Health and Retirement Study (HRS) linked to detailed occupational characteristics from the O*NET project to investigate how mismatches between job demands and workers' resources in two physical and two cognitive domains affect retirement outcomes. We estimate how changes in physical and cognitive resources as well as their interactions with occupational job-demands affect changes in 1) subjective reports of work-limiting health problems; 2) mental health; and 3) subjective probabilities of working past age 65. We also estimate hazard models for transitions from full-time work to retirement. We found that declines in physical and cognitive resources are strong predictors of all outcomes: Fewer resources lead to greater reporting of work-limiting health problems; decline in mental health; smaller subjective probabilities of working full-time past age 65; and more transitions from work to retirement. The interaction of resources with job demands, however, is only statistically significant for workers with large-muscle limitations who are more likely to report changes in outcomes when they work in occupations that rely heavily on physical strength. In contrast, the effects of declines in fine motor skills and cognition do not show statistically significant differences by occupational job demands. It appears cognitive and fine motor skills, at least as measured in the HRS, are universally important determinants of working, not specific to certain occupations.

Citation

Hudomiet, Péter, Michael D. Hurd, Susann Rohwedder, and Robert J. Willis. 2017. "The Effect of Physical and Cognitive Decline at Older Ages on Work and Retirement: Evidence from Occupational Job Demands and Job Mismatch." Ann Arbor MI: University of Michigan Retirement Research Center (MRRC) Working Paper, WP 2017-372.
http://www.mrrc.isr.umich.edu/wp372.pdf

1. Introduction

Poor health is one of the strongest drivers of early retirement (Cahill, Giandrea and Quinn, 2006; Fisher et al., 2016; McGarry, 2004; Rice, Lang, Henley and Melzer, 2011; van Rijn, Robroek, Brouwer and Burdorf, 2014) and of the likelihood of continuing work after separation from career jobs (Topa, Moriano, Depolo, Alcover and Morales, 2009). Poor health or declining cognitive capability makes it more burdensome to carry out the tasks workers are supposed to do. Depending on the characteristics of jobs, however, the difficulty associated with working can vary. For example, someone with minor back pain may have little problem carrying out the tasks of an office clerk but may be unable to carry heavy objects, a task frequently performed by construction workers. Conversely, someone whose memory starts to deteriorate may have more trouble performing as an accountant than as a hairdresser.

When workers' capabilities become mismatched with the demands of their jobs, changes in their work status are more likely to occur. There are several ways workers and employers might accommodate such growing mismatches. First, workers may stay at their current positions, but increase their level of effort to compensate for their decline in cognitive and physical resources. This greater effort may lead to dissatisfaction with work, exhaustion, and mental health problems. Second, employers may accommodate the changing capabilities of their aging employees. Third, workers may reduce their work hours to compensate for their increased difficulty working. Fourth, workers may switch to different jobs or tasks better suited to their changing abilities, seeking less-demanding employers in the same occupation or a less-demanding occupation. Fifth, workers may leave the labor force earlier than they had planned.

Understanding how mismatch between individuals' resources and job demands affects employment and retirement is important for several reasons. If individuals were to work longer then financial pressures on public programs such as Social Security or Medicare would be reduced. While employers have been called on to accommodate workers who develop work limitations, when the

mismatch between the worker's abilities and the job demands becomes too large (and the scope for accommodation limited) the job will be at risk. Policymakers need to understand how often job mismatch due to aging-related processes results in job separation or in employment that is better aligned with the skills of older workers, because such job mismatches may prevent workers from working to the ages they desire or had planned on.

In this paper, we seek to understand how age-related mismatch between job demands and workers' health and cognitive abilities affects retirement outcomes. To do so, we use longitudinal data from the Health and Retirement Study (HRS) linked to detailed occupational characteristics from the O*NET project.[1] We considered a large set of outcome variables, but focus on three of them in this study: work-limiting health problems, depressive symptoms, and the subjective probability of working full time after age 65, which is quite predictive of subsequent, actual retirement (Hurd, 2009).

These outcome variables are available for both workers and nonworkers in all waves of the HRS we consider. We, therefore, can use panel econometric models to estimate how changes in individuals' resources and the interactions between resources and job demands affect *changes* in these outcome variables. These empirical models control for individuals' initial conditions and hence are more credible than models relying on cross-sectional variation.

We also estimate transition models on how changes in resources and their interactions with job demands predict transitions from full-time work to retirement or disability. These models rely on stronger identification assumptions, because they do not control for individual fixed effects, though they also estimate the effect of changes in resources on changes in labor force status.

We consider mismatch in two physical and two cognitive domains. Regarding physical domains, we use measures from the HRS on large muscle problems (such as having difficulties with stooping,

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[1] The O*NET database (www.onetcenter.org) contains information on hundreds of standardized and occupation-specific descriptors that capture, among other things, the characteristics and requirements of the jobs, including the intensity of various activities involved in doing a particular job.

kneeling, or crouching, or with pushing or pulling large objects) and fine motor skill problems (such as having difficulties with picking up a dime from a table and dressing). Regarding cognitive domains, we use a 27-point working and episodic memory score from the HRS, which are closely linked to fluid intelligence and decision-making abilities (Del Missier et al., 2013).

We pair these resource measures with data on occupational job demands from the O*NET project. The O*NET, sponsored by the U.S. Department of Labor's Employment and Training Administration, provides detailed occupational information to the public and is based on a combination of surveys, expert assessments, and tests. Such ratings are available for occupations identified by three-digit codes that can be linked to occupations of HRS respondents.

We use four O*NET job-demand measures. First, we use measures on dynamic strength, i.e., the ability to exert muscle force repeatedly or continuously. We paired these with the HRS large-muscle resource measure. Second, we use measures on finger dexterity, i.e., the ability to make precisely coordinated movements of the fingers. We pair these with the HRS fine-motor skill resource measure. Third, we use measures on memorization, i.e., the ability to remember information. We pair these with the HRS cognition-resource measure. Fourth, we use O*NET measures on analyzing data or information, also pairing them with the HRS cognition-resource measure.

We found that, among HRS respondents, large-muscle abilities, fine-motor skills, and cognitive abilities significantly and strongly decline with age. Furthermore, we found that such declines lead to higher reports of work-limiting health problems, more depressive symptoms, lower subjective probabilities of working full-time past age 65, and more transitions from full-time work to retirement.

To capture the degree of job mismatch for respondents, we use terms capturing the interaction between resource decline and job demands. Such terms, for example, show whether cognitive decline reduces the ability to work in all jobs or only in cognitively demanding ones. We found only one statistically significant interaction term: that for large muscle problems. Workers who develop large-

muscle limitations are more likely to report changes in most outcomes when they work in occupations that rely heavily on physical strength. The interaction effects were large and statistically significant ($p<0.01$) for work-limiting health problems, mental health, and subjective work expectations.

In contrast to the large muscle results, declines in fine motor skills and cognition did not show statistically significant differences by occupational job demands. There are several possible explanations for these differing findings.

First, fine motor skills and cognitive abilities may be universally important determinants of working, and so they are not specific to certain occupations.

Second, the pairing of the O*NET measures was not perfect with the HRS resource measures. For example, the HRS measures of fine-motor skills (having problems with picking up a dime or with dressing or with eating) may decline only at more advanced ages, after many people have left the labor force, so that there is little variation across workers at younger ages and little change in those skills in panel.

Third, workers who face cognitive or fine-motor mismatch may be able to adjust the nature of their work, or they can find jobs that better suit their changing capabilities. A decline in resources does not mean that these workers cannot perform different tasks productively. For example, older workers with declines in their fluid cognitive abilities may start relying more on their crystallized intelligence (i.e. knowledge and experience) that are more resistant to aging and at the same time complement the skills and abilities of younger workers. In contrast, workers in physically demanding jobs may have more limited outside options when they start developing physical problems.

Fourth, there may be greater scope for accommodation in cognitive (and fine motor) occupations.

In the regressions of transitions from full-time work to retirement the interactions between job demands and resources had the expected sign in three out of four cases, but none was statistically

significant at the 5 percent level. This lack of statistical significance may be a result of insufficient sample size. The interaction effect between large muscle problems (resource) and dynamic strength (job-demand), however, was statistically significant for the transition from full-time work to disability.

Our work builds on several previous strands of research. Several studies have shown the role of occupational characteristics in explaining job polarization, wage inequality, and career decisions (Acemoglu and Autor, 2011; Autor et al., 2003; James, 2011; Yamaguchi, 2012), but relatively little research has explored the role of occupational characteristics in the retirement process.

The study of Belbase et al. (2016) is most closely related to ours. It showed that individuals in occupations that heavily rely on skills that tend to decline with age are more likely to retire earlier. Nevertheless, our work differs from theirs in several ways. First, we identified four dimensions of job characteristics for which the HRS elicits respondents' abilities: two cognitive and two physical demands of work. Second, in addition to analyzing the role of job demands in the timing of retirement, we analyzed the role of respondents' corresponding abilities and changes therein. Third, and maybe most importantly, we analyzed the *interaction* between abilities and job demands, whereas Belbase et al. (2016) did not use information about the actual abilities of workers. Fourth, we used retirement expectations data, allowing us to observe the immediate impact of changes in abilities and job mismatch. This has the further advantages of increased sample size and the use of panel variation for identification.

Other related research in psychology explores the person-environment (P-E) fit. Wang and Shultz (2010) suggested that the match between various aspects of the persons (workers) and their work environment may affect work and retirement outcomes, including well-being and retirement timing. Liebermann, Wegge, and Muller (2013) used a P-E framework in a study of German insurance workers to explore several hypotheses related to workers' expectations of remaining in the same job until retirement. McGonagle, et al. (2015) investigate how the match between job demands, job resources and "perceived work ability" affects work-related stress and work outcomes. Finally, Sonnega et al.

(forthcoming) compared objective (O*NET) and subjective (HRS) job-demand measures and how they interacted with HRS resource measures to predict retirement timing. We use a broader set of variables, and we use panel econometric models that are less restrictive than cross-sectional models.

In the next section, we describe the HRS and O*NET data we analyze. We then present separate sections on our methods and results. The final section presents our conclusions and the implications and limitations of our work.

2. Data

The HRS is the primary United States data source for studying the retirement process.[2] It has a large sample—approximately 20,000 responses per wave—of persons at least 50 years of age, and very detailed panel information on them, including information about work, health, cognitive abilities, and socioeconomic status. The HRS has interviewed respondents biennially since 1992.

2.1. Measurement of physical and cognitive resources

The HRS has very detailed information about individuals' health, activities of daily living (ADLs), and cognitive abilities. We use three summary measures, created by the RAND-HRS (2016),[3] in this project. Table 1 provides an overview.

The first measure is termed "large-muscle problems" and represents difficulties with mild-to-moderate physical activities. The measure comprises four items, each corresponding to the respondent's mention of any difficulty with:

1. sitting for about two hours,
2. getting up from a chair after sitting for long periods,
3. stooping, kneeling, or crouching,

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[2] The HRS (Health and Retirement Study) is sponsored by the National Institute on Aging (grant number NIA U01AG009740) and is conducted by the University of Michigan: http://hrsonline.isr.umich.edu/

[3] The RAND HRS Data file is an easy to use longitudinal data set based on the HRS data. It was developed at RAND with funding from the National Institute on Aging and the Social Security Administration www.rand.org/labor/aging/dataprod/hrs-data.html.

4. pulling or pushing large objects such as a living room chair.

The second measure is termed "fine motor problems" and it aims to capture problems with the precise coordination of fingers. The measure sums three items about reporting difficulties with:

1. dressing, including putting on shoes and socks;
2. eating, including cutting food;
3. picking up a dime from a table.

These measures are not ideal for our purposes, as they represent more basic functional limitations that may be more relevant for individuals at advanced ages.[4] In interpreting the results, we will keep in mind their limitations.

Our measure of cognitive ability is the 27-point scale of episodic memory (see Crimmins et al., 2011), which is strongly related to fluid cognitive abilities (Del Missier et al., 2013). The measure sums performance on four cognitive tests:

1. Immediate word recall of a list of 10 words (10 points),
2. Delayed word recall of the same list a few minutes later (10 points),
3. Serial subtraction of 7 from 100 five times (5 points),
4. Backward counting from 20 to 10 with two trials (2 points).

The physical measures are consistently available since 1994 for all interviews, including interviews of proxy respondents for persons unwilling or unable to do the interview. The cognition score is consistently available since 1996, but is not available in proxy interviews because cognitive abilities can only be directly tested. All three resource measures are recoded so that higher values represent more resources (better health). For the regression models we also standardized the measures to have a zero

[4] We considered incorporating difficulties with vision in the score, because good vision may help performance in fine motor tasks, and it is a more relevant problem in the used age range. Vision problems, however, can be corrected reasonably well by glasses or contact lenses. Because the demand for eyewear may vary by job demands, we ultimately decided against using vision in the fine motor index.

mean and a standard deviation of one in our main sample, which comprises respondents 50 to 70 years of age who are working full-time.

2.2. Measurement of job demands

The HRS provides information on workers' occupations by three-digit occupational codes of the U.S. Census Bureau. The classification changed in 2006 from the 1980 to the 2000 census classifications, but cross-walks are available between these specifications (Hudomiet, 2015; Carr et al., 2016). The detailed occupations are linked to detailed occupational characteristics from the O*NET data, similarly to Belbase et al. (2016) and Carr et al. (2016). We extract four key dimensions of job demands that are closely related to the resource measures. Table 1 provides an overview.

The dynamic strength dimension relates to the abilities of individuals to exert muscle force repeatedly or continuously over time. This involves muscular endurance and resistance to muscle fatigue. Occupations that score the highest on this measure include fire fighters, masons, and construction workers. Occupations that score lowest include management, engineering, and financial ones. We pair the dynamic strength measures with the HRS large-muscle resource measure.

The finger dexterity dimension describes the abilities of individuals to make precisely coordinated movements of the fingers of one or both hands to grasp, manipulate, or assemble very small objects. Occupations scoring highest on this measure include dentists, aircraft mechanics, data entry keyers, and precision textile, apparel, and furnishings machine workers. Occupations scoring lowest include real estate sales, management analysists, human resource clerks, and clergy. We pair this job-demand measure with the HRS fine-motor skill resource measure.

The memorization dimension describes the abilities of individuals to remember information such as words, numbers, pictures, and procedures. Occupations scoring highest on this measure include clergy, primary school teachers, lawyers, bartenders, and waiters/waitresses. Occupations scoring lowest

include janitors, painters, vehicle washers, and textile sewing machine operators. We pair this job-demand measure with the HRS cognition-resource measure.

The "analyzing data or information" dimension captures work activities of identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts. Occupations scoring highest include management analysts and various science jobs; occupations scoring lowest include mail carriers, vehicle washers, door-to-door sales, and laundry workers. We also pair this job demand measure with the HRS cognition-resource measure.

The O*NET database contains measures for 974 occupations, corresponding to the occupations in the most recent HRS. As noted above, however, the occupational coding schemes in the restricted HRS data have changed over time (Nolte, Turf, and Servais, 2014). To ensure comparability across waves of HRS data, we use a coding scheme that is consistent over time and that aggregates across small, similar occupation groups. This coding scheme was developed to use in conjunction with the O*NET data and contains 192 separate occupations/occupational groupings derived from the original occupational codes. The coding scheme can be accessed at https://sites.google.com/site/phudomiet/Occupation-Crosswalks-MRRC-2015.xlsx.

If HRS respondents report working more than one job, HRS elicits and codes the occupation information for all jobs a respondent may hold. The interview also asks respondents to name the job they consider to be their main occupation, which is the occupation we use here.

For each occupation in the database, O*NET provides information on the level and importance of each required work activity. Following Firpo, Fortin, and Lemieux (2011), we use Cobb-Douglas weighted means to combine occupation-level importance and level measures. Importance weights are 2/3; level weights are 1/3. Given the smaller number of somewhat aggregated occupations in our HRS data, we average across multiple O*NET occupations that crosswalk to the HRS occupation categories

to create O*NET measures for the HRS occupations. We use CPS detailed occupation frequencies to weight O*NET measures to the level of the 192 detailed occupation categories used in this paper.

The job-demand measures range from 0 to 1. In our regression analyses we use standardized measures that have a mean of zero and standard deviation of one among 50- to 70-year-old, full-time workers.

The HRS typically only ask about workers' occupations if they reported a change in their employment situation (different employer or different tasks at the same employer) or they are newly recruited sample members. To maximize the available information, workers with missing occupations were imputed their previously reported occupations.

2.3. The outcome variables

We considered a large set of outcome variables for the analysis. The most important ones are

- Self-reports of any impairment or health problem that limits the kind or amount of paid work respondents can do. We expect that any mismatch between individuals' resources and the demands of their jobs would increase the report of such impairments.
- The number of depressive symptoms individuals have, using the eight-item HRS version of the Center for Epidemiological Studies-Depression (CESD) Scale. We expect that any mismatch between individuals' resources and the demands of their jobs would increase the number of depressive symptoms.
- The subjective expectations to work full-time after age 65 (or 62). The HRS asks respondents, "Thinking about work in general and not just your present job, what do you think the chances are that you will be working full-time after you reach age 65 [or 62]?" This measure of expected future work has been shown to be highly predictive of actual future work at age 65 or 62 (Hurd, 2009). We expect that a mismatch between a worker's resources and job demands decreases the subjective probabilities of working full-time in the future.

These outcome variables are available for both workers and nonworkers. They are, therefore, well-suited for panel econometric modeling. Depressive symptoms and subjective expectations, however, are not collected in proxy interviews due to their subjective nature.

We also analyze wave-to-wave transition probabilities from full-time work to either full-retirement or disability. The labor force status variables are based on the RAND-HRS (2016) definitions. We expected that mismatch between worker resources and job demands would increase the probability of transition from work to retirement or disability status. Because actual transitions between these states are infrequent, with many workers experiencing just one transition, panel statistical methods are not well suited for their analysis, so we have to use other, more restrictive methods.

We also analyze the effect of mismatch between worker resources and job demands on the probabilities of a worker switching employers between HRS waves, the enjoyment individuals derive from work, and the likelihood an individual will seek another job while working.

2.4. Other variables

Among other variables we use in our analysis are

- Age,
- Gender,
- Race (white, black, other),
- Education (high-school dropout, high school graduate, college dropout, college graduate),
- Marital status (married or not),
- Whether one's spouse works,
- Whether individuals have DB or DC pension plans,
- Whether individuals are covered by health insurance either by their own or their spouse's employers,
- Self-employment status,

- Job tenure,
- Total household income,
- Total household wealth, excluding employer-based retirement wealth[5] (such as 401k balances or defined benefit plan entitlements) and value of secondary residence.[6]

We use the RAND-HRS dataset for these variables.

2.5. The sample

We restrict our sample in several ways. We use only the 1994-2014 waves of the HRS, excluding the 1992 data because many variables of interest to this study were missing in that wave. We also limit our analysis sample to person-year observations when individuals were between 50 and 70 years of age. Individuals with missing gender (only two person-year observations) or occupations (322 person-year observations) are also excluded.

Some variables are not available in the 1994 wave or in proxy interviews (e.g., on cognitive abilities, expectations, CESD). We exclude these from analysis where necessary, while keeping them for analyses that do not use the missing variables.

Our main analyses are carried out on two alternative samples that are restricted further based on labor-force status. The most restricted sample includes only those working full-time in two adjacent waves. A broader sample includes those who work full-time in one wave and are observed in the succeeding wave, irrespective of labor force status in the next wave. In a few cases, however, we don't restrict the sample based on current or future labor force statuses.

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[5] Information about employer sponsored pensions is collected by HRS for all current and previous employers (although limited to jobs held for 5 years or more for employment prior to the first HRS interview). Measurement error on pension plan type, changes in survey design across waves and the large number of components involved makes the derivation of pension wealth measures a major and complicated undertaking, with considerable ambiguity in the profession how best to accomplish this task.

[6] HRS did not ask for the value of any secondary residence in the third wave (1996), so the total wealth measure we use excludes that.

Table 2 presents descriptive information about our unweighted sample, including 50- to 70-year-old, full-time workers (not restricted by future labor force status). Altogether, we have about 47,000 person-year observations, but some variables are missing for various reasons discussed earlier. About half of the sample is female, almost one-fourth is nonwhite, more than one-fourth has a college degree, and nearly three-fourths is married. Most individuals in our sample have only a few, if any, physical limitations, with less than one in 10 reporting a health condition that limits working. On average, they report having one (of eight queried) depressive symptoms. The appendix includes a table with weighted statistics that are very similar.

3. Methods

Suppose that as workers enter their early 50s they are in job equilibrium: Their physical and cognitive capabilities are well matched to the demands of their job. Comparing responses across individuals about job demands may reveal few objective facts, because those workers most suited to the demands will have sorted into those jobs. For example, strong men will have taken up jobs that require considerable strength. If they are asked, however, whether the job requires strength, they may not acknowledge the full extent of those demands. Because of such good matches, there may be little relationship between anticipated retirement and job demands. Yet a person of medium strength put into such a job would likely anticipate early retirement. Similarly, as time passes the quality of the match may deteriorate even for a strong worker because of decreases in physical health.

Our empirical strategy is based on the observation that because of health shocks or gradual declines in physical and cognitive resources, jobs that were once a good match to a worker's characteristics may become increasingly mismatched.

3.1. Panel models

A strength of our approach is its use of panel data. By using panel-data methods, we can control for initial conditions, in particular the initial quality of job matches. We illustrate our empirical strategy

with the example of the subjective probability of working past age 65, but similar methods are used for the other outcomes.

We estimate the following model:

1. $$\Delta p^{65}_{i,t+1} = \beta_0 + \beta_1 r_{it} + \beta_2 \Delta r_{i,t+1} + \beta_3 d_{it} + \beta_4 d_{it} \times \Delta r_{i,t+1} + \beta_5 X_{it} + \varepsilon_{it}, \quad (1)$$

where p^{65}_{it} is the subjective probability of working full time after age 65 for individual *i* at wave *t*; r_{it} denotes individuals' resources, d_{it} represents job demands; X_{it} is a set of time-varying control variables (such as changes in wealth, and in marital status, and interview wave indicators), ε_{it} is the error term; and Δ indicates changes from wave *t* to wave *t+1*. The coefficients of interest are the interaction terms (β_4).

Even though the HRS provides survey weights, they are zeros for many 50- to 55-year-old observations who are not cohort eligible yet. In order to maximize the available information about individuals' initial job matches (when they are 50 to 55 years old), we report unweighted results. Weighted results are very similar, probably because our panel econometric models are little affected by weights that (mostly) correct for stratified sampling.

3.2. Transition models

When modeling wave-to-wave transition probabilities, we use a model similar to (1) above, but we use transition indicators on the left side of the equation, and a larger set of control variables on the right side, including time-invariant variables such as gender and race. These models do not difference out individual fixed effects; as a result, additional control variables that capture the heterogeneity in initial conditions (e.g,. the initial quality of job matches) are important. These models rely on stronger identification assumptions than the panel models.

3.3. Imputations

Since 2006, the HRS has asked all respondents their subjective probabilities of working full-time after age 62 and 65. Prior to 2006, however, it was partially missing for nonworkers. Nonworking individuals were only asked about the probabilities that they would ever work again. A 0 percent answer implies a 0 percent chance of working full-time after ages 62 or 65 as well. Those, who provided a nonzero answer before 2006, however, were not followed up with a question about full-time work after ages 62 and 65.

We seek to include in our broader sample those who currently do not work, but who did work in the prior wave. Because expectations of such individuals are partially missing before 2006, we impute them using information about individuals' age, gender, labor force status, and prior expectations, basing our imputation model on data from 2006 to 2014. Table 12 in the appendix shows our imputation model, and the strength of the variables that predict work expectations. We then used the predicted values of these models to predict subjective probabilities of working full time after age 65 for the relevant missing cases in the 1994 to 2004 waves: Those who were not working, but were full-time workers in the prior wave, who did not have proxy interviews (expectations are only collected in nonproxy interviews), and who provided a nonzero probability of working in the future.

Some of the resource measures were imputed by the RAND team as explained by RAND-HRS (2016). The physical measures only use logical imputations (e.g. not knowing about a limitation implies no limitation, unless all items from the score are missing, in which case the score is left missing). Missing cognitive resource items were imputed using past and future values of the cognitive items, and therefore the 2014 missing values are not yet imputed.

In a handful of cases some control variables (such as education) are also missing. To maximize the available sample, missing discrete controls are replaced by the modes of the variables. Missing household income and wealth were imputed by RAND-HRS (2016). Missing job tenure was replaced by

10 years (about the median). Missing outcome variables or explanatory variables (other than the subjective expectations and resources discussed above), however, are not imputed.

4. Results

4.1: Descriptive patterns

The four panels of Figure 1 show age patterns of work-limiting health problems and the physical and cognitive resource measures for all HRS respondents 50 to 70 years of age. Our theory predicts an increase in work-limiting health problems with age and a decrease in the three resource measures.

Panel A indeed shows a sharp increase in the fraction reporting a work-limiting health problem by age. The prevalence of such problems increases from about 20 percent among 50 year-olds to more than 30 percent among 70 year-olds.

Panels B, C, and D show sharp declines in physical and cognitive resources. The measures are standardized (zero mean and standard deviation of one) among 50-70-year old full-time workers, but the graph includes everyone in that age range. All resource measures are negative, on average, which indicates that full-time workers have more resources than the general population at all ages between 50 and 70. We find a decrease of 0.25 standard deviations in the large-muscle index among persons 50 to 70 years of age (Panel B), as well as a decline of 0.3 standard deviations in the fine-motor skills index (Panel C), and 0.4 standard deviations in the cognition score (Panel D).

Table 3 shows the correlation between the HRS resource measures and their O*NET job demand pairs among respondents 50 to 55 years old. We focus on the ages when most individuals have yet to experience decline in these resources. We seek to get a sense of the quality of the pairings, but this is difficult because of conflicting theories on how these resources may decline with age.

There are, for example, at least two reasons to expect positive correlations between resources and job demands. First, human capital theory suggests that individuals tend to sort into jobs that maximize their lifetime income (Ben-Porath, 1967) by pursuing education and occupations that capitalize on their

comparative advantage (Roy, 1951; Willis and Rosen, 1979). If physical strength and cognitive resources are positively correlated, those with high levels of both cognitive and strength resources will tend to sort into high paying "cognitive" occupations if the variance of worker productivity is greater in relatively cognition-intensive jobs than in relatively strength-intensive manual jobs (Willis, 1986). Second, investment in on-the-job training and learning-by-doing over their careers in a given occupation (or career ladder) would reduce any mismatch between their initial resources and the demands of the job. Indeed, to the extent to which learning new skills depends on cognitive ability, as is likely to be most important in cognitive jobs, the strength of the match between worker resources and job demands is likely to strengthen as job tenure increases. In addition, investments in health capital (Grossman, 1972) to maintain physical and mental health during the career would be important in maintaining match-quality.

At the same time, there is at least one reason to expect negative correlations between resources and job demands. Specifically, too much exposure to the demands of a job may deplete individuals' resources, leading to a negative correlation between their resources and job demands. For example, exposure to repeated heavy physical activities may lead to physical health issues. We do not expect this mechanism to play a role in cognition.

Table 2 shows that there are large, positive correlations between cognitive ability and the two cognitive job demands, each with a correlation coefficient of about 0.3. This suggests that individuals with high cognitive abilities sort into cognitively demanding jobs, cognitively demanding jobs increase workers' cognitive abilities, or such jobs prevent the decline of cognitive abilities. Alternatively, any combination of these mechanisms may operate simultaneously.

At the same time, we found small, negative correlations between the physical resources and job demands. This may mean that sorting into physical jobs and learning-by-doing are less important for physical attributes, and that, instead, depletion of physical resources does occur in physically demanding

jobs. It is also possible that workers in physically demanding jobs have riskier habits (e.g., smoking, heavy drinking) than workers in less physically demanding jobs, leading to depletion of their resources relevant to such jobs. Finally, the physical resource and job-demand measures may not pair well, because they correspond to different attributes of individuals. In such a case, we would not expect a strong interaction effect between these measures in the retirement regressions.

Tables 4 through 7 show how the change in resources interacted with job demands predict the main outcome variables: work-limiting health problems, depressive symptoms, and expectations to work in the future. Here we seek descriptive evidence from data without imposing modeling assumptions. The main patterns we are looking for are increased mismatches between job demands and personal resources as physical and cognitive resources decline, and for differences in mismatches for those in jobs with high versus low demand for a given resource.

Each table focuses on a separate dimension of job demands and workers' corresponding resources. All tables are based on the broader sample that includes full-time workers in wave t, and anyone (workers and nonworkers) in wave t+1.

Table 4 shows the results for the large muscle index. The cells of the table show the means of the outcome variables at wave t and t+1, all computed over the same balanced sample (restricted to those who appear in both wave t and t+1). The rows of the table indicate transitions in the workers' resource measures as observed across two waves in the HRS data: from high (above the mean) or low (below the mean) at wave t to high/low at t+1. The columns indicate the waves (t and t+1) with the left panel showing results for workers in occupations with high demand for dynamic strength (O*NET index above the mean) and the right panel showing results for workers in occupations with low demand for dynamic strength (O*NET index below the mean). We expect larger changes in the outcome variables from wave t to t+1 when individuals' resources (HRS large muscle index) decline from high to low, especially in jobs that demand those resources.

Among individuals who score high on the large muscle index at both waves t and t+1 (workers' resources observed in HRS: high → high), very few report any work-limiting health problems. Specifically, only 2.2 percent of such individuals in occupations demanding a lot of dynamic strength report work-limiting health problems at t, and only 3.3 percent report such problems at t+1. Among workers who score high on the large muscle index in both t and t+1 and who are in occupations with relatively low demand for dynamic strength, less than 3 percent report any work-limiting health problems at either t or t+1.

Among individuals for whom the large-muscle index deteriorates from high to low, there is a sharp increase in reported work-limiting health problems, especially in occupations that demand dynamic strength. Specifically, the proportion of individuals in jobs demanding such strength who report work-limiting health problems increased from 4.5 percent to 18.5 percent, while the proportion of such individuals in other jobs reporting such problems increased from 3.5 percent to only 11.3 percent.

Among individuals whose large-muscle index improved, there are small decreases in work-limiting health problems. At the same time, among individuals whose large-muscle index was low in both waves, the proportion of individuals reporting work-limiting health problems was high and increased sharply: from 18.5 percent to 27.3 percent among individuals in occupations that demand dynamic strength, and from 15.3 percent to 22.3 percent among such individuals in other occupations.

These patterns are as our theory predicts: Declining resources increase the chances that individuals report work-limiting health problems, especially in occupations where dynamic strength is needed.

We see the same general patterns in the CESD depression scores. For example, among individuals who develop large-muscle problems and work in occupations that demand dynamic strength, the average number of reported depressive symptoms increased from 1.157 to 1.493. The increase is

somewhat smaller, from 0.920 to 1.111, among such individuals who do not work in occupations that demand dynamic strength.

There are also similar patterns for subjective probabilities of working past age 65. Individuals who develop large-muscle problems (large muscle index from high to low) report a decline in the subjective probabilities of working past age 65 if they work in occupations that demand such skills. That is in contrast to those with the same change in the large muscle index who work in occupations that do not require dynamic strength. For them the average subjective probability of working past age 65 remained about the same.

Table 5 shows changes among workers by their reports of fine-motor skills and the demand for such skills on their jobs. Levels and changes in fine motor skills all strongly predict whether workers will report developing health limitations on work, more depressive symptoms, or expectation of working past age 65, although the interaction with relevant job demands is less strong than it is with the large muscle index.

Among individuals who develop fine-motor skill problems and work in occupations that demand finger dexterity, the propensity to report work-limiting health problems increases from 19.4 percent to 48.8 percent, or by 29.4 percent. Yet such workers who do not work in jobs requiring finger dexterity report a similarly sharp increase in work-limiting health problems, from 19.1 percent to 42.4 percent, or a change of 23.3 percent.

Table 6 shows our analysis for mismatches between cognitive resources and memorization demands on the job, and Table 7 shows the same analysis for mismatches between cognitive resources and analytical demands of a job. The patterns are more similar to the fine-motor skill results in Table 5 than to the large-muscle results in Table 4. Cognitive decline predicts the outcome variables relatively strongly (though less strongly than fine-motor skills do), but there are only weak interactions with job demands.

For example, among individuals who develop cognitive problems and work in occupations that demand memorization, the propensity to report work-limiting health problems increases from 6.4 percent at t to 10.8 percent at t+1. Among such workers in occupations that do not demand memorization, work-limiting health problems increase even more, from 7.7 percent to 12.7 percent.

4.2. Regression analysis

Tables 8 through 10 show regression versions of the results in Tables 4-7, but expand on those results in three ways. First, these regressions use time-varying control variables: cubic polynomial of age, marital status, whether spouses work, household income, household wealth, and a set of interview-wave indicator variables. Second, they show standard errors that are robust and clustered on household identification numbers.

Third, we run separate regressions on the narrower sample that includes only full-time workers and on the broader sample that also includes nonworkers who were full-time workers in the previous wave. If we assume that retirement does not lead to changes in individual physical or cognitive resources, that is, any correlation between labor force status and health changes are caused by health changes, then the results of the broader sample should be used. Alternatively, if we are concerned that retirement may lead to declines in resources, even in a short period of time, e.g., because of less exposure to challenging tasks, then the results of the narrower sample should be preferred, as they control for labor force status.

We expect that the true effects are somewhere between the estimates from the broader and the narrower samples. Our expectation is that the true effects are closer to those shown in the broader sample because any changes in health or cognition that retirement causes should be small due to the short time elapsed since retirement.

Overall, we find very similar patterns in our regression analyses as in our descriptive analyses. Declines in resources strongly and statistically significantly predict all three outcome variables in the

broader sample, and almost always in the narrower sample. The only exceptions are the effect of changes in motor skills on the probability of working full-time after age 65, and the effect of changes in cognition on work-limiting health problems both in the narrower sample.

The decline in the physical measures tend to have larger effects than declines in cognition, especially on depressive symptoms and reporting of work-limiting health problems. The interactions between the large-muscle resource index and dynamic strength job demands (that capture mismatch in specific dimensions) are statistically significant in all regressions even at the 1 percent level.

The magnitudes of the interactions are also large. In the regressions of subjective expectations (Table 10), the interaction coefficient (0.818 in the fourth row) is almost half as much in absolute value as the coefficient on health change (1.916 in the second row). Given that all coefficients are standardized, this means that changes in the large-muscle index do not predict retirement expectations in occupations whose demand for dynamic strength are about 2.3 standard deviations below the average level of demand for dynamic strength.

In the sample that only includes full-time workers (column 5 of Table 10), the breakeven point is even lower: Occupations about 1.4 standard deviation below the mean are immune to changes in the large muscle index. The interaction effects between the large-muscle index and dynamic strength job demands are strong and statistically significant, but smaller in magnitude in the other two regressions showing effects on work-limiting health problem and depressive symptoms as measured by CESD. This means that developing large-muscle problems increases depressive symptoms and reported work-limiting health problems in all occupations, but the effects are larger in occupations that demand dynamic strength.

The interaction effects are slightly smaller in the narrower sample than in the broader sample, as expected. We expect the true effects are in between these two, so it is notable that the estimates of the interaction effects in both samples are similar.

The interaction effects between fine-motor skills (resource) and finger dexterity (job demand), as well as those between cognition and cognitive job demands are close to zero and almost never statistically significant. The only exception is column 3 in Table 9, in which the interaction term has an unexpectedly positive sign and is statistically significant at the 5 percent level. The model predicts that cognitive decline increases depression relatively more in occupations that do not demand memorization.

Overall, even though fine-motor skills and cognition strongly predict the three outcomes, they do not seem to interact with job demands along these dimensions.

Table 11 shows linear regressions of wave-to-wave transitions between full-time work and full-retirement. These regressions do not control for individual fixed effects, but they control for the same time-varying variables as the first-differences regressions, as well as basic demographic information (gender race, education), and job-attributes in wave t (pensions, health insurance, tenure, self-employment status). Decline in all three resources is a strong predictor of retirement transitions. Large-muscle decline leads to a 2.6 percentage point increase in the likelihood to move from full-time work to full-time retirement, fine-motor skill decline leads to a 1.8 percentage point increase in the likelihood, and cognition decline leads to a 0.8 percentage point increase.

The interactions between resources and job demands are not statistically significant in any of the regressions. It is possible that the sample size is not sufficient to more precisely detect these small interaction effects. Even though the regressions are based on more than 30,000 person-year observations, the effective sample size is much smaller because most individuals only transition once from work to retirement. Note the contrast with subjective expectations of working that can be tracked throughout an individual's life, providing more variation in the data.

In the appendix we report results on additional outcome variables. We summarize the results briefly here. The two physical-decline measures are statistically significant predictors of disliking work (i.e., of disagreeing or strongly disagreeing with the statement that "I really enjoy going to work"), but

cognitive decline is not. The interactions of these measures with job demands on dislike of work is not statistically significant. The outcome variable is only available for workers — those not working at t+1 are not in the analysis sample—and an important part of the sample is therefore missing and may bias the coefficients toward zero.

Measures of decline also have some effects on expecting to work full-time after age 62. All measures of resource decline are significant predictors of the transition from full-time work to disability, with the interaction between the large-muscle index and dynamic strength being significant at the 5 percent level. Decline in the large-muscle and the fine motor indices make it less likely that an individual will switch employers, but none of the interaction effects with job demands are statistically significant.

5. Discussion and conclusion

5.1. Summary

We used longitudinal data from the HRS to test how decline in individuals' physical and cognitive resources, as well as the mismatch between resources and occupational job demands, affected various retirement-related outcomes. We considered three resource measures: 1) a large-muscle index representing strength and overall physical fitness; 2) fine-motor skills representing the ability of individuals to do precise manipulations with their hands (as well as general physical fitness); and 3) cognitive abilities that mostly focused on the quality of individuals' working memories.

We paired these three resource measures with four corresponding job-demands measures derived from the O*NET project. These were dynamic strength (paired with the large muscle index), finger dexterity (paired with fine motor skills), memorization (paired with cognition), and analyzing data and information (also paired with cognition).

We merged the O*NET characteristics with the detailed three-digit occupations of HRS participants and focused on three outcome variables: self-reported work-limiting health problems, the

number of depressive symptoms (as measured by the CESD scale), and subjective probabilities of working full-time after age 65. We tested whether HRS resources and O*NET occupational job demands predicted these outcome variables. We expected that the decline in resources would lead to more work-limiting problems, more depressive symptoms, and smaller subjective probabilities of working longer, especially in occupations that rely on specific skills. This latter effect was tested by the interactions between resources and job demands.

The main novelty of our approach was to use panel econometric models that identified solely intrapersonal rather than interpersonal variation in physical and cognitive resources. Under reasonable assumptions, this variation captures the causal effect of resource decline on the outcomes. We were able to use panel econometric models because we had repeated observations in our outcome variables that were collected among both working and non-working individuals. In standard models of retirement transitions, which we also estimated, such panel variation is not available to researchers, because (most) individuals retire only once. Our approach, therefore, highlights a main advantage of using subjective probabilities such as that of working full-time after age 65: They provide more variation both in the cross-section (probabilities as opposed to 0-1 indicators available at the individual level) and over time (see also Hurd, 2009; Manski, 2004).

We found that physical and cognitive resources all had a strong effect on the three outcome variables, as well as on the probability of transitioning from full-time work to retirement. Decline in the physical measures (large-muscle and fine-motor) tended to have a stronger effect than declines in cognitive abilities. For example, a decline of one standard deviation in the large-muscle index decreased the subjective probability of working after age 65 by about 1.9 percentage points. The corresponding effect of cognitive ability was about half as much at 1 percentage point.

The differences between physical and cognitive resources was even larger for CESD depression. While a decline of one standard deviation in the large-muscle index increased the number of depressive

symptoms (out of eight) by about 0.21, a decline of one standard deviation in cognition increased the number of such symptoms by 0.04 (both increases statistically significant at 1 percent).

We also found that decline in the large-muscle index had a strong interaction effect with dynamic strength job demands, implying the importance of mismatch in large muscle problems for retirement. For example, an increase of one standard deviation from the mean in the importance of dynamic strength in occupations resulted, on average, in the effect of large-muscle index on the subjective probability of working past age 65 increasing from 1.9 to 2.7 percentage points. Such an increase also increased the effect on depressive symptoms reported from 0.21 to 0.25.

We found weak and statistically insignificant interaction effects between the fine-motor index (resource) and finger dexterity (job demands), as well as between cognition (resource) and memorization or analyzing data and information (job demands). There are several possible explanations for this. It may be that fine motor skills and cognitive abilities are important determinants of working in all occupations. Workers in cognitive and fine-motor occupations may have good jobs that protect them from the adverse effects of mismatch: their employers may accommodate the changing capabilities, or such workers may be able to switch to tasks or jobs that better align with their reduced skills. Finally, the pairing of the O*NET measures was not perfect with the HRS resource measures, which may have biased the interaction effect toward zero.

5.2. Implications

Our paper demonstrates the importance for retirement research of considering the considerable heterogeneity in individuals' skills and in their jobs' demands. Different jobs rely on different skills. As workers age, their physical and cognitive resources decline, for some more rapidly than for others. By simultaneously considering the heterogeneity in job demands and resources, we showed that mismatch may be an important obstacle for the employability of some workers, especially those working in occupations that rely on muscular endurance.

While we found that cognitive decline was associated with some outcomes (depressive symptoms, retirement expectations, actual retirement), the association was considerably weaker than with physical decline. We also did not find any interaction between cognitive decline and job demands.

There are many potential reasons why decline in cognitive abilities is less crucial for retirement outcomes. Workers in cognitive jobs who experience declines in their fluid cognitive abilities can rely on their crystallized intelligence (general knowledge and experience) that is found to be more resistant to aging. Such workers also may be in good jobs with more accommodating employers or have better outside options. Regardless, cognitive decline appears to be less of a problem for workers at older ages than decline in physical skills is.

We found decline in fine-motor skills was a very strong predictor of retirement outcomes, but we found little interaction effects with job demands.

We did find very large interaction effects between large-muscle problems and corresponding job demands (dynamic strength). Employability in physically demanding jobs appears to be very sensitive to an individual's physical capabilities, or at least much more so than employability in cognitive jobs is to declines in cognitive skills.

Workers in physically demanding jobs, thus, are more likely to face mismatch with the demands of their jobs, especially those who experience a decline in their physical capabilities. Currently, these mismatched workers are very likely to leave the labor force, perhaps because they are not able to effectively work in their occupations and their options for work in other occupations are limited.

Delaying the decline in the physical health of these workers may increase the chances that they can work to the ages they desired or had planned on. They may also be better off if their employers accommodated their changing skills or if they could find alternative work arrangements that better fit their abilities.

5.3. Limitations

There are several limitations to our study. The job-demand measures were defined by occupations, and so any heterogeneity within occupations was ignored. We used occupational measures, because they are based on more objective information than self-reported survey data and because O*NET provided a large number of measures from which to choose. Future research might profitably consider within-occupation heterogeneity in job demands.

The two physical-resource measures may be too general and focused on problems for individuals at older ages than those analyzed. This is particularly true for the fine-motor index that included problems with eating and dressing. Such issues are rare in the working-age population and typically manifest long after an individual leaves the labor force. This may explain why we found no interaction effects between the fine-motor index and the corresponding job-demand (finger dexterity).

An important element of our methods was pairing HRS resource measures with O*NET job characteristics and to analyze the interactions between these. The success of this method depends on the quality of the pairing. If the resource and the job-demand measures are misaligned because, for example, they correspond to somewhat different factors, then we would expect muted coefficients. This problem may have contributed to the lack of significance between the fine-motor index and finger dexterity, but we think the quality of the other pairs was better.

Our preferred sample included those nonworkers who had a job in the previous HRS waves. But before 2006, the HRS did not ask the subjective probability of working after ages 62/65 question of some nonworkers. We imputed these cases using a relatively simple single-imputation methodology that flexibly included age, gender, labor force status and past expectations. Imputation, however, is never perfect. In the future, when more HRS waves become available, researchers might estimate similar models using only post-2006 data that needs no imputation. It would also be interesting to implement more sophisticated imputation techniques, such as multiple imputation.

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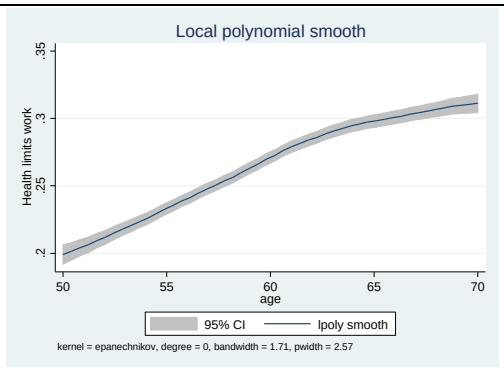
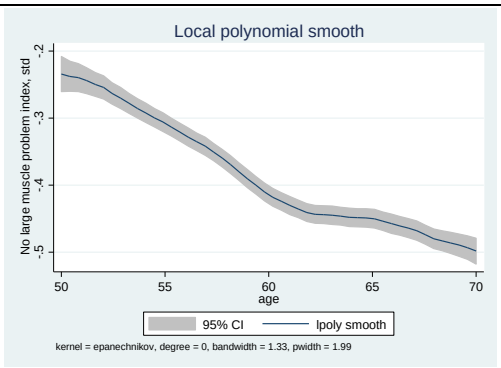
Tables and Figures

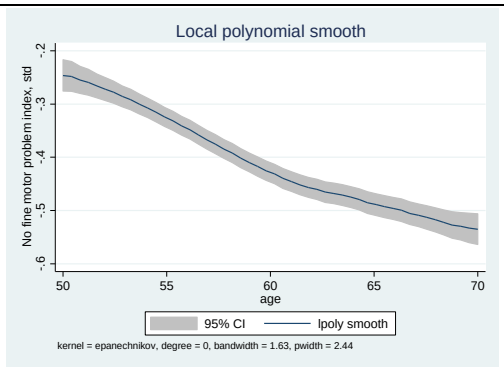
Figure 1. Age patterns in whether health limits working and three resource measures, nonparametric regressions, HRS, Ages 50-70, 1994-2014, unweighted



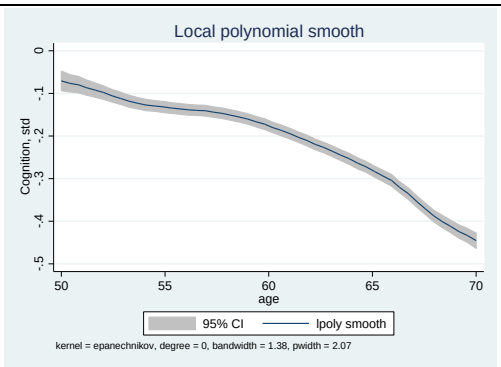
Panel A: Whether health limits work



Panel B: Large muscle index



Panel C: Fine motor skills index



Panel D: Cognition

*The three resource measures are standardized to have zero mean and standard deviation of one among 50-70 years old full-time workers, but the graphs include everyone regardless of labor force status. Higher values indicate better health. The confidence intervals assume i.i.d. data, and they are likely too narrow due to the positive correlations in the panel.

Table 1. Definition of the HRS resource measures and the O*NET occupational job demands

#	Pair #	HRS-resource measures	Definition*
R1	D1	Large-muscle problems	Having problems with 1) sitting for 2 hours; 2) getting up from a chair; 3) stooping, kneeling or crouching; 4) pushing or pulling large objects
R2	D2	Fine motor problems	Having problems with the following activities: 1) picking up a dime; 2) eating; 3) dressing
R3	D3, D4	Cognition	27-point scale involving immediate word recall (10 words), delayed word recall (10 words), serial subtraction of 7 from 100 (5 times) and backward counting from 20 to 10 (2 trials)

#	Pair #	O*NET job demands	Definition**
D1	R1	Dynamic strength	The ability to exert muscle force repeatedly or continuously over time. This involves muscular endurance and resistance to muscle fatigue.
D2	R2	Finger dexterity	The ability to make precisely coordinated movements of the fingers of one or both hands to grasp, manipulate, or assemble very small objects.
D3	R3	Memorization	The ability to remember information such as words, numbers, pictures, and procedures.
D4	R3	Analyzing data or information	Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts.

* See the RAND-HRS (2016) documentation for details.
** See the O*NET documentation for details at https://www.onetcenter.org/content.html.

Table 2. Descriptive statistics about the main variables, HRS, Ages 50-70, full-time workers, unweighted

	N	mean	sd	min	max
Age	46935	57.9	4.597	50	70
Female	46935	0.477	0.499	0	1
White	46935	0.767	0.423	0	1
Black	46935	0.163	0.369	0	1
Other race	46935	0.070	0.256	0	1
Hispanic	46935	0.106	0.308	0	1
High school dropout	46935	0.177	0.382	0	1
High school graduate	46935	0.285	0.452	0	1
College dropout	46935	0.258	0.438	0	1
College graduate	46935	0.280	0.449	0	1
Married	46935	0.713	0.452	0	1
Spouse works	46935	0.493	0.500	0	1
Household income	46935	90797	147927	0	13570429
Total household wealth	46935	355945	1086466	-4383000	90648200
Has a DB pension	46935	0.326	0.469	0	1
Has a DC pension	46935	0.397	0.489	0	1
Self employed	46935	0.158	0.365	0	1
Tenure at job, in years	46935	13.747	11.494	0	55
Has health insurance from employer	46935	0.680	0.467	0	1
Has health insurance from spouse	46935	0.149	0.356	0	1
HRS interview wave	46935	6.933	3.236	2	12
Dynamic strength, O*NET	46935	0.178	0.126	0.000	0.562
Finger dexterity, O*NET	46935	0.393	0.097	0.177	0.718
Memorization, O*NET	46935	0.339	0.080	0.104	0.580
Analyzing data or information, O*NET	46935	0.523	0.147	0.157	0.877
Large muscle problem index	46927	0.740	1.075	0	4
Fine motor problem index	46935	0.047	0.236	0	3
Cognition	39357	17.020	3.876	0	27

Full-time work → retirement transition	39699	0.104	0.306	0	1
Full-time work → disability transition	39699	0.008	0.087	0	1
Subjective probability working full time after age 62	34674	57.053	36.894	0	100
Subjective probability working full time after age 65	37449	36.661	35.693	0	100
Health limits work	46651	0.078	0.267	0	1
CESD depression score	43876	1.088	1.665	0	8
Moves to a different employer	33158	0.094	0.292	0	1
Does not enjoy going to work	42991	0.121	0.326	0	1

Table 3. Correlations between the O*NET job demands and the HRS resources measures, HRS, Age 50-55, full-time workers

	N	**Correlation**
Dynamic strength vs. no large muscle problem index	16052	-0.056
Finger dexterity vs. no fine motor problem index	16055	-0.030
Memorization vs. Cognition	13233	0.279
Analyzing data vs. cognition	13233	0.274

* Higher values indicate higher job demands and more resources (better health).

Table 4. Mean health limitations, CESD depressive symptoms and subjective probabilities of working full-time after age 65 by the dynamic strength O*NET measures and changes in the HRS large muscle index

Workers' Resources (HRS)	**HIGH job demand for dynamic strength (O*NET) at t**			**LOW job demand for dynamic strength (O*NET) at t**		
Transition in Large Muscle Index		**Fraction with health limitations**			**Fraction with health limitations**	
	N	**t**	**t+1**	**N**	**t**	**t+1**
High → high	7682	0.022	0.033	9737	0.016	0.023
High → low	2736	0.045	0.185	2621	0.035	0.113
Low → high	2127	0.074	0.064	2138	0.066	0.044
Low → low	5771	0.185	0.273	5460	0.153	0.223
All	18316	0.083	0.135	19956	0.061	0.092
Workers' Resources (HRS)	**HIGH job demand for dynamic strength (O*NET) at t**			**LOW job demand for dynamic strength (O*NET) at t**		
Transition in Large Muscle Index		**Mean CESD score**			**Mean CESD score**	
	N	**t**	**t+1**	**N**	**t**	**t+1**
High → high	6771	0.811	0.823	9213	0.626	0.621
High → low	2427	1.157	1.493	2485	0.920	1.111
Low → high	1909	1.285	1.117	2020	1.048	0.829
Low → low	5511	1.841	1.962	5384	1.424	1.491
All	16618	1.257	1.332	19102	0.934	0.952
Workers' Resources (HRS)	**HIGH job demand for dynamic strength (O*NET) at t**			**LOW job demand for dynamic strength (O*NET) at t**		
Transition in Large Muscle Index		**Mean P(work after 65)**			**Mean P(work after 65)**	
	N	**t**	**t+1**	**N**	**t**	**t+1**
High → high	5168	35.4	36.5	7134	38.8	40.2
High → low	1814	33.5	30.1	1855	35.1	35.7
Low → high	1411	30.3	32.1	1563	35.6	37.6
Low → low	3968	30.6	28.7	3909	35.9	35.8
All	13000	32.4	31.9	15176	36.3	37.2

*Sample: HRS, Ages 50 to 70, full-time workers at t and non-missing answers to the three questions at t and t+1. The CESD score is only collected in non-proxy interviews. Subjective probabilities of working are only collected in non-proxy interviews from people younger than age 65. Prior to 2006, the HRS did not ask this question from nonworkers. The values of expectations for the 50-61-year-old nonproxy, nonworkers are imputed with a model described in section 3.3. High and low values of the O*NET and the HRS measures are defined as being above (=high job demands or high individual resources) or below the mean (=low job demands or low individual resources) in the sample of 50-70-year-old full-time workers.

Table 5. Mean health limitations, CESD depressive symptoms and subjective probabilities of working full-time after age 65 by the finger dexterity O*NET measures and changes in the HRS fine motor skill index

Workers' Resources (HRS)	**HIGH job demand for finger dexterity (O*NET) at t**			**LOW job demand for finger dexterity (O*NET) at t**		
Transition in Fine Motor Index	**N**	**Fraction with health limitations**		**N**	**Fraction with health limitations**	
		t	**t+1**		**t**	**t+1**
High → high	15945	0.062	0.098	19347	0.051	0.078
High → low	783	0.194	0.488	655	0.191	0.424
Low → high	442	0.285	0.290	424	0.250	0.241
Low → low	392	0.360	0.497	291	0.364	0.495
All	17562	0.080	0.129	20717	0.064	0.098
Workers' Resources (HRS)	**HIGH job demand for finger dexterity (O*NET) at t**			**LOW job demand for finger dexterity (O*NET) at t**		
Transition in Fine Motor Index	**N**	**Mean CESD score**		**N**	**Mean CESD score**	
		t	**t+1**		**t**	**t+1**
High → high	14383	1.083	1.139	18496	0.920	0.929
High → low	712	2.021	2.605	633	1.912	2.436
Low → high	406	2.283	1.990	413	1.954	1.826
Low → low	386	2.772	2.847	295	2.285	2.356
All	15887	1.197	1.268	19837	0.994	1.017
Workers' Resources (HRS)	**HIGH job demand for finger dexterity (O*NET) at t**			**LOW job demand for finger dexterity (O*NET) at t**		
Transition in Fine Motor Index	**N**	**Mean P (work after 65)**		**N**	**Mean P (work after 65)**	
		t	**t+1**		**t**	**t+1**
High → high	10896	33.9	34.2	13941	36.8	37.6
High → low	506	32.4	26.7	437	32.8	28.5
Low → high	287	29.9	30.2	285	34.8	33.3
Low → low	267	30.2	24.5	205	31.3	29.0
All	12573	33.0	32.9	15604	35.8	36.2

*Sample: HRS, Age 50-70, full-time workers at t and non-missing answers to the three questions at t and t+1. The CESD score is only collected in non-proxy interviews. Subjective probabilities of working are only collected in non-proxy interviews from people younger than age 65. Prior to 2006, the HRS did not ask this question from nonworkers. The values of expectations for the 50-61-year-old non-proxy nonworkers are imputed with a model described in section 3.3. High and low values of the O*NET and the HRS measures are defined as being above (=high job demands or high individual resources) or below the mean (=low job demands or low individual resources) in the sample of 50-70-year-old full-time workers.

Table 6. Mean health limitations, CESD depressive symptoms and subjective probabilities of working full-time after age 65 by the memorization O*NET measures and changes in the HRS cognition score

Workers' Resources (HRS)	**HIGH job demand for memorization (O*NET) at t**			**LOW job demand for memorization (O*NET) at t**		
Transition in Cognition	**N**	**Fraction with health limitations**		**N**	**Fraction with health limitations**	
		t	**t+1**		**t**	**t+1**
High → high	7002	0.053	0.079	3148	0.076	0.107
High → low	2883	0.064	0.108	2141	0.077	0.127
Low → high	2747	0.071	0.091	1955	0.080	0.116
Low → low	4764	0.082	0.115	6509	0.078	0.144
All	17396	0.066	0.096	13753	0.078	0.129
Workers' Resources (HRS)	**HIGH job demand for memorization (O*NET) at t**			**LOW job demand for memorization (O*NET) at t**		
Transition in Cognition	**N**	**Mean CESD score**		**N**	**Mean CESD score**	
		t	**t+1**		**t**	**t+1**
High → high	7084	0.810	0.850	3196	1.013	1.063
High → low	2928	0.935	0.960	2172	1.202	1.245
Low → high	2788	0.915	0.895	1985	1.178	1.190
Low → low	4843	1.170	1.202	6627	1.519	1.590
All	17643	0.946	0.972	13980	1.306	1.359
Workers' Resources (HRS)	**HIGH job demand for memorization (O*NET) at t**			**LOW job demand for memorization (O*NET) at t**		
Transition in Cognition	**N**	**Mean P (work after 65)**		**N**	**Mean P (work after 65)**	
		t	**t+1**		**t**	**t+1**
High → high	5569	38.5	40.0	2467	38.4	38.2
High → low	2201	38.6	39.2	1623	36.4	34.7
Low → high	2168	37.7	39.3	1524	34.7	35.3
Low → low	3556	37.3	37.1	4650	31.4	30.5
All	14043	37.3	38.2	10755	33.8	33.1

*Sample: HRS, Age 50-70, full-time workers at t and non-missing answers to the three questions at t and t+1. The CESD score is only collected in non-proxy interviews. Subjective probabilities of working are only collected in non-proxy interviews from people younger than age 65. Prior to 2006, the HRS did not ask this question from nonworkers. The values of expectations for the 50-61-year-old non-proxy nonworkers are imputed with a model described in section 3.3. High and low values of the O*NET and the HRS measures are defined as being above (=high job demands or high individual resources) or below the mean (=low job demands or low individual resources) in the sample of 50-70-year-old full-time workers.

Table 7. Mean health limitations, CESD depressive symptoms and subjective probabilities of working full-time after age 65 by the analyzing data or information O*NET measures and changes in the HRS cognition score

Workers' Resources (HRS)	HIGH job demand for analyzing data or information (O*NET) at t			LOW job demand for analyzing data or information (O*NET) at t		
Transition in Cognition	N	Fraction with health limitations		N	Fraction with health limitations	
		t	t+1		t	t+1
High → high	6430	0.049	0.073	3720	0.080	0.115
High → low	2515	0.062	0.106	2509	0.077	0.126
Low → high	2360	0.069	0.094	2342	0.080	0.109
Low → low	3763	0.073	0.107	7510	0.083	0.144
All	15068	0.060	0.090	16081	0.081	0.130
Workers' Resources (HRS)	**HIGH job demand for analyzing data or information (O*NET) at t**			**LOW job demand for analyzing data or information (O*NET) at t**		
Transition in Cognition	N	Mean CESD score		N	Mean CESD score	
		t	t+1		t	t+1
High → high	6502	0.799	0.822	3778	1.001	1.079
High → low	2555	0.931	0.951	2545	1.167	1.212
Low → high	2394	0.911	0.877	2379	1.138	1.160
Low → low	3827	1.131	1.170	7643	1.492	1.554
All	15278	0.922	0.939	16345	1.276	1.334
Workers' Resources (HRS)	**HIGH job demand for analyzing data or information (O*NET) at t**			**LOW job demand for analyzing data or information (O*NET) at t**		
Transition in Cognition	N	Mean P (work after 65)		N	Mean P (work after 65)	
		t	t+1		t	t+1
High → high	5123	37.9	39.6	2913	39.4	39.2
High → low	1953	38.1	38.2	1871	37.2	36.4
Low → high	1881	37.1	38.3	1811	35.8	37.0
Low → low	2854	36.7	36.5	5352	32.5	31.7
All	12300	36.8	37.6	12498	34.8	34.4

*Sample: HRS, Age 50-70, full-time workers at t and non-missing answers to the three questions at t and t+1. The CESD score is only collected in non-proxy interviews. Subjective probabilities of working are only collected in non-proxy interviews from people younger than age 65. Prior to 2006, the HRS did not ask this question from nonworkers. The values of expectations for the 50-61-year-old non-proxy nonworkers are imputed with a model described in section 3.3. High and low values of the O*NET and the HRS measures are defined as being above (=high job demands or high individual resources) or below the mean (=low job demands or low individual resources) in the sample of 50-70-year-old full-time workers.

Table 8. OLS regressions of the change in whether health limits working as a function of job demands, resources and their interactions

	Full-time worker at t, interview at t+1				**Full-time worker at t and at t+1**			
	[1]	**[2]**	**[3]**	**[4]**	**[5]**	**[6]**	**[7]**	**[8]**
Large muscle index at t	-0.038				-0.009			
	[0.002]				[0.002]			
	***				***			
Change in large muscle index, R1	-0.075				-0.041			
	[0.003]				[0.002]			
	***				***			
Dynamic strength at t, D1	0.007				0.002			
	[0.001]							
	***				[0.002]			
R1 x D1	-0.012				-0.005			
	[0.003]				[0.002]			
	***				***			
Fine motor index at t		-0.025				-0.009		
		[0.003]				[0.002]		
		***				***		
Change in fine motor index, R2		-0.043				-0.021		
		[0.002]				[0.002]		
		***				***		
Finger dexterity at t, D2		0.005				0.002		
		[0.001]						
		***				[0.002]		
R2 x D2		0.000				0.000		
		[0.002]				[0.002]		
Cognition at t			-0.010	-0.010			-0.001	-0.001
			[0.002]	[0.002]			[0.002]	[0.002]

			***	***				
Change in cognition, R3			-0.010	-0.010			-0.004	-0.004
			[0.002]	[0.002]				
			***	***			[0.002]	[0.002]
Memorization at t, D3			-0.008				-0.003	
			[0.002]					
			***				[0.002]	
R3 x D3			-0.003				-0.001	
			[0.002]				[0.002]	
Analyzing data or information at t, D4				-0.008				-0.003
				[0.002]				[0.002]
				***				*
R3 x D4				0.001				0.001
				[0.002]				[0.002]
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Constant	0.051	0.047	0.048	0.048	0.028	0.025	0.022	0.022
	[0.008]	[0.009]	[0.009]	[0.009]	[0.008]	[0.008]	[0.008]	[0.008]
	***	***	***	***	***	***	***	***
R-squared	0.047	0.028	0.009	0.009	0.017	0.008	0.003	0.003
N	38272	38279	31149	31149	28950	28956	23535	23535

*Sample: HRS, Age 50-70, full-time workers at t and either valid interviews at t+1 (columns 1-4) or full-time workers at t+1 (columns 5-8). Job demands and resources are standardized and higher values indicate higher demands and more resources (better health). Change measures are all defined from wave t to t+1. Robust standard errors clustered on the household id are in brackets. *, **, and *** indicate statistical significance at 10, 5, and 1 percent respectively. Control variables include a set of wave dummies and wave-to-wave changes in the following variables: age, age-50 squared, age-50 cube, marital status, spouse works, log household income, whether household income is positive, log household wealth, whether household wealth is positive. The full output is in the appendix.

Table 9. OLS regressions of the change in the CESD depressive symptoms as a function of job demands, resources and their interactions

	Full-time worker at t, interview at t+1				**Full-time worker at t and at t+1**			
	[1]	**[2]**	**[3]**	**[4]**	**[5]**	**[6]**	**[7]**	**[8]**
Large muscle index at t	-0.042				-0.006			
	[0.009]							
	***				[0.012]			
Change in large muscle index, R1	-0.208				-0.171			
	[0.014]				[0.013]			
	***				***			
Dynamic strength at t, D1	0.014				0.001			
	[0.007]							
	**				[0.010]			
R1 x D1	-0.041				-0.037			
	[0.013]				[0.012]			
	***				***			
Fine motor index at t		-0.030				0.006		
		[0.011]						
		***				[0.013]		
Change in fine motor index, R2		-0.109				-0.080		
		[0.012]				[0.011]		
		***				***		
Finger dexterity at t, D2		0.012				-0.010		
		[0.007]						
		*				[0.010]		
R2 x D2		0.004				0.000		
		[0.012]				[0.010]		
Cognition at t			-0.004	-0.002			0.013	0.014
			[0.010]	[0.010]			[0.013]	[0.013]
Change in cognition, R3			-0.044	-0.043			-0.028	-0.027
			[0.013]	[0.013]			[0.014]	[0.014]

			***	***			**	**
Memorization at t, D3			-0.013				0.001	
			[0.008]				[0.012]	
R3 x D3			0.023				0.009	
			[0.012]					
			**				[0.012]	
Analyzing data or information at								
t, D4				-0.018				-0.001
				[0.008]				
				**				[0.012]
R3 x D4				0.015				0.005
				[0.012]				[0.012]
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Constant	0.024	0.015	0.050	0.050	-0.009	-0.021	0.017	0.017
	[0.047]	[0.047]	[0.048]	[0.048]	[0.048]	[0.048]	[0.049]	[0.049]
R-squared	0.021	0.014	0.010	0.010	0.017	0.012	0.010	0.010
N	35720	35724	31623	31623	26903	26908	23792	23792

*Sample: HRS, Age 50-70, non-proxy, full-time workers at t and either valid interviews at t+1 (columns 1-4) or full-time workers at t+1 (columns 5-8). Job demands and resources are standardized and higher values indicate higher demands and more resources (better health). Change measures are all defined from wave t to t+1. Robust standard errors clustered on the household id are in brackets. *, **, and *** indicate statistical significance at 10, 5, and 1 percent respectively. Control variables include a set of wave dummies and wave-to-wave changes in the following variables: age, age-50 squared, age-50 cube, marital status, spouse works, log household income, whether household income is positive, log household wealth, whether household wealth is positive. The full output is in the appendix.

Table 10. OLS regressions of the change in the subjective probabilities of working full-time after age 65 as a function of job demands, resources and their interactions

	Full-time worker at t, interview at t+1				Full-time worker at t and at t+1			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Large muscle index at t	1.243				0.445			
	[0.166]				[0.241]			
	***				*			
Change in large muscle index, R1	1.916				1.026			
	[0.244]				[0.265]			
	***				***			
Dynamic strength at t, D1	-0.289				-0.156			
	[0.152]							
	*				[0.217]			
R1 x D1	0.818				0.745			
	[0.237]				[0.246]			
	***				***			
Fine motor index at t		1.099				0.578		
		[0.208]				[0.274]		
		***				**		
Change in fine motor index, R2		1.001				0.319		
		[0.197]						
		***				[0.229]		
Finger dexterity at t, D2		-0.038				0.002		
		[0.149]				[0.215]		
R2 x D2		0.119				0.283		
		[0.182]				[0.208]		
Cognition at t			0.65	0.615			0.345	0.333
			[0.221]	[0.219]				
			***	***			[0.287]	[0.287]
Change in cognition, R3			1.046	1.022			0.817	0.817

			[0.271]	[0.269]			[0.287]	[0.287]
			***	***			***	***
Memorization at t, D3			0.486				0.443	
			[0.177]				[0.247]	
			***				*	
R3 x D3			-0.213				-0.047	
			[0.254]				[0.256]	
Analyzing data or information at t, D4				0.576				0.468
				[0.172]				[0.241]
				***				*
R3 x D4				-0.234				-0.164
				[0.245]				[0.255]
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Constant	-2.217	-2.132	-1.982	-1.984	-0.544	-0.484	-0.098	-0.114
	[0.994]	[0.995]	[1.016]	[1.016]				
	**	**	*	*	[0.991]	[0.991]	[1.013]	[1.014]
R-squared	0.008	0.006	0.006	0.006	0.009	0.008	0.009	0.009
N	28176	28177	24798	24798	22043	22044	19447	19447

*Sample: HRS, Age 50-64, non-proxy, full-time workers at t and either valid interviews at t+1 (columns 1-4) or full-time workers at t+1 (columns 5-8). Job demands and resources are standardized and higher values indicate higher demands and more resources (better health). Change measures are all defined from wave t to t+1. Robust standard errors clustered on the household id are in brackets. *, **, and *** indicate statistical significance at 10, 5, and 1 percent respectively. Control variables include a set of wave dummies and wave-to-wave changes in the following variables: age, age-50 squared, age-50 cube, marital status, spouse works, log household income, whether household income is positive, log household wealth, whether household wealth is positive. The full output is in the appendix. Subjective probabilities of working are only collected in non-proxy interviews from people younger than age 65. Prior to 2006, the HRS did not ask this question from nonworkers. The values of expectations for the 50-64-year-old non-proxy nonworkers are imputed (used in columns 1-4 only) with a model described in section 3.3.

Table 11. OLS regressions of the transitions from full-time work to retirement as a function of job demands, resources and their interactions

	[1]	[2]	[3]	[4]
Large muscle index at t	-0.027			
	[0.002]***			
Change in large muscle index, R1	-0.026			
	[0.002]***			
Dynamic strength at t, D1	0.009			
	[0.002]***			
R1 x D1	-0.003			
	[0.002]			
Fine motor index at t		-0.020		
		[0.002]***		
Change in fine motor index, R2		-0.018		
		[0.002]***		
Finger dexterity at t, D2		0.008		
		[0.002]***		
R2 x D2		0.000		
		[0.002]		
Cognition at t			-0.013	-0.013
			[0.002]***	[0.002]***
Change in cognition, R3			-0.008	-0.008
			[0.002]***	[0.002]***
Memorization at t, D3			-0.004	
			[0.002]**	
R3 x D3			-0.001	
			[0.002]	
Analyzing data or information at t, D4				-0.005
				[0.002]**
R3 x D4				-0.001
				[0.002]
Controls	YES	YES	YES	YES
Constant	-0.025	-0.020	-0.035	-0.040

	[0.029]	[0.029]	[0.032]	[0.032]
R-squared	0.087	0.085	0.078	0.078
N	38777	38786	31596	31596

*Sample: HRS, Age 50-70, full-time workers at t and valid interviews at t+1. Job demands and resources are standardized and higher values indicate higher demands and more resources (better health). Change measures are all defined from wave t to t+1. Robust standard errors clustered on the household id are in brackets. *, **, and *** indicate statistical significance at 10, 5, and 1 percent respectively. Control variables include: a cubic function of age, gender, race, education, marital status, spouse works, log household income, whether household income is positive, log household wealth, whether household wealth is positive, having DB/DC pensions, tenure, self-employment status, having health insurance, and a set of wave dummies. The full output is in the appendix.

Appendix: The complete output of the main tables and additional tables

Table 12. Descriptive statistics about the main variables, HRS, Age 50-70, full-time workers, weighted by HRS survey weights

	N	mean	sd	min	max
Age	43759	57.7	4.290	50	70
Female	43759	0.429	0.495	0	1
White	43759	0.852	0.356	0	1
Black	43759	0.090	0.287	0	1
Other race	43759	0.058	0.234	0	1
Hispanic	43759	0.072	0.258	0	1
High school dropout	43759	0.128	0.334	0	1
High school graduate	43759	0.268	0.443	0	1
College dropout	43759	0.267	0.442	0	1
College graduate	43759	0.337	0.473	0	1
Married	43759	0.707	0.455	0	1
Spouse works	43759	0.505	0.500	0	1
Household income	43759	105043	162553	0	13570429
Total household wealth	43759	428069	1142513	-4383000	90648200
Has a DB pension	43759	0.335	0.472	0	1
Has a DC pension	43759	0.440	0.496	0	1
Self employed	43759	0.164	0.370	0	1
Tenure at job, in years	43759	14.139	11.614	0	55
Has health insurance from employer	43759	0.704	0.457	0	1
Has health insurance from spouse	43759	0.150	0.357	0	1
HRS interview wave	43759	7.764	2.981	2	12
Dynamic strength, O*NET	43759	0.168	0.125	0.000	0.562
Finger dexterity, O*NET	43759	0.389	0.099	0.177	0.718
Memorization, O*NET	43759	0.345	0.078	0.104	0.580
Analyzing data or information, O*NET	43759	0.539	0.146	0.157	0.877
Large muscle problem index	43752	0.709	1.059	0	4
Fine motor problem index	43759	0.046	0.236	0	3
Cognition	36900	17.361	3.684	0	27
Full-time work → retirement transition	37105	0.091	0.288	0	1

Full-time work → disability transition	37105	0.006	0.077	0	1
Subjective probability working full time after age 62	31995	60.217	35.878	0	100
Subjective probability working full time after age 65	34771	40.083	35.880	0	100
Health limits work	43484	0.076	0.265	0	1
CESD depression score	40929	1.041	1.640	0	8
Moves to a different employer	30909	0.094	0.292	0	1
Does not enjoy going to work	40140	0.125	0.331	0	1

Table 13. Imputation model used to impute the subjective probabilities of working full-time after age 62 and 65, HRS, Age 50-61 (column 1) and Age 50-64 (column 2), non-proxy, nonworkers in the current wave, full-time workers in the previous wave, reported a positive chance of working in the future, 2006-2014

	pw62	**pw65**
Age - 50 (A)	-0.15	-0.952
	[0.639]	[0.336]***
Age - 50 squared (A2)	-0.004	0.046
	[0.035]	[0.015]***
Age - 50 cube (A3)	2.538	5.644
	[3.533]	[2.353]**
Female (F)	1.419	2.197
	[2.961]	[2.096]
Retired	ref.	ref.
Unemployed (U)	43.224	29.404
	[6.455]***	[5.032]***
Disabled (D)	31.404	16.137
	[11.037]***	[8.899]*
OLF other reason (O)	21.322	20.842
	[9.459]**	[8.277]**
U x A	-1.725	-0.926
	[0.761]**	[0.505]*
D x A	-1.613	-0.428
	[1.403]	[1.042]
O x A	0.38	-0.127
	[1.071]	[0.844]
U x F	-3.087	-2.757
	[4.085]	[3.222]
D x F	-7.553	-10.837
	[7.336]	[6.482]*
O x F	-0.31	-10.054
	[7.302]	[6.176]
Lagged Pr (works after 62)	0.27	

	[0.027]***	
Lagged Pr(works after 65)		0.298
		[0.023]***
Constant	1.349	-3.941
	[7.623]	[6.183]
R-squared	0.323	0.256
N	977	1328

Table 14. OLS regressions of the change in whether health limits working as a function of job demands, resources and their interactions

	Full-time worker at t, interview at t+1				Full-time worker at t and at t+1			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Large muscle index at t	-0.038				-0.009			
	[0.002]***				[0.002]***			
Change in large muscle index, R1	-0.075				-0.041			
	[0.003]***				[0.002]***			
Dynamic strength at t, D1	0.007				0.002			
	[0.001]***				[0.002]			
R1 x D1	-0.012				-0.005			
	[0.003]***				[0.002]***			
Fine motor index at t		-0.025				-0.009		
		[0.003]***				[0.002]***		
Change in fine motor index, R2		-0.043				-0.021		
		[0.002]***				[0.002]***		
Finger dexterity at t, D2		0.005				0.002		
		[0.001]***				[0.002]		
R2 x D2		0.000				0.000		
		[0.002]				[0.002]		
Cognition at t			-0.010	-0.010			-0.001	-0.001
			[0.002]***	[0.002]***			[0.002]	[0.002]
Change in cognition, R3			-0.010	-0.010			-0.004	-0.004
			[0.002]***	[0.002]***			[0.002]	[0.002]
Memorization at t, D3			-0.008				-0.003	

			[0.002]***				[0.002]	
R3 x D3			-0.003				-0.001	
			[0.002]				[0.002]	
Analyzing data or information at t, D4				-0.008				-0.003
				[0.002]***				[0.002]*
R3 x D4				0.001				0.001
				[0.002]				[0.002]
Change in age	-0.019	-0.017	-0.021	-0.021	-0.014	-0.013	-0.012	-0.012
	[0.005]***	[0.005]***	[0.005]***	[0.005]***	[0.005]***	[0.005]***	[0.005]**	[0.005]**
Change in age - 50 squared	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000
	[0.000]*	[0.000]*	[0.000]***	[0.000]***	[0.000]	[0.000]	[0.000]	[0.000]
Change in age - 50 cube	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Change in married	0.014	0.010	0.014	0.014	-0.003	-0.005	-0.004	-0.004
	[0.010]	[0.010]	[0.011]	[0.011]	[0.010]	[0.010]	[0.011]	[0.011]
Change in spouse works	0.001	0.002	0.001	0.001	0.001	0.001	0.000	0.000
	[0.005]	[0.005]	[0.005]	[0.005]	[0.005]	[0.005]	[0.005]	[0.005]
Change in log household income	-0.019	-0.019	-0.021	-0.021	-0.002	-0.001	-0.002	-0.002
	[0.003]***	[0.003]***	[0.003]***	[0.003]***	[0.003]	[0.003]	[0.003]	[0.003]
Change in positive household income	-0.010	-0.007	-0.010	-0.010	-0.031	-0.027	-0.024	-0.025
	[0.020]	[0.021]	[0.023]	[0.023]	[0.018]*	[0.018]	[0.020]	[0.020]
Change in log household wealth	-0.001	-0.001	0.000	0.000	0.001	0.001	0.001	0.001
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Change in household wealth positive	0.000	-0.003	-0.003	-0.003	-0.018	-0.019	-0.015	-0.015

	[0.022]	[0.023]	[0.025]	[0.025]	[0.019]	[0.020]	[0.021]	[0.021]
1994 wave	0.014	0.010			0.011	0.009		
	[0.007]*	[0.007]			[0.007]*	[0.007]		
1996 wave	-0.006	-0.005	-0.002	-0.002	-0.003	-0.001	0.001	0.001
	[0.007]	[0.008]	[0.008]	[0.008]	[0.007]	[0.007]	[0.007]	[0.007]
1998 wave	0.004	0.005	0.009	0.009	0.000	0.001	0.002	0.002
	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]
2000 wave	-0.006	-0.002	0.005	0.005	-0.002	0.001	0.005	0.004
	[0.007]	[0.007]	[0.008]	[0.008]	[0.007]	[0.007]	[0.008]	[0.008]
2002 wave	0.051	0.054	0.059	0.059	0.047	0.049	0.051	0.051
	[0.007]***	[0.007]***	[0.008]***	[0.008]***	[0.008]***	[0.008]***	[0.008]***	[0.008]***
2004 wave	-0.010	-0.006	0.000	0.000	-0.007	-0.004	-0.001	-0.001
	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]
2006 wave	-0.015	-0.014	-0.012	-0.012	-0.005	-0.005	-0.005	-0.005
	[0.007]**	[0.007]*	[0.008]	[0.008]	[0.007]	[0.007]	[0.008]	[0.008]
2008 wave	0.012	0.017	0.025	0.025	0.007	0.009	0.013	0.013
	[0.009]	[0.009]*	[0.009]***	[0.009]***	[0.008]	[0.008]	[0.008]	[0.008]
2010 wave	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
2012 wave	-0.005	-0.003	0.002	0.002	-0.003	-0.002	0.002	0.002
	[0.008]	[0.008]	[0.008]	[0.008]	[0.007]	[0.007]	[0.007]	[0.007]
Constant	0.051	0.047	0.048	0.048	0.028	0.025	0.022	0.022
	[0.008]***	[0.009]***	[0.009]***	[0.009]***	[0.008]***	[0.008]***	[0.008]***	[0.008]***
R-squared	0.047	0.028	0.009	0.009	0.017	0.008	0.003	0.003
N	38272	38279	31149	31149	28950	28956	23535	23535

*Sample: HRS, Age 50-70, full-time workers at t and either valid interviews at t+1 (columns 1-4) or full-time workers at t+1 (columns 5-8). Job demands and resources are standardized and higher values indicate higher demands and more resources (better health). Change measures are all defined from wave t to t+1. Robust standard errors clustered on the household id are in brackets. *, **, and *** indicate statistical significance at 10, 5, and 1 percent respectively.

Table 15. OLS regressions of the change in the CESD depressive symptoms as a function of job demands, resources and their interactions

	Full-time worker at t, interview at t+1				Full-time worker at t and at t+1			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Large muscle index at t	-0.042				-0.006			
	[0.009]***				[0.012]			
Change in large muscle index, R1	-0.208				-0.171			
	[0.014]***				[0.013]***			
Dynamic strength at t, D1	0.014				0.001			
	[0.007]**				[0.010]			
R1 x D1	-0.041				-0.037			
	[0.013]***				[0.012]***			
Fine motor index at t		-0.030				0.006		
		[0.011]***				[0.013]		
Change in fine motor index, R2		-0.109				-0.080		
		[0.012]***				[0.011]***		
Finger dexterity at t, D2		0.012				-0.010		
		[0.007]*				[0.010]		
R2 x D2		0.004				0.000		
		[0.012]				[0.010]		
Cognition at t			-0.004	-0.002			0.013	0.014
			[0.010]	[0.010]			[0.013]	[0.013]
Change in cognition, R3			-0.044	-0.043			-0.028	-0.027
			[0.013]***	[0.013]***			[0.014]**	[0.014]**

Memorization at t, D3			-0.013				0.001	
			[0.008]				[0.012]	
R3 x D3			0.023				0.009	
			[0.012]**				[0.012]	
Analyzing data or information at t, D4				-0.018				-0.001
				[0.008]**				[0.012]
R3 x D4				0.015				0.005
				[0.012]				[0.012]
Change in age	0.031	0.037	0.022	0.022	0.026	0.031	0.014	0.014
	[0.027]	[0.027]	[0.028]	[0.028]	[0.029]	[0.029]	[0.030]	[0.030]
Change in age - 50 squared	-0.002	-0.001	-0.001	-0.001	-0.001	0.000	-0.001	-0.001
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]
Change in age - 50 cube	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Change in married	-0.445	-0.452	-0.451	-0.451	-0.462	-0.467	-0.450	-0.450
	[0.065]***	[0.066]***	[0.069]***	[0.069]***	[0.058]***	[0.058]***	[0.061]***	[0.061]***
Change in spouse works	-0.038	-0.036	-0.032	-0.032	-0.048	-0.047	-0.039	-0.039
	[0.028]	[0.028]	[0.030]	[0.030]	[0.029]*	[0.029]	[0.031]	[0.031]
Change in log household income	-0.045	-0.046	-0.049	-0.050	-0.040	-0.038	-0.035	-0.035
	[0.016]***	[0.016]***	[0.017]***	[0.017]***	[0.016]**	[0.016]**	[0.017]**	[0.017]**
Change in positive household income	0.226	0.241	0.248	0.250	0.249	0.281	0.263	0.264
	[0.125]*	[0.128]*	[0.141]*	[0.141]*	[0.110]**	[0.110]**	[0.117]**	[0.117]**
Change in log household wealth	-0.014	-0.014	-0.006	-0.006	-0.013	-0.013	-0.007	-0.007
	[0.007]*	[0.007]*	[0.007]	[0.007]	[0.006]**	[0.006]**	[0.007]	[0.007]

Change in household wealth positive	0.155	0.148	0.011	0.011	0.190	0.182	0.078	0.079
	[0.133]	[0.133]	[0.140]	[0.140]	[0.117]	[0.117]	[0.124]	[0.124]
1994 wave	0.028	0.015			-0.005	-0.017		
	[0.037]	[0.038]			[0.041]	[0.042]		
1996 wave	0.279	0.284	0.290	0.290	0.274	0.284	0.286	0.286
	[0.039]***	[0.039]***	[0.039]***	[0.039]***	[0.043]***	[0.043]***	[0.044]***	[0.044]***
1998 wave	-0.073	-0.067	-0.073	-0.073	-0.056	-0.051	-0.054	-0.054
	[0.038]*	[0.038]*	[0.038]*	[0.038]*	[0.041]	[0.041]	[0.041]	[0.041]
2000 wave	-0.121	-0.108	-0.101	-0.101	-0.123	-0.110	-0.103	-0.103
	[0.039]***	[0.040]***	[0.040]**	[0.040]**	[0.045]***	[0.045]**	[0.045]**	[0.045]**
2002 wave	-0.150	-0.139	-0.139	-0.140	-0.149	-0.145	-0.144	-0.145
	[0.042]***	[0.042]***	[0.042]***	[0.042]***	[0.047]***	[0.047]***	[0.048]***	[0.048]***
2004 wave	0.077	0.093	0.099	0.100	0.068	0.080	0.086	0.086
	[0.039]**	[0.039]**	[0.039]**	[0.039]**	[0.042]	[0.043]*	[0.043]**	[0.043]**
2006 wave	-0.158	-0.158	-0.158	-0.158	-0.156	-0.157	-0.157	-0.157
	[0.041]***	[0.041]***	[0.041]***	[0.041]***	[0.044]***	[0.044]***	[0.044]***	[0.044]***
2008 wave	-0.077	-0.066	-0.056	-0.056	-0.103	-0.093	-0.086	-0.086
	[0.046]*	[0.046]	[0.046]	[0.046]	[0.049]**	[0.049]*	[0.049]*	[0.049]*
2010 wave	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.

2012 wave	-0.116	-0.107	-0.112	-0.112	-0.142	-0.135	-0.139	-0.139
	[0.043]***	[0.043]**	[0.043]***	[0.043]***	[0.041]***	[0.041]***	[0.041]***	[0.041]***
Constant	0.024	0.015	0.050	0.050	-0.009	-0.021	0.017	0.017
	[0.047]	[0.047]	[0.048]	[0.048]	[0.048]	[0.048]	[0.049]	[0.049]
R-squared	0.021	0.014	0.010	0.010	0.017	0.012	0.010	0.010
N	35720	35724	31623	31623	26903	26908	23792	23792

*Sample: HRS, Age 50-70, non-proxy, full-time workers at t and either valid interviews at t+1 (columns 1-4) or full-time workers at t+1 (columns 5-8). Job demands and resources are standardized and higher values indicate higher demands and more resources (better health). Change measures are all defined from wave t to t+1. Robust standard errors clustered on the household id are in brackets. *, **, and *** indicate statistical significance at 10, 5, and 1% respectively.

Table 16. OLS regressions of the change in the subjective probabilities of working full-time after age 65 as a function of job demands, resources and their interactions

	Full-time worker at t, interview at t+1				**Full-time worker at t and at t+1**			
	[1]	**[2]**	**[3]**	**[4]**	**[5]**	**[6]**	**[7]**	**[8]**
Large muscle index at t	1.243				0.445			
	[0.166]***				[0.241]*			
Change in large muscle index, R1	1.916				1.026			
	[0.244]***				[0.265]***			
Dynamic strength at t, D1	-0.289				-0.156			
	[0.152]*				[0.217]			
R1 x D1	0.818				0.745			
	[0.237]***				[0.246]***			
Fine motor index at t		1.099				0.578		
		[0.208]***				[0.274]**		
Change in fine motor index, R2		1.001				0.319		
		[0.197]***				[0.229]		
Finger dexterity at t, D2		-0.038				0.002		
		[0.149]				[0.215]		
R2 x D2		0.119				0.283		
		[0.182]				[0.208]		

Cognition at t			0.65	0.615			0.345	0.333
			[0.221]***	[0.219]***			[0.287]	[0.287]
Change in cognition, R3			1.046	1.022			0.817	0.817
			[0.271]***	[0.269]***			[0.287]***	[0.287]***
Memorization at t, D3			0.486				0.443	
			[0.177]***				[0.247]*	
R3 x D3			-0.213				-0.047	
			[0.254]				[0.256]	
Analyzing data or information at t, D4				0.576				0.468
				[0.172]***				[0.241]*
R3 x D4				-0.234				-0.164
				[0.245]				[0.255]
Change in age	1.014	0.950	0.786	0.788	0.695	0.661	0.335	0.336
	[0.594]*	[0.595]	[0.622]	[0.622]	[0.657]	[0.657]	[0.688]	[0.688]
Change in age - 50 squared	-0.078	-0.075	-0.079	-0.079	-0.204	-0.202	-0.191	-0.191
	[0.063]	[0.063]	[0.066]	[0.066]	[0.075]***	[0.075]***	[0.079]**	[0.079]**
Change in age - 50 cube	0.004	0.004	0.005	0.005	0.016	0.015	0.015	0.015
	[0.003]	[0.003]	[0.003]	[0.003]	[0.004]***	[0.004]***	[0.004]***	[0.004]***
Change in married	-1.921	-1.815	-1.783	-1.789	-1.878	-1.851	-1.547	-1.562
	[1.188]	[1.192]	[1.276]	[1.277]	[1.180]	[1.180]	[1.251]	[1.251]
Change in spouse works	-0.19	-0.23	-0.365	-0.36	-0.09	-0.097	-0.116	-0.105
	[0.587]	[0.587]	[0.630]	[0.630]	[0.614]	[0.614]	[0.656]	[0.656]

Change in log household income	0.336	0.358	0.553	0.556	-0.38	-0.384	-0.21	-0.215
	[0.310]	[0.311]	[0.331]*	[0.331]*	[0.337]	[0.337]	[0.358]	[0.358]
Change in positive household income	2.661	2.693	3.633	3.61	1.923	1.85	2.27	2.316
	[2.572]	[2.587]	[2.742]	[2.745]	[2.472]	[2.474]	[2.615]	[2.615]
Change in log household wealth	-0.081	-0.084	-0.045	-0.048	-0.168	-0.168	-0.142	-0.145
	[0.136]	[0.136]	[0.143]	[0.143]	[0.130]	[0.130]	[0.137]	[0.137]
Change in household wealth positive	1.023	1.103	0.161	0.201	2.401	2.415	1.637	1.697
	[2.589]	[2.594]	[2.735]	[2.737]	[2.458]	[2.459]	[2.587]	[2.587]
1994 wave	1.396	1.433			1.598	1.592		
	[0.740]*	[0.741]*			[0.851]*	[0.851]*		
1996 wave	-0.555	-0.586	-0.83	-0.803	-0.669	-0.718	-0.829	-0.809
	[0.791]	[0.793]	[0.795]	[0.795]	[0.911]	[0.911]	[0.916]	[0.916]
1998 wave	1.982	1.935	1.906	1.905	1.89	1.852	1.862	1.864
	[0.744]***	[0.745]***	[0.746]**	[0.746]**	[0.848]**	[0.848]**	[0.852]**	[0.851]**
2000 wave	-0.543	-0.662	-0.87	-0.867	-0.625	-0.722	-0.776	-0.761
	[0.816]	[0.816]	[0.817]	[0.817]	[0.949]	[0.949]	[0.953]	[0.953]
2002 wave	5.301	5.17	4.94	4.942	5.28	5.246	5.131	5.14
	[0.885]***	[0.885]***	[0.887]***	[0.887]***	[0.993]***	[0.993]***	[0.996]***	[0.996]***
2004 wave	1.045	0.908	0.723	0.711	1.68	1.624	1.513	1.513
	[0.820]	[0.821]	[0.820]	[0.821]	[0.869]*	[0.869]*	[0.872]*	[0.872]*
2006 wave	4.803	4.78	4.633	4.632	5.203	5.188	5.119	5.116
	[0.852]***	[0.853]***	[0.852]***	[0.852]***	[0.909]***	[0.909]***	[0.911]***	[0.911]***

2008 wave	-1.799	-1.891	-2.034	-2.017	-1.285	-1.344	-1.352	-1.331
	[1.001]*	[1.002]*	[1.005]**	[1.005]**	[1.012]	[1.012]	[1.016]	[1.016]
2010 wave	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
2012 wave	1.511	1.467	1.253	1.257	0.693	0.646	0.427	0.428
	[0.847]*	[0.848]*	[0.848]	[0.848]	[0.829]	[0.829]	[0.833]	[0.833]
Constant	-2.217	-2.132	-1.982	-1.984	-0.544	-0.484	-0.098	-0.114
	[0.994]**	[0.995]**	[1.016]*	[1.016]*	[0.991]	[0.991]	[1.013]	[1.014]
R-squared	0.008	0.006	0.006	0.006	0.009	0.008	0.009	0.009
N	28176	28177	24798	24798	22043	22044	19447	19447

*Sample: HRS, Age 50-64, non-proxy, full-time workers at t and either valid interviews at t+1 (columns 1-4) or full-time workers at t+1 (columns 5-8). Job demands and resources are standardized and higher values indicate higher demands and more resources (better health). Change measures are all defined from wave t to t+1. Robust standard errors clustered on the household id are in brackets. *, **, and *** indicate statistical significance at 10, 5, and 1 percent respectively. Subjective probabilities of working are only collected in non-proxy interviews from people younger than age 65. Prior to 2006, the HRS did not ask this question from nonworkers. The values of expectations for the 50-64-year-old non-proxy nonworkers are imputed (used in columns 1-4 only) with a model described in section 3.3.

Table 17. OLS regressions of the transitions from full-time work to retirement as a function of job demands, resources and their interactions

	[1]	[2]	[3]	[4]
Large muscle index at t	-0.027			
	[0.002]***			
Change in large muscle index, R1	-0.026			
	[0.002]***			
Dynamic strength at t, D1	0.009			
	[0.002]***			
R1 x D1	-0.003			
	[0.002]			
Fine motor index at t		-0.020		
		[0.002]***		
Change in fine motor index, R2		-0.018		
		[0.002]***		
Finger dexterity at t, D2		0.008		
		[0.002]***		
R2 x D2		0.000		
		[0.002]		
Cognition at t			-0.013	-0.013
			[0.002]***	[0.002]***
Change in cognition, R3			-0.008	-0.008
			[0.002]***	[0.002]***
Memorization at t, D3			-0.004	
			[0.002]**	
R3 x D3			-0.001	
			[0.002]	
Analyzing data or information at t, D4				-0.005
				[0.002]**
R3 x D4				-0.001
				[0.002]
Age - 50	-0.025	-0.025	-0.022	-0.022
	[0.002]***	[0.002]***	[0.003]***	[0.003]***

Age - 50, squared	0.006	0.006	0.005	0.005
	[0.000]***	[0.000]***	[0.000]***	[0.000]***
Age - 50, cube	0.000	0.000	0.000	0.000
	[0.000]***	[0.000]***	[0.000]***	[0.000]***
Female	-0.001	0.003	0.005	0.004
	[0.003]	[0.003]	[0.003]	[0.003]
White	0.000	-0.001	0.002	0.002
	[0.006]	[0.006]	[0.007]	[0.007]
Black	0.009	0.008	0.008	0.008
	[0.007]	[0.007]	[0.008]	[0.008]
Other race	ref.	ref.	ref.	ref.
Hispanic	-0.012	-0.014	-0.014	-0.014
	[0.006]**	[0.006]**	[0.006]**	[0.006]**
Less than high school	0.031	0.039	0.034	0.034
	[0.006]***	[0.006]***	[0.007]***	[0.007]***
High school	0.023	0.029	0.029	0.029
	[0.004]***	[0.004]***	[0.005]***	[0.005]***
Some college	0.020	0.024	0.024	0.024
	[0.004]***	[0.004]***	[0.004]***	[0.004]***
College graduate	ref.	ref.	ref.	ref.
Married	0.012	0.014	0.016	0.016
	[0.004]***	[0.004]***	[0.005]***	[0.005]***
Spouse works	-0.027	-0.026	-0.028	-0.029
	[0.004]***	[0.004]***	[0.004]***	[0.004]***
Log household income	0.003	0.001	0.002	0.003
	[0.002]	[0.002]	[0.003]	[0.003]
Positive household income	0.002	0.008	0.008	0.006
	[0.019]	[0.020]	[0.021]	[0.021]
Log household wealth	0.004	0.003	0.003	0.003
	[0.001]***	[0.001]***	[0.001]***	[0.001]***
Household wealth positive	-0.046	-0.035	-0.040	-0.041
	[0.016]***	[0.016]**	[0.018]**	[0.018]**

Has a DB pension	0.052	0.052	0.053	0.053
	[0.004]***	[0.004]***	[0.004]***	[0.004]***
Has a DC pension	-0.008	-0.010	-0.009	-0.009
	[0.003]**	[0.003]***	[0.004]**	[0.004]**
Self employed	-0.049	-0.049	-0.046	-0.046
	[0.005]***	[0.005]***	[0.005]***	[0.005]***
Tenure at job, in years	0.001	0.001	0.001	0.001
	[0.000]***	[0.000]***	[0.000]***	[0.000]***
Tenure missing	0.035	0.033	0.026	0.024
	[0.019]*	[0.019]*	[0.023]	[0.023]
Has health insurance from employer	-0.004	-0.003	-0.002	-0.002
	[0.004]	[0.004]	[0.005]	[0.005]
Has health insurance from spouse	0.017	0.016	0.017	0.017
	[0.005]***	[0.005]***	[0.006]***	[0.006]***
1994 wave	0.026	0.024		
	[0.006]***	[0.006]***		
1996 wave	0.019	0.017	0.021	0.021
	[0.006]***	[0.006]***	[0.007]***	[0.007]***
1998 wave	0.019	0.017	0.020	0.020
	[0.006]***	[0.006]***	[0.006]***	[0.006]***
2000 wave	0.032	0.033	0.035	0.035
	[0.007]***	[0.007]***	[0.007]***	[0.007]***
2002 wave	0.003	0.004	0.012	0.012
	[0.007]	[0.007]	[0.007]	[0.007]
2004 wave	0.013	0.014	0.017	0.017
	[0.006]**	[0.006]**	[0.006]***	[0.006]***
2006 wave	-0.007	-0.006	-0.004	-0.004
	[0.006]	[0.006]	[0.006]	[0.006]
2008 wave	0.017	0.019	0.023	0.023
	[0.007]**	[0.007]***	[0.007]***	[0.007]***
2010 wave	ref.	ref.	ref.	ref.

2012 wave	0.000	0.001	0.002	0.002
	[0.006]	[0.006]	[0.006]	[0.006]
Constant	-0.025	-0.020	-0.035	-0.040
	[0.029]	[0.029]	[0.032]	[0.032]
R-squared	0.087	0.085	0.078	0.078
N	38777	38786	31596	31596

*Sample: HRS, Age 50-70, full-time workers at t and valid interviews at t+1. Job demands and resources are standardized and higher values indicate higher demands and more resources (better health). Change measures are all defined from wave t to t+1. Robust standard errors clustered on the household id are in brackets. *, **, and *** indicate statistical significance at 10, 5, and 1 percent respectively.

Table 18. OLS regressions of the change in disliking to work as a function of job demands, resources and their interactions

	Full-time worker at t, any work at t+1				Full-time worker at t and at t+1			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Large muscle index at t	-0.001				-0.002			
	[0.002]				[0.002]			
Change in large muscle index, R1	-0.007				-0.007			
	[0.003]**				[0.003]***			
Dynamic strength at t, D1	-0.002				-0.002			
	[0.002]				[0.002]			
R1 x D1	0.002				0.003			
	[0.003]				[0.002]			
Fine motor index at t		-0.004				-0.005		
		[0.002]*				[0.003]*		
Change in fine motor index, R2		-0.007				-0.007		
		[0.002]***				[0.002]***		
Finger dexterity at t, D2		-0.002				-0.001		
		[0.001]				[0.002]		
R2 x D2		0.000				0.000		
		[0.002]				[0.002]		
Cognition at t			0.003	0.002			0.005	0.004
			[0.002]	[0.002]			[0.003]*	[0.003]
Change in cognition, R3			0.003	0.003			0.004	0.004
			[0.003]	[0.003]			[0.003]	[0.003]

Memorization at t, D3			-0.001				-0.002	
			[0.002]				[0.002]	
R3 x D3			0.000				0.000	
			[0.002]				[0.002]	
Analyzing data or information at t, D4				0.002				0.000
				[0.002]				[0.002]
R3 x D4				0.001				0.000
				[0.003]				[0.002]
Change in age	0.011	0.011	0.010	0.010	0.011	0.011	0.010	0.010
	[0.006]*	[0.006]*	[0.006]*	[0.006]*	[0.006]*	[0.006]*	[0.006]	[0.006]
Change in age - 50 squared	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]	[0.001]
Change in age - 50 cube	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Change in married	0.000	0.000	0.006	0.006	-0.002	-0.002	0.003	0.003
	[0.012]	[0.012]	[0.013]	[0.013]	[0.012]	[0.012]	[0.013]	[0.013]
Change in spouse works	0.012	0.012	0.011	0.011	0.011	0.011	0.010	0.010
	[0.006]*	[0.006]*	[0.006]*	[0.006]*	[0.006]*	[0.006]*	[0.007]	[0.007]
Change in log household income	0.002	0.002	0.002	0.002	-0.002	-0.002	-0.002	-0.002
	[0.004]	[0.004]	[0.004]	[0.004]	[0.003]	[0.003]	[0.003]	[0.003]
Change in positive household income	-0.021	-0.021	-0.022	-0.022	-0.021	-0.021	-0.024	-0.024
	[0.025]	[0.025]	[0.027]	[0.027]	[0.024]	[0.024]	[0.024]	[0.024]

Change in log household wealth	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Change in household wealth positive	-0.023	-0.023	-0.027	-0.027	-0.019	-0.019	-0.024	-0.024
	[0.027]	[0.027]	[0.028]	[0.028]	[0.025]	[0.025]	[0.026]	[0.026]
1994 wave	0.003	0.003			0.009	0.008		
	[0.009]	[0.009]			[0.009]	[0.009]		
1996 wave	-0.001	-0.001	-0.002	-0.002	0.004	0.005	0.003	0.004
	[0.009]	[0.009]	[0.009]	[0.009]	[0.009]	[0.009]	[0.009]	[0.009]
1998 wave	0.002	0.002	0.001	0.002	0.007	0.007	0.006	0.007
	[0.008]	[0.008]	[0.008]	[0.008]	[0.009]	[0.009]	[0.009]	[0.009]
2000 wave	-0.022	-0.022	-0.023	-0.022	-0.012	-0.011	-0.012	-0.012
	[0.009]**	[0.009]**	[0.009]***	[0.009]**	[0.009]	[0.009]	[0.009]	[0.009]
2002 wave	0.005	0.006	0.005	0.005	0.011	0.011	0.010	0.010
	[0.009]	[0.009]	[0.009]	[0.009]	[0.010]	[0.010]	[0.010]	[0.010]
2004 wave	-0.002	-0.002	-0.002	-0.002	0.000	0.001	0.000	0.000
	[0.008]	[0.008]	[0.008]	[0.008]	[0.009]	[0.009]	[0.009]	[0.009]
2006 wave	-0.011	-0.011	-0.011	-0.011	-0.005	-0.005	-0.006	-0.006
	[0.008]	[0.008]	[0.009]	[0.009]	[0.009]	[0.009]	[0.009]	[0.009]
2008 wave	-0.003	-0.003	-0.003	-0.003	0.001	0.002	0.001	0.001
	[0.010]	[0.010]	[0.010]	[0.010]	[0.010]	[0.010]	[0.010]	[0.010]
2010 wave	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.

2012 wave	-0.001	-0.001	-0.002	-0.002	0.003	0.003	0.002	0.002
	[0.009]	[0.009]	[0.009]	[0.009]	[0.009]	[0.009]	[0.009]	[0.009]
Constant	-0.007	-0.008	-0.008	-0.008	-0.010	-0.010	-0.010	-0.010
	[0.010]	[0.010]	[0.010]	[0.010]	[0.010]	[0.010]	[0.010]	[0.010]
R-squared	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
N	29818	29823	26863	26863	26307	26311	23639	23639

*Sample: HRS, Age 50-70, non-proxy, full-time workers at t and either full or part-time workers at t+1 (columns 1-4) or only full-time workers at t+1 (columns 5-8). Disliking to work is defined as disagreeing or strongly disagreeing with the statement that "I really enjoy going to work." Job demands and resources are standardized and higher values indicate higher demands and more resources (better health). Change measures are all defined from wave t to t+1. Robust standard errors clustered on the household id are in brackets. *, **, and *** indicate statistical significance at 10, 5, and 1 percent respectively.

Table 19. OLS regressions of the change in the subjective probabilities of working full-time after age 62 as a function of job demands, resources and their interactions

	Full-time worker at t, interview at t+1				**Full-time worker at t and at t+1**			
	[1]	**[2]**	**[3]**	**[4]**	**[5]**	**[6]**	**[7]**	**[8]**
Large muscle index at t	1.506				0.347			
	[0.211]***				[0.271]			
Change in large muscle index, R1	2.004				0.578			
	[0.294]***				[0.297]*			
Dynamic strength at t, D1	-0.633				-0.466			
	[0.180]***				[0.244]*			
R1 x D1	0.653				0.455			
	[0.286]**				[0.275]*			
Fine motor index at t		1.441				0.544		
		[0.252]***				[0.310]*		
Change in fine motor index, R2		1.336				0.398		
		[0.242]***				[0.255]		
Finger dexterity at t, D2		-0.366				-0.388		
		[0.180]**				[0.241]		
R2 x D2		0.268				0.475		
		[0.228]				[0.233]**		
Cognition at t			1.053	1.051			0.662	0.651
			[0.264]***	[0.264]***			[0.318]**	[0.318]**
Change in cognition, R3			1.359	1.361			1.268	1.263
			[0.324]***	[0.323]***			[0.319]***	[0.319]***

Memorization at t, D3			0.37				0.179	
			[0.214]*				[0.275]	
R3 x D3			-0.003				0.135	
			[0.286]				[0.285]	
Analyzing data or information at t, D4				0.379				0.208
				[0.205]*				[0.269]
R3 x D4				0.196				0.144
				[0.284]				[0.283]
Change in age	0.690	0.617	0.449	0.448	0.439	0.413	0.107	0.108
	[0.717]	[0.719]	[0.747]	[0.747]	[0.771]	[0.770]	[0.798]	[0.798]
Change in age - 50 squared	-0.144	-0.141	-0.091	-0.090	-0.221	-0.220	-0.154	-0.154
	[0.094]	[0.094]	[0.098]	[0.098]	[0.104]**	[0.104]**	[0.109]	[0.109]
Change in age - 50 cube	0.012	0.012	0.009	0.009	0.023	0.022	0.018	0.018
	[0.005]**	[0.005]**	[0.005]	[0.005]	[0.006]***	[0.006]***	[0.006]***	[0.006]***
Change in married	-2.616	-2.487	-1.953	-1.950	-2.148	-2.114	-1.221	-1.223
	[1.283]**	[1.294]*	[1.368]	[1.369]	[1.306]	[1.306]	[1.368]	[1.368]
Change in spouse works	0.726	0.723	0.516	0.523	0.477	0.495	0.362	0.368
	[0.670]	[0.669]	[0.710]	[0.710]	[0.688]	[0.689]	[0.730]	[0.730]
Change in log household income	0.323	0.332	0.46	0.463	-0.615	-0.626	-0.385	-0.386
	[0.367]	[0.367]	[0.389]	[0.389]	[0.377]	[0.377]*	[0.396]	[0.396]
Change in positive household income	4.696	4.71	5.834	5.872	2.008	1.956	3.357	3.409
	[3.156]	[3.161]	[3.254]*	[3.256]*	[2.754]	[2.754]	[2.891]	[2.891]

Change in log household wealth	-0.134	-0.132	-0.099	-0.102	-0.214	-0.213	-0.206	-0.208
	[0.152]	[0.153]	[0.159]	[0.159]	[0.145]	[0.145]	[0.150]	[0.150]
Change in household wealth positive	2.983	2.917	2.101	2.137	3.993	3.97	3.702	3.74
	[2.871]	[2.881]	[2.986]	[2.989]	[2.727]	[2.726]	[2.838]	[2.838]
1994 wave	0.106	0.188			-0.09	-0.068		
	[0.874]	[0.875]			[0.934]	[0.935]		
1996 wave	0.114	0.135	-0.229	-0.223	-0.501	-0.512	-0.734	-0.73
	[0.949]	[0.951]	[0.959]	[0.959]	[0.998]	[0.998]	[0.989]	[0.990]
1998 wave	1.652	1.646	1.524	1.528	1.053	1.057	1.037	1.041
	[0.863]*	[0.863]*	[0.867]*	[0.866]*	[0.938]	[0.938]	[0.930]	[0.930]
2000 wave	-0.139	-0.203	-0.493	-0.49	-0.944	-0.972	-1.083	-1.077
	[0.937]	[0.937]	[0.938]	[0.938]	[1.048]	[1.047]	[1.037]	[1.037]
2002 wave	2.135	2.016	1.756	1.752	1.896	1.911	1.793	1.785
	[1.036]**	[1.037]*	[1.042]*	[1.041]*	[1.186]	[1.185]	[1.172]	[1.172]
2004 wave	0.473	0.382	0.084	0.079	0.972	0.995	0.783	0.785
	[0.916]	[0.917]	[0.917]	[0.917]	[0.993]	[0.993]	[0.981]	[0.981]
2006 wave	5.743	5.776	5.574	5.567	5.626	5.665	5.528	5.519
	[0.946]***	[0.945]***	[0.947]***	[0.946]***	[1.042]***	[1.042]***	[1.030]***	[1.030]***
2008 wave	-4.268	-4.278	-4.464	-4.45	-3.865	-3.883	-3.897	-3.891
	[1.134]***	[1.133]***	[1.141]***	[1.141]***	[1.184]***	[1.183]***	[1.171]***	[1.171]***
2010 wave	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.

2012 wave	0.847	0.822	0.688	0.688	0.145	0.104	0.035	0.031
	[0.956]	[0.956]	[0.957]	[0.958]	[0.958]	[0.958]	[0.949]	[0.949]
Constant	-1.321	-1.204	-1.237	-1.246	0.375	0.428	0.544	0.531
	[1.073]	[1.075]	[1.097]	[1.098]	[1.113]	[1.113]	[1.124]	[1.124]
R-squared	0.009	0.008	0.007	0.007	0.008	0.008	0.009	0.009
N	24226	24227	21064	21064	19841	19842	17265	17265

*Sample: HRS, Age 50-64, non-proxy, full-time workers at t and either valid interviews at t+1 (columns 1-4) or full-time workers at t+1 (columns 5-8). Job demands and resources are standardized and higher values indicate higher demands and more resources (better health). Change measures are all defined from wave t to t+1. Robust standard errors clustered on the household id are in brackets. *, **, and *** indicate statistical significance at 10, 5, and 1 percent respectively. Subjective probabilities of working are only collected in non-proxy interviews from people younger than age 62. Prior to 2006, the HRS did not ask this question from nonworkers. The values of expectations for the 50-61-year-old non-proxy nonworkers are imputed (used in columns 1-4 only) with a model described in section 3.3.

Table 20. OLS regressions of the transitions from full-time work to disability as a function of job demands, resources and their interactions

	[1]	[2]	[3]	[4]
Large muscle index at t	-0.009			
	[0.001]***			
Change in large muscle index, R1	-0.011			
	[0.001]***			
Dynamic strength at t, D1	0.001			
	[0.000]			
R1 x D1	-0.002			
	[0.001]**			
Fine motor index at t		-0.008		
		[0.001]***		
Change in fine motor index, R2		-0.010		
		[0.001]***		
Finger dexterity at t, D2		0.001		
		[0.000]		
R2 x D2		0.000		
		[0.001]		
Cognition at t			-0.003	-0.003
			[0.001]***	[0.001]***
Change in cognition, R3			-0.002	-0.002
			[0.001]***	[0.001]***
Memorization at t, D3			-0.001	
			[0.001]	
R3 x D3			0.000	
			[0.001]	
Analyzing data or information at t, D4				-0.001
				[0.001]
R3 x D4				-0.001
				[0.001]

Age - 50	0.001	0.001	0.002	0.002
	[0.001]*	[0.001]*	[0.001]**	[0.001]**
Age - 50, squared	0.000	0.000	0.000	0.000
	[0.000]***	[0.000]**	[0.000]***	[0.000]***
Age - 50, cube	0.000	0.000	0.000	0.000
	[0.000]***	[0.000]***	[0.000]***	[0.000]***
Female	-0.003	-0.001	0.002	0.002
	[0.001]***	[0.001]	[0.001]*	[0.001]*
White	0.001	0.000	0.000	0.000
	[0.002]	[0.002]	[0.002]	[0.002]
Black	0.006	0.005	0.003	0.003
	[0.003]**	[0.003]**	[0.003]	[0.003]
Other race	ref.	ref.	ref.	ref.
Hispanic	0.003	0.002	0.000	0.000
	[0.002]	[0.002]	[0.002]	[0.002]
Less than high school	0.003	0.005	0.004	0.004
	[0.002]*	[0.002]***	[0.002]*	[0.002]*
High school	-0.002	0.000	0.000	0.000
	[0.001]	[0.001]	[0.001]	[0.001]
Some college	0.000	0.001	0.001	0.001
	[0.001]	[0.001]	[0.001]	[0.001]
College graduate	ref.	ref.	ref.	ref.
Married	-0.003	-0.002	-0.002	-0.002
	[0.001]**	[0.001]*	[0.001]*	[0.001]*
Spouse works	0.000	0.000	0.000	0.000
	[0.001]	[0.001]	[0.001]	[0.001]
Log household income	-0.001	-0.001	-0.001	-0.001
	[0.001]	[0.001]*	[0.001]	[0.001]
Positive household income	0.002	0.003	-0.006	-0.006
	[0.009]	[0.009]	[0.011]	[0.011]
Log household wealth	0.000	0.000	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]
Household wealth positive	-0.011	-0.007	-0.008	-0.009
	[0.008]	[0.008]	[0.009]	[0.009]

Has a DB pension	-0.002	-0.001	-0.001	-0.001
	[0.001]	[0.001]	[0.001]	[0.001]
Has a DC pension	0.000	-0.001	0.000	0.000
	[0.001]	[0.001]	[0.001]	[0.001]
Self employed	-0.003	-0.003	-0.003	-0.003
	[0.001]**	[0.001]***	[0.001]*	[0.001]*
Tenure at job, in years	0.000	0.000	0.000	0.000
	[0.000]***	[0.000]***	[0.000]***	[0.000]***
Tenure missing	0.001	-0.001	0.004	0.004
	[0.006]	[0.006]	[0.008]	[0.008]
Has health insurance from employer	-0.003	-0.002	-0.003	-0.003
	[0.001]*	[0.001]*	[0.001]**	[0.001]**
Has health insurance from spouse	-0.001	-0.001	-0.001	-0.001
	[0.001]	[0.001]	[0.002]	[0.002]
1994 wave	0.004	0.003		
	[0.002]**	[0.002]		
1996 wave	0.000	0.000	0.000	0.000
	[0.002]	[0.002]	[0.002]	[0.002]
1998 wave	0.003	0.003	0.003	0.003
	[0.002]*	[0.002]	[0.002]	[0.002]
2000 wave	0.000	0.001	0.001	0.001
	[0.002]	[0.002]	[0.002]	[0.002]
2002 wave	0.003	0.004	0.003	0.003
	[0.002]	[0.002]*	[0.002]	[0.002]
2004 wave	0.000	0.001	0.001	0.001
	[0.002]	[0.002]	[0.002]	[0.002]
2006 wave	-0.001	-0.001	-0.001	-0.001
	[0.002]	[0.002]	[0.002]	[0.002]
2008 wave	-0.001	-0.001	0.000	0.000
	[0.002]	[0.002]	[0.002]	[0.002]
2010 wave	ref.	ref.	ref.	ref.

2012 wave	0.000	0.000	0.000	0.000
	[0.002]	[0.002]	[0.002]	[0.002]
Constant	0.029	0.027	0.032	0.032
	[0.012]**	[0.012]**	[0.014]**	[0.014]**
R-squared	0.021	0.025	0.007	0.007
N	38777	38786	31596	31596

*Sample: HRS, Age 50-70, full-time workers at t and valid interviews at t+1. Job demands and resources are standardized and higher values indicate higher demands and more resources (better health). Change measures are all defined from wave t to t+1. Robust standard errors clustered on the household id are in brackets. *, **, and *** indicate statistical significance at 10, 5, and 1 percent respectively.

Table 21. OLS regressions of the transitions from full-time work to a different employer as a function of job demands, resources and their interactions

	[1]	[2]	[3]	[4]
Large muscle index at t	0.008			
	[0.002]***			
Change in large muscle index, R1	0.005			
	[0.002]**			
Dynamic strength at t, D1	0.000			
	[0.002]			
R1 x D1	0.002			
	[0.002]			
Fine motor index at t		0.004		
		[0.002]**		
Change in fine motor index, R2		0.003		
		[0.001]***		
Finger dexterity at t, D2		0.000		
		[0.002]		
R2 x D2		0.000		
		[0.001]		
Cognition at t			0.007	0.006
			[0.003]***	[0.003]**
Change in cognition, R3			0.004	0.003
			[0.002]	[0.002]
Memorization at t, D3			0.003	
			[0.002]	
R3 x D3			-0.001	
			[0.002]	
Analyzing data or information at t, D4				0.008
				[0.002]***
R3 x D4				0.001
				[0.002]
Age - 50	0.005	0.005	0.005	0.005
	[0.003]	[0.003]	[0.004]	[0.004]

Age - 50, squared	-0.001	-0.001	-0.001	-0.001
	[0.000]**	[0.000]**	[0.000]*	[0.000]*
Age - 50, cube	0.000	0.000	0.000	0.000
	[0.000]*	[0.000]*	[0.000]	[0.000]
Female	-0.022	-0.024	-0.025	-0.025
	[0.004]***	[0.004]***	[0.004]***	[0.004]***
White	0.004	0.004	-0.004	-0.004
	[0.009]	[0.009]	[0.009]	[0.009]
Black	-0.019	-0.019	-0.019	-0.018
	[0.009]**	[0.009]*	[0.010]*	[0.010]*
Other race	ref.	ref.	ref.	ref.
Hispanic	-0.032	-0.032	-0.031	-0.031
	[0.007]***	[0.007]***	[0.008]***	[0.008]***
Less than high school	-0.021	-0.022	-0.008	-0.004
	[0.007]***	[0.007]***	[0.008]	[0.008]
High school	-0.014	-0.015	-0.009	-0.006
	[0.005]***	[0.005]***	[0.006]	[0.006]
Some college	-0.002	-0.003	0.001	0.002
	[0.005]	[0.005]	[0.006]	[0.006]
College graduate	ref.	ref.	ref.	ref.
Married	-0.007	-0.007	-0.006	-0.006
	[0.005]	[0.005]	[0.005]	[0.005]
Spouse works	0.008	0.008	0.007	0.008
	[0.004]**	[0.004]**	[0.005]	[0.005]*
Log household income	-0.005	-0.005	-0.005	-0.006
	[0.003]*	[0.003]	[0.003]	[0.003]*
Positive household income	0.031	0.030	0.034	0.039
	[0.022]	[0.022]	[0.025]	[0.025]
Log household wealth	-0.006	-0.005	-0.006	-0.006
	[0.001]***	[0.001]***	[0.001]***	[0.001]***
Household wealth positive	0.100	0.096	0.106	0.108
	[0.021]***	[0.021]***	[0.023]***	[0.023]***
Has a DB pension	-0.035	-0.035	-0.034	-0.034
	[0.004]***	[0.004]***	[0.004]***	[0.004]***
Has a DC pension	-0.022	-0.022	-0.022	-0.022

	[0.004]***	[0.004]***	[0.004]***	[0.004]***
Tenure at job, in years	-0.003	-0.003	-0.004	-0.004
	[0.000]***	[0.000]***	[0.000]***	[0.000]***
Tenure missing	-0.033	-0.033	-0.021	-0.021
	[0.019]*	[0.019]*	[0.024]	[0.024]
Has health insurance from employer	-0.040	-0.040	-0.042	-0.043
	[0.006]***	[0.006]***	[0.006]***	[0.006]***
Has health insurance from spouse	-0.018	-0.018	-0.020	-0.020
	[0.007]***	[0.007]***	[0.007]***	[0.007]***
1994 wave	0.009	0.010		
	[0.007]	[0.007]		
1996 wave	0.021	0.021	0.020	0.020
	[0.007]***	[0.007]***	[0.007]***	[0.007]***
1998 wave	0.023	0.024	0.023	0.023
	[0.007]***	[0.007]***	[0.007]***	[0.007]***
2000 wave	0.057	0.057	0.059	0.059
	[0.007]***	[0.007]***	[0.008]***	[0.008]***
2002 wave	0.020	0.020	0.021	0.020
	[0.007]***	[0.007]***	[0.008]***	[0.008]***
2004 wave	0.020	0.019	0.020	0.019
	[0.007]***	[0.007]***	[0.007]***	[0.007]***
2006 wave	0.011	0.011	0.009	0.008
	[0.007]	[0.007]	[0.007]	[0.007]
2008 wave	0.009	0.009	0.009	0.009
	[0.007]	[0.007]	[0.007]	[0.007]
2010 wave	ref.	ref.	ref.	ref.
2012 wave	0.013	0.013	0.012	0.011
	[0.006]**	[0.006]**	[0.006]*	[0.006]*
Constant	0.201	0.201	0.197	0.208
	[0.036]***	[0.036]***	[0.039]***	[0.039]***
R-squared	0.044	0.044	0.046	0.046
N	32517	32524	26717	26717

*Sample: HRS, Age 50-70, full-time employees at t and in the sample at t+1. Those who lose their jobs or become self-employed are coded as zeros (they did not switch employers). Job demands and resources are standardized and higher values indicate higher demands and more resources (better health). Change measures are all defined from wave t to t+1. Robust standard errors clustered on the household id are in brackets. *, **, and *** indicate statistical significance at 10, 5, and 1 percent respectively.