# Job Quality and Employment of Older People in Europe

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*Abstract.* We study the relationship between job quality and retirement using data from the Survey of Health, Ageing and Retirement in Europe, a longitudinal survey covering individuals aged 50+ in several European countries. Although most previous studies looked at the impact of bad working conditions on retirement intentions, we can use the panel dimension to study actual retirement as well as other pathways out of a job. As indicators for job quality we use three different approaches: overall job satisfaction, over- and undereducation for a particular job as well as effort–reward imbalance, which measures the imbalance between a worker's effort and the rewards he or she receives in turn. The analysis gives some evidence that poor job quality decreases retirement age, in particular for women.

## 1. Introduction

Europe is a continent of early retirement. Given ongoing trends of increasing life expectancy, the currently high proportion of persons in some form of retirement in the age group 55–65 observed in most European countries is one of the major challenges to European policymakers in the 21st century. In order to design policies that increase the participation rates among those 55 years and older, policymakers should be aware of the factors that influence the decision to stop working or to retire. Past research has shown that macroeconomic and institutional conditions, such as the incentives created by the pension system have a strong influence on retirement decisions (Gruber and Wise, 1999). Furthermore, the decision to stop working is influenced by health conditions (Kalwij and Vermeulen, 2008), such as chronic illness or disability. For the study of industrial relations it is particularly important if also working conditions and job quality are related to retirement decisions of workers.

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In the last decade, job quality has become an economic policy issue at the international level. In 1999, the International Labour Organisation (ILO) declared that securing decent work for women and men will be the primary goal during the ongoing period of global transition (ILO, 1999). Since the Lisbon Summit in March 2000 the European Union has acknowledged the improvement of working conditions as important for the well-being of workers, to promote social inclusion and to drive up employment levels (European Commission, 2001, 2002, 2008). Although job quality is an important value in its own right, improving it could also contribute towards increasing the retirement age.

First results from the Survey of Health, Ageing and Retirement in Europe (SHARE) have shown a strong correlation between poor job quality and poor health (Siegrist *et al.*, 2005), and that both, poor job quality and reduced well-being are positively related to the intention to retire (Siegrist *et al.*, 2006). Consequently, job quality may have both a direct and an indirect effect — by affecting health — on the decision to stop working or to retire (see, for example, Van den Berg *et al.*, 2010). Although there have been studies investigating directly the impact of job quality on intentions to retire, no studies have looked at actual retirement yet. Moreover, it has been found that job quality has significant importance for quit intentions and actual job-to-job changes (Böckerman and Ilmakunnas, 2009).

In this contribution we use data from the first and the second wave of SHARE to explore the relationship between job quality and the decision to stop working or to retire as well as the relationship between job quality and retirement intentions. As job quality is a collective term for various working and employment conditions, such as the physical work load, the imposed work pressure, the incentive structure, and the perceived job stability, no encompassing and operational definition of job quality is available. Therefore, we use three different approaches to measure it.

Our first measure of job quality is an individual's subjective overall job satisfaction, which is meant to capture all dimensions of job quality. Therefore, it is not very operative — such that it could be directly targeted — by a firm or a policy-maker. Therefore, we use two additional measures of job quality that should, in principle, be easier to manipulate and therefore more relevant. The first one is whether an individual is overeducated, undereducated, or adequately educated for the job he or she holds. Tsang *et al.* (1991) have shown that overeducated male workers are less satisfied in their job and have a higher intention to leave the firm. The second one is derived from the effort–reward imbalance (ERI) model (Siegrist *et al.*, 2004) and measures the imbalance between a worker's effort and the rewards he or she receives in turn. Although over- or undereducation can be tackled by job assignment and matching of workers, the ERI contains several precise indicators, which might lend themselves to manipulation, like job security, time pressure, recognition, or support.

Although other indicators, like the 'job-demand-control' model by Karasek *et al.* (1998) might also be relevant, they are not readily available in internationally comparable data sets covering both adequate health and employment aspects as well as pathways into retirement.

## 2. Dimensions of job quality

Job quality is a multidimensional concept that refers to various employment and working conditions. Owing to its multidimensional nature the concept of job quality is difficult to define, resulting in considerable disagreement with respect to its measurement. In a recent survey, Muñoz de Bustillo *et al.* (2011) discuss different views and existing proposals of job quality indicators used in the recent social science and policy literature. They suggest that a job

quality indicator should cover two broad areas, i.e. employment quality and work quality, and should be measured at the individual rather than at the aggregate (i.e. country or firm) level.[1] Although employment quality refers to the employment relations and covers areas such as the employment contract, remuneration, working hours, and career development opportunities, work quality covers all aspects of the working activity, for instance, autonomy, work intensity, and the social and physical environment. Using measures constructed from individual-level data has the main advantage of being able to analyse the distribution of job quality for subgroups of workers. Existing indicators defined by the European Union (Laeken indicators of job quality, European Commission, 2008) and the ILO (Decent work indexes, Bonnet *et al.*, 2003) are constructed from aggregate data and include, besides job characteristics, indicators for the work and wider labour market context.

One way to overcome these problems is to use the declared level of job satisfaction as an indicator of job quality. Subjective job satisfaction captures all dimensions of job quality and can be considered as a general measure of match quality (Clark, 2001). It is a powerful predictor of labour mobility (Clark *et al.*, 1998; Freeman, 1978), even conditional on wages and working hours. However, it also has a number of shortcomings. Job satisfaction is only an indirect measure of job quality, as it measures the well-being of workers at their jobs, which is — to a high degree — the result of their working conditions (Muñoz de Bustillo *et al.*, 2011). Poggi (2010) argues that job satisfaction measures the individual evaluation of objective working conditions, which is influenced by personality, emotions, cognitive ability, and aspiration levels. They find evidence for aspiration levels creating bias in the evaluation of working conditions. Moreover, subjective overall job satisfaction is not very operative from a policy perspective.

The literature on educational mismatch suggests a link between adequate education and job satisfaction. For instance, Tsang *et al.* (1991) have shown that overeducated male workers are less satisfied in their job (and have a higher intention to leave the firm).[2] Arguably, whether people are adequately educated for the job they hold can be considered as a measure of a certain aspect of the match quality between the individuals and their jobs. Results based on a measure of educational mismatch may supplement the results obtained from models that use job satisfaction as an indicator for job quality and provide valuable insights with respect to a certain aspect that is more operative than the overall level of job satisfaction.[3]

The occupational health literature has focused on the psychosocial quality of work and has tried to find a general definition of work-related stress. In this context, two models have emerged: the demand-control model (Karasek, 1979; Karasek *et al.*, 1998) and the ERI model (Siegrist, 1996; Siegrist *et al.*, 2004). The demand-control model focuses on job tasks and defines stressful jobs as jobs that are characterized by the interaction of high demands (e.g. high pace, effort, or volume) and low autonomy (e.g. lack of decision authority and high monotony). Van der Doef and Maes (1999) reviewed studies of the job demand-control model and confirm that workers in high demands-low control jobs report negative psychological wellbeing. In contrast, the ERI model focuses on various aspects of the work contract, and assumes that a stressful job is characterized by a violation of reciprocity, i.e. an imbalance between a worker's efforts and the rewards a worker receives at work in terms of money, esteem, career prospects, and job security.[4] Likewise, Van Vegchel *et al.* (2005) in their review of the ERI model found a correlation between jobs with high effort and low rewards with several adverse physical and mental health outcomes.

The empirical literature on the link between educational/skill mismatches and job satisfaction is somewhat ambiguous: Tsang *et al.* (1991) suggest a negative correlation between overeducation and job satisfaction among male workers. Using data from the European

Community Household panel, Vieira (2005) obtains similar results for a pooled sample of male and female workers. In contrast, Groot and van den Brink (1999) find no significant correlation between over- or undereducation and job satisfaction among older workers. Rubb (2009) shows that there is no relationship between an educational mismatch and the probability to retire early, although the literature suggests a link between job dissatisfaction and the intention to retire early (e.g. Blanchet and Debrand, 2009). Rubb (2009) provides two explanations for the missing link between an educational mismatch and the probability to retire early. (i) As human capital depreciates over time, a 'formal' education–job mismatch is not necessarily accompanied by an actual mismatch between acquired and required skills (skill mismatch) at later stages of the working life. (ii) At the end of their career, older workers may voluntarily choose jobs for which they are overskilled. Both explanations suggest that over-educated workers may not be dissatisfied with their job. Allen and van der Velden (2001) provide evidence that — even among younger workers — an educational mismatch need not imply a skill mismatch, and show that the skill mismatch rather than the educational mismatch is negatively related to job satisfaction of younger workers and lead to a higher probability of on-the-job search.

In our paper, we aim at analysing different aspects of job quality and therefore, follow different strategies of measuring job quality. We use the individual's subjective job satisfaction and a measure of educational mismatch to capture the (i) general match quality and (ii) a specific aspect of the match quality, respectively. Another important aspect, the (iii) psychological quality of work is measured by the effort–reward ratio (Siegrist, 1996). We believe that the ERI model is more suitable than the demand-control model as it is based on several job characteristics that are considered as important determinants of job quality and goes beyond the job task level. Finally, we analyse the contribution of (iv) specific employment and working conditions separately.

## 3. Data and empirical design

We use data from the first two waves of the SHARE, a survey focusing on the living conditions of Europeans aged 50 and above. The first wave was conducted in 2004/05 in 11 European countries and the respondents were re-interviewed in 2006/07. About 2,500 individuals were randomly selected in each country and face-to-face computer-assisted interviews were conducted. The data provide information on social relations, health conditions, and economic variables such as income, employment status, and job characteristics.[5]

We focus on the population aged 50 to 65 at the time of the first interview in 10 European countries: Austria, Belgium, Denmark, France, Germany, Italy, the Netherlands, Spain, Sweden, and Switzerland.[6] From these 14,121 individuals, about 48 per cent were working while not receiving any public pension benefits. As we are interested in whether the quality of the job has an influence on the employment decision later on, we dropped all individuals who did not work in the first wave and who were self-employed resulting in a data set of 5,639 individuals.[7] Of those persons, 3,712 were interviewed again in the second wave 2 years later and completed the questions on their employment status. Sample attrition between wave 1 and wave 2 is substantial in our study and amounts to 34 per cent. In Section 5, we discuss this issue in more detail.

As shown in Figure 1, a large majority of the individuals in our sample is still working at the time of the second interview in 2006/07, although 49 per cent of women and 43 per cent of men have stated in wave 1 that they would like to retire as early as possible. With respect to actual

**Figure 1.** Employment status by gender in 2006/07
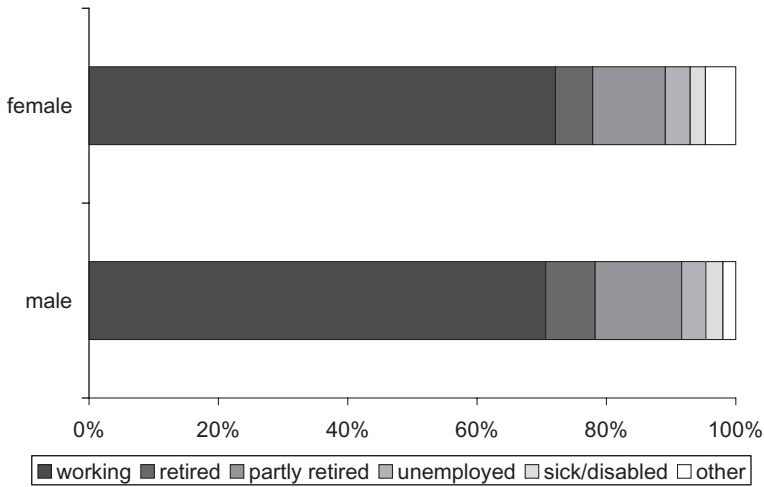


retirement, we observe two different states: those who are fully retired and those who already claim public pension benefits while still being employed (at least partly). We will classify the second group as 'partly retired'. Seventeen per cent of women and 21 per cent of men retired or partly retired between the two waves. About 5 per cent of the female workers left employment due to other reasons, e.g. to become homemakers (about 80 per cent of female workers in this category).

Differences among European countries are highlighted in Figure 2. The share of individuals who are still working ranges from 77 per cent in Switzerland to 64 per cent in Spain. The retirement and partial retirement rates vary substantially between European countries. In Austria, Italy, and Sweden, 20 per cent or more switch to retirement or partial retirement. Although most of them are fully retired in Austria (20 per cent), Swedes more often opt for partial retirement (nearly 21 per cent). The Austrian workers seem to give up working immediately when they start receiving public pension benefits. This phenomenon may be partly explained by differences in the pension systems and regulations concerning the compatibility of work and claims for public pension benefits.

We are interested in whether the characteristics of the jobs, individuals held in 2004/05, have an influence on the intention and decision to stop working (retire) within the next 2 years. On average, 16 per cent of the individuals stopped working; they retired, became unemployed, sick or disabled, or left employment due to other reasons (e.g. to become homemakers). The remaining 84 per cent are working or partly retired, i.e. they are working and receive public pension benefits at the same time. On the one hand, partly retired individuals contribute to a country's GDP and should therefore be counted as working. On the other hand, they receive public pension benefits involving costs to the welfare state. According to this view, partly retired individuals should be counted as retired. We investigate both options because the decision to retire fully or only partly may depend on the characteristics of the last job. A low job quality may abet full retirement, whereas a medium quality may result in partial retirement only.

We estimate binary and multinomial probit models. In the binary case, we analyse three different outcomes. (i) Our first binary dependent variable *working* is coded to be one for

**Figure 2.** Employment status by country in 2006/07
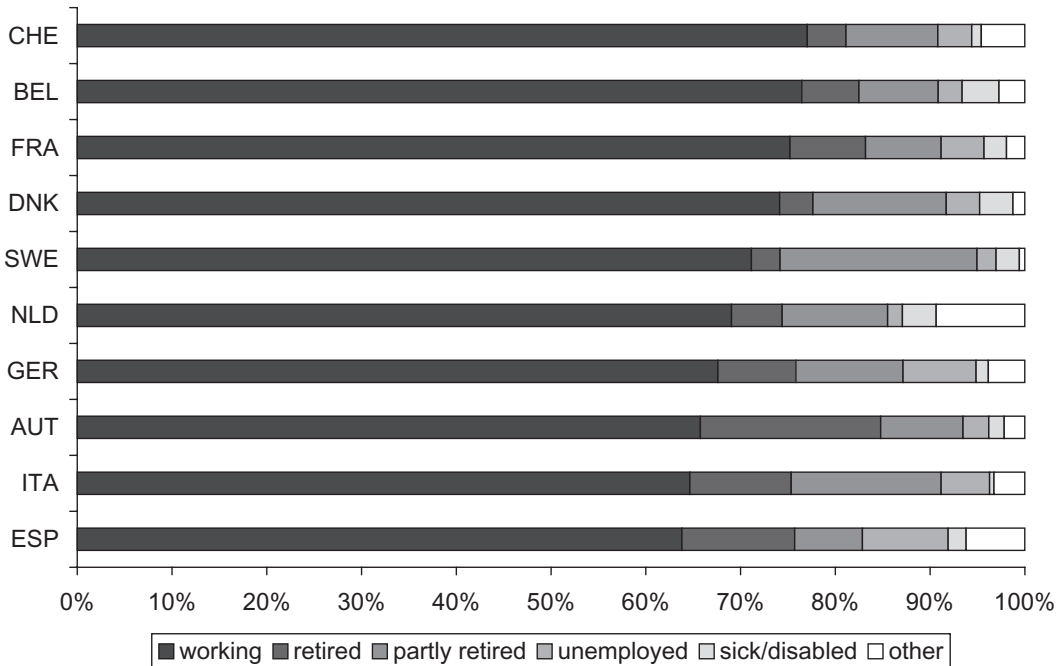


individuals who work and zero for all other categories. (ii) The second variable *working or partly retired* is one for all individuals who work, irrespective of whether they receive any public pension benefits. This definition includes partly retired individuals. (iii) Our third dependent variable *no intention to retire* is based upon the following question in wave 1: 'Thinking about your present job, would you like to retire as early as you can from this job?' We have recoded the variable such that it is one if the worker has *not* considered to retire early to make it comparable with the other results. About 71 per cent of the individuals in our sample are working, 84 per cent are working or partly retired, and 54 per cent have not considered to retire early. The difference between those numbers suggest that institutional conditions impede early retirement, as the number of retired workers is lower than the number of workers who intended to retire.

To analyse possible transition states of persons who gave up their job between the two waves in more detail, we also apply multinomial probit models. In that case, the dependent variable consists of six categories: working, retired, partly retired, unemployed, permanently sick or disabled, and other (including homemakers). A description of the dependent variables and the explanatory variables as well as summary statistics for the whole sample and for women and men separately are given in Table 1. We include basic demographic control variables and country indicators in all models. Additional controls describing the health status of the respondent and other job characteristics next to our job quality indicators are included in some models. There are reasons to assume that health and job quality are correlated. Not included these health status variables would, therefore, lead to coefficients for job quality, which are capturing both direct and indirect effects of job quality on retirement behaviour;

**Table 1.** Variable description and summary statistics

| Variable | Description | All | | Means | |
|---|---|---|---|---|---|
| | | Mean | Stdev | Women | Men |
| *Binary outcomes* | | | | | |
| Working | Individual is working (in wave 2) | 0.713 | | 0.721 | 0.706 |
| Working or partly retired | Individual is working or partly retired (in wave 2) | 0.837 | | 0.834 | 0.840 |
| No intention to retire | Individual states no intention to retire (in wave 1) | 0.539 | | 0.570 | 0.510 |
| *Multinomial outcomes* | | | | | |
| Working | Individual is working | 0.713 | | 0.721 | 0.706 |
| Retired | Retired | 0.067 | | 0.058 | 0.076 |
| Partly retired | Working and receives public pensions | 0.123 | | 0.112 | 0.134 |
| Sick or disabled | Permanently sick or disabled | 0.038 | | 0.039 | 0.037 |
| Unemployed | Unemployed or looking for work | 0.025 | | 0.023 | 0.027 |
| Other | Homemaker or other (in wave 2) | 0.033 | | 0.047 | 0.020 |
| *Job quality variables* | | | | | |
| Very satisfied | Individual is strongly satisfied with the job | 0.466 | | 0.482 | 0.450 |
| Satisfied | Satisfied with the job | 0.461 | | 0.438 | 0.482 |
| Not satisfied | Dissatisfied or very dissatisfied with the job | 0.073 | | 0.079 | 0.068 |
| Overeducated | More years of education than the mean value (plus one standard deviation) in the one-digit ISCO-group in the country | 0.170 | | 0.149 | 0.189 |
| Adequately educated | Neither over- nor undereducated | 0.692 | | 0.706 | 0.679 |
| Undereducated | Fewer years of education than the mean value (minus one standard deviation) in the one-digit ISCO-group in the country | 0.138 | | 0.145 | 0.132 |
| Physically demanding | Individual (strongly) agrees to the statement: the job is physically demanding | 0.431 | | 0.444 | 0.419 |
| Time pressure | He/she is under time pressure | 0.540 | | 0.528 | 0.551 |
| Support | He/she receives adequate support | 0.740 | | 0.761 | 0.720 |
| Recognition | He/she receives recognition | 0.718 | | 0.741 | 0.697 |
| Adequate earnings | The earnings are adequate | 0.583 | | 0.539 | 0.625 |
| Poor prospects | The job prospects are poor | 0.682 | | 0.687 | 0.677 |
| Poor job security | The job security is poor | 0.216 | | 0.188 | 0.242 |
| ERI ratio | ERI measure: efforts divided by rewards (adjusted for number of items) | 0.991 | 0.437 | 0.983 | 0.997 |
| ERI first tertile | First tertile of the ERI ratio (in his/her country) | 0.352 | | 0.368 | 0.338 |
| ERI second tertile | Second tertile of the ERI ratio | 0.320 | | 0.298 | 0.340 |
| ERI third tertile | Third tertile of the ERI ratio | 0.328 | | 0.334 | 0.322 |
| *Basic controls* | | | | | |
| Female | Individual is female | 0.482 | | 1.000 | 0.000 |
| Married | Individual is married | 0.808 | | 0.769 | 0.845 |
| Age | Age in years | 55.257 | 3.733 | 55.096 | 55.406 |
| Education | Years of education | 12.840 | 3.763 | 12.719 | 12.953 |
| Early possible | Early retirement possible according to age, gender, and regulations in the country | 0.241 | | 0.246 | 0.236 |
| Statutory possible | Statutory retirement possible | 0.092 | | 0.095 | 0.089 |
| *Health & job controls* | | | | | |
| Health excellent | Self-rated health is excellent | 0.299 | | 0.304 | 0.294 |
| Health very good | Very good | 0.510 | | 0.491 | 0.528 |
| Health good | Good | 0.166 | | 0.182 | 0.152 |
| Health poor | Fair or poor | 0.025 | | 0.023 | 0.025 |
| adl | Limitations with activities of daily life | 0.030 | | 0.027 | 0.033 |
| Life expectancy | Number of additional years the individual expects to be alive[a] | 14.083 | 5.240 | 14.489 | 13.702 |
| Civil servant | Individual is a civil servant | 0.185 | | 0.174 | 0.195 |
| Wage | Monthly gross wage (in 10,000 €) | 0.271 | 0.204 | 0.213 | 0.326 |
| Other pay | Wage includes additional payments (like bonus) | 0.217 | | 0.200 | 0.234 |
| Unfolding brackets | Income derived through unfolding brackets in interview | 0.090 | | 0.097 | 0.083 |
| Hours | Number of working hours per week | 33.658 | 10.299 | 30.099 | 36.967 |
| m_life expectancy | Life expectancy missing | 0.035 | | 0.032 | 0.038 |
| m_wage | Wage missing | 0.075 | | 0.063 | 0.087 |
| m_hours | Working hours missing | 0.022 | | 0.022 | 0.021 |
| *Countries* | | | | | |
| AUT | Austria | 0.050 | | 0.044 | 0.055 |
| BEL | Belgium | 0.138 | | 0.122 | 0.154 |
| CHE | Switzerland | 0.053 | | 0.050 | 0.056 |
| DNK | Denmark | 0.107 | | 0.108 | 0.106 |
| ESP | Spain | 0.057 | | 0.051 | 0.061 |
| FRA | France | 0.125 | | 0.135 | 0.116 |
| GER | Germany | 0.105 | | 0.109 | 0.101 |
| ITA | Italy | 0.058 | | 0.053 | 0.062 |
| NLD | Netherlands | 0.121 | | 0.114 | 0.127 |
| SWE | Sweden | 0.187 | | 0.214 | 0.161 |
| Observations | | 3,712 | | 1,790 | 1,922 |

*Notes*: The number of observations is smaller for job satisfaction (3,703), for over- and undereducation (3,635), for job characteristics (3,639), and for retirement intentions (3,637).
[a] This variable is based on the following question on life expectancy: 'What are the chances that you will live to be age T or more'. Possible responses range from 0 (absolutely no chance) to 100 (absolutely certain). We have constructed the variable as follows: (age T − age) ∗ stated chances (divided by 100) to be alive at age T. The target age T depends on the age class of the individual. In our sample the target age T = 75.

while with inclusion of these health indicators we measure the impact of job quality once potential confounders are eliminated.

As derived in Section 2, we use three different sets of variables to measure job quality: subjective job satisfaction, match quality in terms of education as well as effort and reward related job characteristics. At the first interview, the respondents were asked about their overall job satisfaction: 'All things considered, I am satisfied with my job. — Would you say you strongly agree, agree, disagree, or strongly disagree?' About 47 per cent of the respondents strongly agreed, 46 per cent agreed, 6 per cent disagreed, and about 1.5 per cent strongly disagreed with this statement. For our estimations, we form three categories: very satisfied, satisfied, and not satisfied (including strongly dissatisfied). The distribution of job satisfaction differs somewhat between genders, with women being found significantly less often in the second category (44 per cent versus 48 per cent).

Our measure of match quality is whether people are adequately educated for the job they hold or whether they are over- or undereducated. The adequate (required) education level for a job is approximated by the mean value of education years within country-specific one-digit occupational groups. Based on these average education levels, we construct binary variables for over- and undereducation. Being overeducated implies that a person has undergone more years of education than the mean value (plus one standard deviation) in the one-digit ISCO group in a country; accordingly, for undereducation. This approach is based on the work of Verdugo and Turner-Verdugo (1989). In total, about 17 per cent of all respondents are overeducated and about 14 per cent are undereducated for their job. Male workers are significantly more likely to be overeducated than their female counterparts (19 per cent compared with 15 per cent).

For our third measure of job quality, we use the ERI model, developed by Siegrist (1996) and recently applied by Siegrist *et al.* (2004, 2005, 2006). In the first wave of the survey, the employed individuals were asked about the efforts they put into their work and the rewards they finally get. The respondents had to appraise to what extent they agree with the following statements (strongly agree, agree, disagree, or strongly disagree):[8]

- My job is physically demanding. (43)
- I am under a constant time pressure due to heavy workload. (54)
- I receive adequate support in difficult situations. (74)
- I receive the recognition I deserve for my work. (72)
- Considering all my efforts and achievements, my earnings are adequate. (58)
- My job promotion prospects/prospects for job advancement are poor. (68)
- My job security is poor. (22)

The first two items are effort related, whereas the other five items refer to rewards people get for their work. Statistically significant gender differences are found for the items on support, recognition, the adequacy of earnings, and job security, with female workers reporting higher levels on support (76 versus 72 per cent) and recognition (74 versus 70 per cent) and lower levels of adequacy of earnings (54 versus 63 per cent) and job insecurity (19 versus 24 per cent).

The ERI is defined by the ratio of the sum of scores for efforts to the sum of scores for rewards, adjusted for the number of items and ranges from $\frac{1}{4}$ to 4.[9] Following Siegrist *et al.* (2006), we use tertiles of the ratio, which we calculated for each country separately to account for different reporting styles. The third tertile is associated with the poorest job quality. In our regressions, we use the tertiles as well as the specific items of the ERI to explore which job characteristics are most relevant for the employment decision within the next 2 years.

**Table 2.** Job satisfaction, education, and ERI

| Variable | Women | Men |
|---|---|---|
| *Correlation of not satisfied & . . .* | | |
| Overeducated | 0.009 | −0.002 |
| Undereducated | 0.005 | 0.013 |
| Physically demanding | 0.059** | 0.085*** |
| Time pressure | 0.089*** | 0.054** |
| Support | −0.255*** | −0.264*** |
| Recognition | −0.263*** | −0.239*** |
| Adequate earnings | −0.139*** | −0.137*** |
| Poor prospects | 0.097*** | 0.039* |
| Poor job security | 0.133*** | 0.115*** |
| ERI ratio | 0.261*** | 0.256*** |
| ERI first tertile | −0.153*** | −0.131*** |
| ERI second tertile | −0.056** | −0.039* |
| ERI third tertile | 0.210*** | 0.172*** |
| Observations | 1,731 | 1,835 |

*Notes*: Correlation coefficients reported, sample of all observations with non-missing information on all job-quality variables. ***, **, and * indicate statistical significance at the 1 per cent, 5 per cent, and 10 per cent level.

Table 2 shows the correlation between subjective job satisfaction and the other job quality indicators. Over- and undereducation are not related to job satisfaction. For all other measures significant correlation coefficients are obtained. Regarding the specific job quality items, the correlations are strongest for support in difficult situations and recognition for work, followed by adequate earnings and job security. The ERI ratio, as an overall measure of job quality, is also strongly correlated with job satisfaction. Figure 3 highlights the correlation between job satisfaction (per cent not satisfied) and the ERI (per cent efforts exceed rewards) by country. Job satisfaction as well as the effort–reward relation is most favourable in Switzerland and least favourable in Italy.[10]

We use binary and multinomial probit regressions to estimate the relationship between job quality and the employment decisions of older individuals. The binary model can be written as

$$Working^*_{ict+2} = \beta_1 + \beta_2 JQ_{ict} + \beta_3 X_{ict} + \upsilon_c + \varepsilon_{ict} \qquad [1]$$

$$Working_{ict+2} = \begin{cases} 1 & \text{if } Working^*_{ict+2} > 0 \\ 0 & \text{otherwise} \end{cases} \qquad [2]$$

where $Working^*_{ict+2}$ is the latent probability of individual $i$ in country $c$ to work at the time of the second interview $t + 2$ (2 years after the first interview). $JQ_{ict}$ captures quality indicators of the job people held at the time of the first interview $t$, $X_{ict}$ is a vector of control variables, and $\upsilon_c$ are country fixed effects.

Alternatively, the multinomial probit model can be written as

$$U_{icat+2} = \beta_{1a} + \beta_{2a} JQ_{ict} + \beta_{3a} X_{ict} + \upsilon_{ca} + \varepsilon_{icat}, \qquad [3]$$

$$\varepsilon_{icat} \sim MVN(0, \Sigma), \qquad [4]$$

**Figure 3.** Job satisfaction and ERI



$$U_{ic1t+2} = 0 \qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad [5]$$
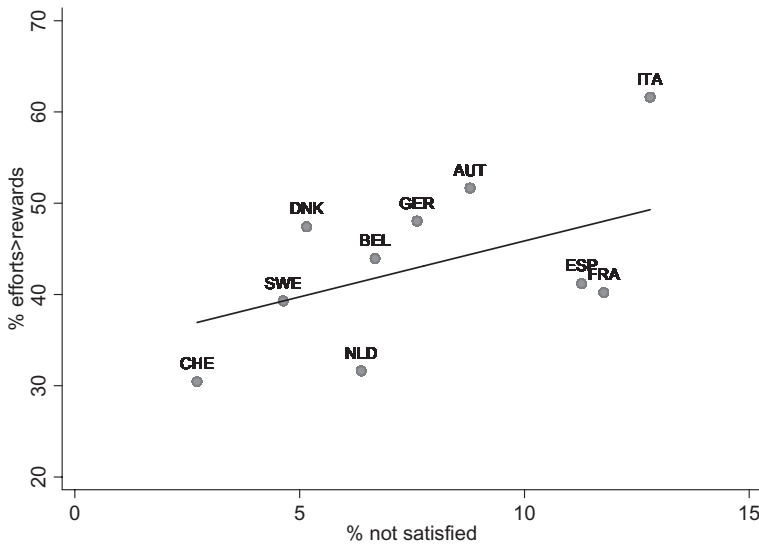
$$Y_{ict+2} = j \Leftrightarrow U_{icjt+2} > U_{icat+2} \quad \forall \quad a \neq j, \qquad\qquad\qquad\qquad\qquad [6]$$

where $U_{icat+2}$ is the utility of individual $i$ in country $c$ of alternative $a$ in time $t + 2$. We investigate six alternatives: working, retired, partly retired, unemployed, sick or disabled, and other. The category *working* is always the base alternative and its $\beta$s are set to zero. Therefore, we have five alternative specific $\beta$s to estimate because the influence of each job quality variable or control variable can be different for each alternative. Finally we have a set of alternative and country-specific fixed effects $v_{ca}$.

The vector $X_{ict}$ in equations [1] and [3] includes basic individual characteristics (binary indicator for female, binary indicator for being married, indicators capturing 10 age categories, years of education), two variables that account for the heterogeneity in pension systems in the different countries (whether early and statutory retirement is possible based on age, gender, and regulations of minimum pension ages in the countries). Our preferred specification also controls for a set of health indicators (self-perceived health, activity limitations, and subjective life expectancy)[11] and job-related characteristics (civil servant, monthly gross wage, and number of weekly working hours).[12]

We estimate the model on the pooled female and male sample and interact all job quality variables with a female dummy. In Tables 3 and 4 we present marginal effects that use either male or female workers of a specific base group as reference for the calculation.[13] The effects reported in one row include the base category (working) and add up to zero within the group of female workers and the group of male workers.

In general, our estimation sample consists of 3,712 observations. However, depending on the job quality indicators we are using, several observations have to be dropped because of missing values.[14] Furthermore, the information on some control variables, such as subjective

**Table 3.** Binary probit regressions: job quality

| Variable | Working | | Working | | Working or partly retired | | No intention to retire[a] | |
|---|---|---|---|---|---|---|---|---|
| | Women | Men | Women | Men | Women | Men | Women | Men |
| **Panel A** (N = 3,703) | | | | | | | | |
| Base: very satisfied | | | | | | | | |
| Satisfied | −3.335 | 1.757 | −3.286 | 4.675 | −5.552 | 3.477 | −15.726 | −17.004 |
| | (3.656) | (3.337) | (3.704) | (3.560) | (3.047)* | (2.571) | (3.656)*** | (3.743)*** |
| Not satisfied | −15.636 | −8.133 | −14.183 | −3.705 | −9.124 | −3.803 | −46.736 | −42.498 |
| | (6.637)** | (7.351) | (6.700)** | (6.981) | (5.534)* | (5.337) | (3.919)*** | (3.743)*** |
| **Panel B** (N = 3,635) | | | | | | | | |
| Base: adequately educated | | | | | | | | |
| Overeducated | −3.986 | −10.582 | −1.732 | −6.252 | −1.116 | −7.424 | 2.257 | −14.299 |
| | (5.872) | (5.367)** | (5.759) | (5.607) | (4.203) | (4.428)* | (5.760) | (5.609)** |
| Undereducated | −1.824 | −0.336 | −4.796 | −1.707 | −0.725 | 3.452 | −10.885 | −0.027 |
| | (4.801) | (5.089) | (5.063) | (5.877) | (3.494) | (3.191) | (5.038)** | (5.958) |
| **Panel C** (N = 3,639) | | | | | | | | |
| Base: ERI first tertile | | | | | | | | |
| ERI second tertile | −3.630 | 4.231 | −4.779 | 5.811 | −0.461 | 4.926 | −10.235 | −1.473 |
| | (4.410) | (3.820) | (4.496) | (3.982) | (3.302) | (3.018) | (4.375)** | (4.272) |
| ERI third tertile | −6.127 | −3.651 | −5.053 | −1.198 | −0.622 | −0.862 | −19.904 | −17.770 |
| | (4.213) | (4.191) | (4.051) | (4.342) | (2.916) | (3.494) | (4.076)*** | (4.376)*** |
| *Included controls:* | | | | | | | | |
| Basic controls | x | x | x | x | x | x | x | x |
| Country-effects | x | x | x | x | x | x | x | x |
| Health & job controls | | | x | x | x | x | x | x |
| **Panel D** (N = 3,639) | | | | | | | | |
| Physically demanding | −1.965 | 3.115 | −0.786 | 4.729 | 1.047 | 3.489 | −3.653 | −4.963 |
| | (3.595) | (3.204) | (3.444) | (3.330) | (2.642) | (2.393) | (3.748) | (3.817) |
| Time pressure | 3.356 | 3.333 | 1.777 | 1.867 | 4.234 | 3.031 | −8.094 | −5.467 |
| | (3.468) | (3.238) | (3.421) | (3.431) | (2.543)* | (2.505) | (3.673)** | (3.663) |
| Support | 4.507 | 4.746 | 4.490 | 3.419 | 0.279 | 1.210 | 4.026 | 5.895 |
| | (3.996) | (3.662) | (3.713) | (3.990) | (3.070) | (3.052) | (4.353) | (4.523) |
| Recognition | 1.665 | −1.220 | 2.383 | −1.881 | 4.451 | −0.798 | 8.972 | 4.121 |
| | (4.039) | (3.915) | (3.878) | (4.208) | (2.931) | (3.132) | (4.357)** | (4.488) |
| Adequate earnings | −3.110 | 5.670 | −4.368 | 3.142 | −7.141 | 0.203 | 11.604 | 5.863 |
| | (3.811) | (3.470) | (3.751) | (3.768) | (3.337)** | (2.758) | (3.758)*** | (4.018) |
| Poor prospects | −4.757 | −2.687 | −4.927 | −2.628 | −2.280 | 3.551 | 1.985 | −6.558 |
| | (3.962) | (3.706) | (3.940) | (3.806) | (2.950) | (2.666) | (3.879) | (3.973)* |
| Poor job security | −16.799 | −13.248 | −15.350 | −11.843 | −18.278 | −14.014 | 1.846 | −4.207 |
| | (5.432)*** | (4.422)*** | (5.443)*** | (4.359)*** | (5.004)*** | (4.196)*** | (4.750) | (4.262) |
| *Included controls:* | | | | | | | | |
| Basic controls | x | x | x | x | x | x | x | x |
| Country-effects | x | x | x | x | x | x | x | x |
| Health & job controls | x | x | x | x | x | x | x | x |

*Notes:* Each panel (A–D) in each outcome refers to a separate regression; the female column shows the interaction effect of the job quality variable with the female dummy, for men the same applies; marginal effects reported are multiplied by 100; heteroscedasticity-robust standard errors reported in parentheses; weights account for differences in sampling probabilities; ***, **, and * indicate statistical significance at the 1 per cent, 5 per cent, and 10 per cent level. Control variables as shown in Table 1 are included.
a Note that for this outcome variable the number of observations is 3,632 in Panel A; 3,569 in Panel B, 3,572 in Panel C, and 3,572 in Panel D.

**Table 4.** Multinomial probit regressions: job quality

| Variable | Working | Part-retired | Retired | Unemployed | Sick/disabled | Other |
|---|---|---|---|---|---|---|
| **Panel A** (N = 3,703) | | | | | | |
| Satisfied * female | −1.714 | −2.422 | 0.316 | 2.496 | −0.281 | 1.604 |
| | (2.988) | (1.908) | (1.174) | (1.832) | (0.338) | (1.091) |
| Not satisfied * female | −13.974 | 5.068 | 5.603 | 0.034 | −0.334 | 3.603 |
| | (6.224)** | (4.295) | (3.898) | (2.231) | (0.561) | (2.196) |
| Satisfied * male | 3.449 | −0.271 | −0.572 | −1.753 | −0.058 | −0.795 |
| | (3.105) | (1.997) | (0.875) | (1.866) | (0.104) | (1.819) |
| Not satisfied * male | −3.303 | −1.252 | −1.077 | 3.175 | 0.086 | 2.371 |
| | (6.509) | (3.213) | (1.072) | (4.392) | (0.261) | (4.607) |
| **Panel B** (N = 3,635) | | | | | | |
| Overeducated * female | −2.157 | 0.213 | −0.525 | 2.331 | −0.137 | 0.275 |
| | (4.749) | (3.303) | (1.262) | (3.048) | (0.684) | (1.381) |
| Undereducated * female | −7.483 | 4.487 | 4.861 | −1.700 | −0.205 | 0.041 |
| | (4.690) | (3.471) | (2.979) | (1.057) | (0.512) | (0.855) |
| Overeducated * male | −5.994 | −0.630 | 1.199 | 8.133 | −0.054 | −2.655 |
| | (5.305) | (2.750) | (1.365) | (4.391)* | (0.173) | (2.531) |
| Undereducated * male | −1.557 | 6.163 | 0.139 | −2.447 | 0.153 | −2.450 |
| | (5.416) | (4.880) | (0.936) | (1.647) | (0.344) | (2.516) |
| **Panel C** (N = 3,639) | | | | | | |
| ERI second tertile * female | −6.346 | 4.434 | 1.784 | −0.181 | 1.300 | −0.991 |
| | (3.793)* | (2.984) | (1.870) | (1.487) | (0.857) | (0.667) |
| ERI third tertile * female | −8.203 | 4.498 | 3.967 | −0.436 | 1.452 | −1.278 |
| | (3.824)** | (3.078) | (2.092)* | (1.312) | (0.866)* | (0.546)** |
| ERI second tertile * male | 2.978 | −0.965 | −1.842 | 0.479 | −0.028 | −0.621 |
| | (3.651) | (1.882) | (0.925)** | (2.576) | (0.069) | (2.445) |
| ERI third tertile * male | −4.750 | −0.045 | −0.819 | 2.973 | −0.094 | 2.734 |
| | (4.373) | (1.997) | (0.902) | (3.037) | (0.076) | (3.589) |
| **Panel D** (N = 3,639) | | | | | | |
| Physically demanding * female | −1.117 | 2.423 | −1.229 | −0.708 | 0.279 | 0.353 |
| | (2.824) | (2.199) | (1.423) | (0.802) | (0.648) | (0.482) |
| Time pressure * female | −2.685 | 2.350 | 1.837 | −0.789 | 0.198 | −0.911 |
| | (2.864) | (2.074) | (1.800) | (0.837) | (0.620) | (0.438)** |
| Support * female | 4.475 | −3.145 | −1.385 | −0.052 | −0.170 | 0.277 |
| | (2.815) | (1.730)* | (1.674) | (1.052) | (0.665) | (0.455) |
| Recognition * female | 2.425 | 2.124 | −3.563 | −0.843 | −0.437 | 0.294 |
| | (3.028) | (2.258) | (1.626)** | (1.030) | (0.640) | (0.535) |
| Adequate earnings * female | −4.227 | −1.943 | 5.743 | 0.034 | −0.260 | 0.653 |
| | (3.269) | (1.594) | (2.817)** | (0.885) | (0.490) | (0.647) |
| Poor prospects * female | −4.148 | 1.710 | 1.605 | −0.305 | 0.987 | 0.152 |
| | (3.164) | (2.336) | (1.831) | (1.024) | (0.741) | (0.438) |
| Poor job security * female | −9.762 | −2.604 | 3.172 | 7.123 | 0.582 | 1.489 |
| | (4.493)** | (1.666) | (2.719) | (3.058)** | (0.800) | (1.247) |
| Physically demanding * male | 2.711 | −1.520 | −1.237 | 0.092 | −0.101 | 0.055 |
| | (2.890) | (1.566) | (0.770) | (2.186) | (0.091) | (1.351) |
| Time pressure * male | 0.275 | 2.851 | −0.162 | −2.165 | −0.044 | −0.755 |
| | (3.095) | (1.985) | (0.715) | (2.149) | (0.061) | (1.440) |
| Support * male | 1.800 | −2.317 | −1.111 | 1.411 | −0.010 | 0.228 |
| | (3.482) | (1.845) | (0.935) | (2.514) | (0.058) | (1.627) |
| Recognition * male | −1.270 | 0.685 | 0.219 | 0.092 | 0.052 | 0.222 |
| | (3.601) | (2.071) | (0.913) | (2.492) | (0.084) | (1.689) |
| Adequate earnings * male | −0.080 | −1.728 | −0.831 | 0.883 | −0.011 | 1.766 |
| | (3.336) | (1.891) | (0.783) | (2.272) | (0.062) | (1.903) |
| Poor prospects * male | −5.745 | 4.238 | −1.266 | 0.764 | −0.132 | 2.141 |
| | (3.434)* | (2.184)* | (0.892) | (2.555) | (0.123) | (1.924) |
| Poor job security * male | −13.978 | −2.282 | 0.377 | 13.602 | 0.101 | 2.181 |
| | (4.848)*** | (1.591) | (1.068) | (5.125)*** | (0.149) | (2.229) |

*Notes*: Each panel (A–D) refers to a separate regression; gender-specific marginal effects reported are multiplied by 100 (base is always male or female corresponding to reported effect); basic controls, country-effects, and health & job controls included in all regressions; heteroscedasticity-robust standard errors in parentheses; weights account for differences in sampling probabilities; ***, **, and * indicate statistical significance at the 1 per cent, 5 per cent, and 10 per cent level. Control variables as shown in Table 1 are included.

life expectancy, monthly gross wage, and working hours, is missing in some cases. We keep these observations, set the values to zero, and control for missing values with binary indicators in the regressions.

## 4. Results

The results of our empirical analysis on the relationship between job quality and employment decisions (and retirement intentions) are shown in Table 3 for the binary probit models and in Table 4 for the multinomial probit model.

### 4.1 Employment decision — binary model

Table 3 presents results from the binary probit model for the two outcomes *working* and *working or partly retired* and the different measures of job quality — job satisfaction (Panel A), match quality with respect to education (Panel B), and the ERI ratio and its components (Panels C and D). Although the regressions presented in column 1 for working only include basic individual control variables and country-fixed effects, in columns 2 and 3 we additionally control for health and job characteristics. Each panel represents three separate regressions (two for working and one for working or partly retired as outcome) using the pooled sample of male and female workers in each regression.

**Panel A.** Using three categories of job satisfaction as indicators for job quality, we find a negative association between lower levels of overall satisfaction with the job and the probability of working 2 years later for female workers. Compared with women who are very satisfied with their job, those who are not satisfied are 16 percentage points less likely to be employed. The inclusion of health and job control variables decreases the marginal effect to 14 percentage points. For male workers, we find no significant associations between their job satisfaction and employment probability.

In the third two columns we present estimation results for our second dependent variable *working or partly retired*. The working population now includes additionally also individuals who are working and receiving public pension benefits at the same time. When counting these individuals as working, we again find a significant association between job satisfaction and the outcome variable for female workers and no significant effects for men. The estimated marginal effect of being not satisfied with the job decreases to about 9 percentage points, suggesting that many dissatisfied female workers are more likely to retire only partly instead of leaving the labour market entirely.

The strong reaction of women points to a lower attachment to the labour market as suggested by generally higher labour supply elasticities of female workers compared with male workers.[15]

**Panel B.** Our second set of estimates is based on the match quality between individuals and their jobs with respect to education as a measure of job quality. We find some evidence that overeducated male workers are less likely to be employed and employed or partly retired. Interestingly, when partly retired workers are not included in the working population the significant relationship disappears if individual health and job characteristics are included in the regressions. For women no significant results are obtained.

**Panel C.** Results based on the ERI ratio are presented in Panel C of Table 3. The ERI ratio is divided into country-specific tertiles. We use the first tertile as base group and present the marginal effects for the second and third tertile. The base group includes individuals in high quality jobs, whereas the third tertile includes individuals in poor quality jobs, i.e. individuals who have to make high efforts but receive low rewards in return. Contrary to expectations

from the ERI model, our estimation results suggest no significant effect of an imbalance between efforts and rewards on the employment probability, irrespective of whether we include partly retired workers in the working population or not.

***Panel D.*** As there is no direct support for the combination of effort–reward items according to the ERI model, we concentrate on estimating the effects of the specific items separately instead of using the ERI ratio. The most important determinant of the employment status is whether the individual hold a job with poor job security. We find a large and highly significant marginal effect in all specifications for both genders. Women who indicated that they have a poor job security are 15–17 percentage points more likely to leave their job 2 years later. For male workers the marginal effects are somewhat smaller and amount to 12–13 percentage points. These associations might reflect the fact that individuals in jobs with poor job security actually lose their jobs later on.[16] Neither of the other items related to rewards (support, recognition, pay, and prospects) or efforts (physically demanding job and time pressure) are significantly related to the probability of working.

Using our second dependent variable *working or partly retired* we find somewhat higher negative effects of poor job security for both genders, implying that workers who face low job security do not go into partial retirement but leave the labour market entirely. Moreover, female workers are 4 percentage points more likely to be working or partly retired if they stated that they are under a constant time pressure due to heavy workload, and 7 percentage points less likely if their earnings are adequate with respect to their efforts.

***Groups of countries.*** As the analysis is based on individuals from different European countries, we investigate whether the results differ between country groups. We therefore split our sample into three groups based on the geographic location of the country and run the regressions separately for Northern, Central, and Southern Europe.[17] Although women who are not satisfied with their job, seem to be more likely to stop working in all of the country groups, the coefficient is only statistically significant in Southern European countries. Moreover, the country analysis shows that the significant association between overeducation and (partial) retirement among male workers is driven by Southern European countries. In Northern European countries, we find a significant negative coefficient of undereducation for women when it comes to working or partial retirement. For the ERI ratio, we find no significant associations for Northern and Central European countries, but some significant coefficients for Southern Europe: Men in the second tertile are less likely to fully retire and women in the third tertile are more likely to retire or partly retire from their job. When considering the specific items capturing various dimensions of efforts in and rewards from a job, we again see that poor job security is strongly associated with working for both genders. However, the coefficients are only statistically significant in Central and Southern European countries. Concerning the other effort and reward measures, we again find that female workers are more sensitive to the quality of their job than male workers. For them, support in difficult situations plays a significant role in Northern and Southern Europe, whereas recognition and the absence of time pressure are important dimensions of job quality in Central European countries. Overall, the analysis confirms our main results and shows that the associations are generally stronger in Southern European countries.

## 4.2 Retirement intention

The last two columns of Table 3 show the results of our analysis of workers' retirement intentions. For ease of comparison with the results on the decision to stay in employment, we analyse whether job quality is related to having *no* intentions to retire (or to having intentions

to stay in employment). The estimated parameters are based on regressions using the pooled sample of male and female workers and including the full set of control variables.

Using job satisfaction as a measure for job quality (*Panel A*), we find a strong positive (negative) association between lower levels of overall satisfaction with the job and the intention to retire as early as possible (the intention to stay in employment) for female and male workers. The correlation increases the higher the level of job dissatisfaction. A comparison with the results for employment decisions indicates that workers (particularly men) with low job satisfaction and early retirement intentions face institutional and other (e.g. monetary) constraints that prevent them from actually leaving employment. Similarly, the negative association between overeducation and employment (*Panel B*) is more pronounced for intended than actual employment decisions. Moreover, we find that female undereducated workers are more likely to have retirement intentions, which, however, do not result in the actual decision to stop working. Undereducated workers may earn rather low wages and have had discontinuous working histories, and therefore, face monetary and/or institutional constraints that inhibit their retirement.

*Panel C* shows the results based on the ERI ratio. Again, the relationship is much stronger for intentions than actual decisions and increases with the imbalance between efforts and rewards (i.e. with a higher ERI ratio). The marginal effects are somewhat higher for female workers than for male workers. This gender difference is also visible in the separate estimations for the specific items of the ERI ratio (*Panel D*): Adequate earnings and recognition are significantly positively related to the intention to stay in employment for female workers only. Moreover, women who experience time pressure have higher intentions to retire. Male workers are more likely to consider retiring early when they have poor promotion or job advancement prospects. We do not find comparable effects when considering actual decisions. Regarding intentions, we do not find a significant association with poor job security. This suggests that the negative effect of poor job security on actual employment may reflect the fact that individuals in jobs with poor job security actually lose their jobs later on.

Overall, these results are in line with other studies on job quality and retirement intentions (e.g. Sejbaek *et al.*, 2012; Siegrist *et al.*, 2006). With respect to gender differences we find some evidence that male and female workers are sensible to different job attributes. The comparison of intentions and decisions may imply that workers face a trade-off when it comes to the actual decision to stop working because retiring early comes at a cost. For instance, in some countries the pension is reduced by a specific percentage for each year that it is claimed before the statutory retirement age. Other countries provide monetary incentives to work beyond the statutory retirement age. Although we control for many individual, health, and job-related characteristics, we cannot perfectly account for the individual cost of retiring. Part of the difference in the estimated effects may also be due to the fact that the actual decision is the result of a longer process whereas the answer to the question on retirement intentions may reflect a snapshot of the worker's current situation. Moreover, the timing of the intended retirement is not necessarily within the next 2 years, because the survey asks about retirement as soon as possible.

### 4.3 Employment decision — multinomial model

The results of the multinomial model are shown in Table 4. Each panel presents marginal effects in percentage points obtained from one multinomial probit regression and multiple non-linear marginal effects calculations. The effects in one line add up to zero.[18]

*Panel A.* The self reported job satisfaction measures show less clear results in the multinomial model than in the binary model. If we split the outcome into six different categories the precision of the estimates suffers. Nevertheless, we find a strong negative effect of job dissatisfaction in the first wave on the probability of working 2 years later (−14 percentage points), again for female workers only. The positive effects on partial retirement, full retirement, and other (esp. being homemaker) confirm, though less significant, the tendency to reduce working time in these unsatisfying jobs.

*Panel B.* The estimates for our measure of match quality complement the effects of the binary models above. The results show a significant transition of overeducated male workers into unemployment (8 percentage points) compared with workers with adequate education. Undereducated female and male workers also tend to reduce their labour force participation. Being undereducated tends to increase the probability of partial and full retirement for female workers (about 4 percentage points each) and the probability of partial retirement for male workers (6 percentage points), although these results are not significant. Our estimates are consistent with the literature on the link between educational mismatches and job satisfaction for older workers, as described before.

*Panel C.* Compared with the binary model, we do find significant effects of the ERI ratio in the multinomial model. First of all, the effects for female workers are much stronger and clearer than those for male workers. Female workers with ERI ratios in the second and third tertiles significantly reduced their labour force participation by 6 and 8 percentage points compared with female workers in high quality jobs (first tertile). For the third ERI tertile we find a significant increase in full retirement of 4 percentage points and in sick or disability leave of 1.5 percentage points. The lower the job quality the more female workers tend to go into partial retirement (4.5 percentage points for both tertiles, not significant). Furthermore, we find a significant but small negative effect on the transition into other states (esp. homemakers) for the third tertile.

The effects of an imbalance between efforts and rewards are less consistent for male workers. We find a significant reduction of the transition into full retirement for workers in medium quality jobs (second tertile) compared with workers with high quality jobs (−1.8 percentage points). These workers seem to work longer than their colleagues in high quality jobs (3 percentage points, not significant). Workers with poor quality jobs tend to stop working and tend to have a higher transition probability into unemployment and other states compared with workers in high quality jobs, although the coefficients are again not significant.

*Panel D.* Finally, we look at the effects of the effort and reward related job characteristics that compose the ERI ratio in detail. Consistent with the findings in the binary model we estimate a significant reduction in labour force participation of 14 and 9.8 percentage points due to poor job security for male and female workers. As expected, this reduction is reflected in a significant transition out of the labour market, particularly into unemployment (13.6 and 7.1 percentage points). One hypothesis for this strong effect is that workers with short-term contracts face poor job security.[19]

The effects of the remaining job characteristics differ with respect to gender. Female workers are responsive to support and recognition at their workplace. Women who get adequate support in difficult situations are 3 percentage points less likely to go into partial retirement and — though insignificant — 4.5 percentage points more likely to be employed. When female workers receive adequate recognition, they are 3.6 percentage points less likely to retire and tend to have higher employment and partial retirement rates compared with female workers who do not receive recognition for their work. Adequate earnings, on the other hand, seem to reduce labour force participation. Female workers whose earnings are adequate with respect to their

efforts are 5.7 percentage points more likely to retire. This comes along with reduced labour force participation and reduced partial retirement, though both insignificant. This counterintuitive result might be due to heterogeneity with respect to lifetime income (social security wealth), i.e. workers with higher lifetime income might take the opportunity to retire.

In contrast, male workers seem to be less responsive to effort- and reward-related job characteristics. Next to job security, only promotion prospects matter for the labour force participation decision of men. Poor promotion prospects lead to a significant reduction in labour force participation (−5.7 percentage points) and a significant transition into partial retirement (4.2 percentage points) compared with workers who have good career opportunities.

## 5. Discussion

Our study shows that retirement behaviour is somewhat influenced by the quality of the job the elderly worker is in. Although previous studies found consistent evidence on job quits and job-to-job changes (Böckerman and Ilmakunnas, 2009) as well as retirement intentions (Siegrist *et al.*, 2005) we can explore intentions to retire and actual transitions into retirement for a large sample of workers coming from 10 European countries. Although we are using several measures of job quality, in most of these, the impact of job quality on retirement is much stronger for women as compared with men. Women postpone retirement entry significantly if overall job satisfaction is good, if they get adequate recognition for their work, if time pressure is not too bad, if job security is reasonably okay and — in some specifications of our models — if the effort–reward relation is adequate. For men, only low job security and the fact of being overeducated for the actual job leads to early entry into retirement. These results are in accord with other studies showing that stress, repetitive working conditions (Filer and Petri, 1988) and in particular physically demanding jobs (Blekesaune and Solem, 2005) are associated with early retirement. Moreover, there are results showing that low autonomy in the job may lead to frustration and, thus, to early exit from the labour force (Blekesaune and Solem, 2005; Lund and Villadsen, 2005). Concentrating on job quality and working conditions is a fairly novel approach within economics, where the major emphasis has been traditionally laid on (financial) incentives and legal regulations for retirement. Our study is comparable to Van den Berg *et al.* (2010) who use the same data but concentrate more on the correlates of health and self-perceived health on retirement.

The finding that job quality is more relevant for women's transition to retirement compared with men's is reminiscent to female labour supply. Traditionally, women's labour supply reactions with respect to their own wage were typically much larger than those of men. Recent evidence (e.g. Bishop *et al.*, 2009; Blau and Kahn, 2007; Wernhart and Winter-Ebmer, 2012) shows that there still is a difference, but it has decreased substantially since the early 1980s. This can be explained by a more traditional role model of women, where alternative life expositions may exist and full-time work is not the only option — next to family or child-care. Our sample of retirement behaviour is remarkable in that respect, because we are observing women around age 60 in our sample. Although we are capturing only those women who were — given their birth cohort — already active in the labour market, they still seem to care more about non-financial aspects of a job — compared with men of the same birth cohort. Related results can be found in socio-psychological research (Lowe and Northcott, 1988) or from studies on gender wage differentials where women often care more for good working conditions (Filer, 1985; Hersch, 1990) to the expense of higher wages.

A major predictor for early retirement is the fact, that job security in the current job is especially poor. This can be due in part to involuntary transitions into early retirement or

unemployment, because of a job loss at a later stage in life, but it could also be due to higher levels of distress or lower levels of job satisfaction if one is holding a job with low job security.

Strengths of our approach are the multi-country set-up, which allows us to use highly comparable data for a large number of European countries. By doing so, we can draw on a large sample of working Europeans where we observe their working conditions and who are re-sampled after 2 years. Although 2 years might be a small period to observe retirement transitions, the period should not be larger, because otherwise, we would not be able to relate the past working conditions to a final exit of the labour market. So we think, a two-year period is just about right for our research question. Another strength of our analysis concerns the various ways we are able to measure job quality.

As mentioned above, around 34 per cent of all individuals in our sample left the panel between the two waves. Although we have no information on the employment status of these individuals in the second wave, we are able to analyse whether these individuals differ from those in our sample with respect to the quality of their job in the first wave. Table 5 presents binary probit estimations. The dependent variable is an indicator equal to 1 if the respondent

**Table 5.** Probit regressions for sample attrition

| Variable | (1) Left panel | (2) Left panel | (3) Left panel | (4) Left panel | (5) Left panel |
|---|---|---|---|---|---|
| Satisfied | 0.062 (0.054) | | | | 0.073 (0.056) |
| Not satisfied | 0.055 (0.102) | | | | 0.104 (0.110) |
| Overeducated | | −0.051 (0.085) | | | −0.056 (0.086) |
| Undereducated | | −0.193 (0.083)** | | | −0.187 (0.083)** |
| ERI second tertile | | | −0.074 (0.064) | | |
| ERI third tertile | | | −0.104 (0.064) | | |
| Physically demanding | | | | 0.001 (0.055) | −0.009 (0.055) |
| Time pressure | | | | −0.048 (0.056) | −0.047 (0.056) |
| Support | | | | 0.090 (0.064) | 0.093 (0.065) |
| Recognition | | | | −0.045 (0.065) | −0.025 (0.066) |
| Adequate earnings | | | | 0.044 (0.056) | 0.050 (0.057) |
| Poor prospects | | | | −0.017 (0.056) | −0.022 (0.056) |
| Poor job security | | | | 0.045 (0.062) | 0.037 (0.063) |

*Notes*: Each column presents the coefficients of separate binary probit regressions of an indicator variable equal to 1 if a respondent left the survey between wave 1 and wave 2 on all control variables (basic controls, country-effects, and health & job controls). Heteroscedasticity-robust standard errors in parentheses; weights account for differences in sampling probabilities. N = 5,620 (19 observations were dropped because the sampling weight was missing). ***, **, and * indicate statistical significance at the 1 per cent, 5 per cent, and 10 per cent level.

left the survey between the two waves. Neither job satisfaction, nor the ERI ratio and its components is significantly related to sample attrition. However, in columns 2 and 5, we see that undereducated individuals are less likely to leave the panel compared with those who hold the adequate level of education for their job. Overall, we conclude that sample attrition does not bias our results on job satisfaction and the ERI. However, the estimates on educational mismatch should be interpreted with caution.

Furthermore, although our study shows interesting associations between job quality indicators and employment decisions, we want to point out that these associations might be partly driven by unobserved heterogeneity. Although we control for many individual, health, and job-related characteristics, such as age, family status, self-perceived health, activity limitations, wages, and hours worked, some other factors may be missing. Highly motivated and talented individuals, for example, might feel more satisfied with their job, rate the dimensions of their job in a positive way and at the same time stay in their job for a longer period. Furthermore, we cannot rule out reversed causality. For example, future plans of retirement might lead to a downgrading in the job quality indicators, i.e. people who gave the interview shortly before they retire might be less satisfied with their job due to cognitive dissonance. Unobserved heterogeneity with respect to constraints may also be partly responsible for some of the differences between the intention and the actual decision to retire.

## Notes

[1] The paper includes a discussion of further methodological issues, for instance, whether a job quality indicator should measure results or procedures, should be static or dynamic and should be a composite index or a system of indicators.

[2] McGuiness and Wooden (2009) have shown that greater mobility among overskilled workers is often due to involuntary job separations and even when job separations are voluntary, the majority of moves do not result in improved skill matches.

[3] See Verdugo and Turner-Verdugo (1989) or Vieira (2005) for other aspects of educational mismatch.

[4] The model assumes that it is impossible to specify complete contingent contracts, i.e. contracts that contain all relationship-specific investments.

[5] See http://www.share-project.org/ for detailed information on the survey. The survey is sampling households with persons above 50; all persons above 50 are interviewed plus their partners. The household response rate across Europe is 61.6 per cent and the individual response rate is 85.3 per cent.

[6] We had to drop Greece from the analysis because some categories in the outcome variable and in several right-hand-side variables had no observations, which would have caused a perfect prediction in the models. An inclusion of these observations in some of the models (where possible) did not change the results.

[7] Note that the survey does not provide job quality indicators for self-employed individuals.

[8] The numbers in parentheses indicate the percentage of all individuals who agreed or strongly agreed to the statements.

[9] Note that promotion prospects and job insecurity are reverse coded in order to compute the sum of scores.

[10] See Schnalzenberger *et al.* (2008) for a descriptive analysis.

[11] Subjective life expectancy may capture current and future expected values of variables that influence mortality risk, such as exercise, diet, and smoking habits (Perozek, 2008), and predicts actual survival (Hurd and McGarry, 2002). Moreover, there is evidence that low subjective probabilities of survival are positively correlated with early retirement (Hurd *et al.*, 2004) and retirement intentions (Van Solinge and Henkens, 2010).

[12] The results do not significantly change when including health and job-related controls.

[13] The estimated coefficients of separate estimations for men and women are very similar to the results presented below.

[14] We lose 0.24 per cent of the observations when focussing on job satisfaction, 2.07 per cent for over- and undereducation and 1.97 per cent when effort and reward-based job quality indicators are used.

[15] See Blundell and MaCurdy (1999) for a review of the literature on labour supply. More recent evidence (e.g. Bishop *et al.*, 2009; Blau and Kahn, 2007; Wernhart and Winter-Ebmer, 2012) shows that women's labour supply elasticity with respect to their own wage has decreased substantially since the early 1980s.

[16] The results of the multinomial model presented in the next section reveal that poor job security is significantly associated with unemployment 2 years later.

[17] We grouped the countries as follows: Northern Europe (Denmark and Sweden), Central Europe (Netherlands, Belgium, Germany, Switzerland, and Austria), and Southern Europe (France and Italy).

[18] The marginal effects are calculated using the method proposed in Ai and Norton (2003).

[19] 55.6 per cent of workers with short-term contracts in the first wave also reported poor job security. Also 20.2 per cent of workers with permanent contracts report job security. So we find a positive — but not very strong — correlation (0.234) between poor job security and having a short-term contract. 31.7 per cent of the unemployed workers in wave 2 reported a short-term contract in wave 1 whereas only 14.2 per cent of the unemployed report that they lost their job because of a temporary contract. This indicates a much broader sense of the poor job security reported by the respondents.

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