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Job Quality and Employment of Older People in Europe

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Abstract

We study the relationship between job quality and retirement using panel data for European countries (SHARE). While 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.

JEL Classification: J14, J18, J26, J28
Keywords: retirement, job quality, job satisfaction, educational mismatch, effort-reward imbalance, SHARE

1   Introduction

Given the ongoing demographic transition caused by decreasing fertility rates and an 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, policy-makers 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, and job quality. For the study of industrial relations it is particularly important if also working conditions and job quality are related to retirement decisions of workers.

First results from the Survey of Health, Ageing, and Retirement in Europe (SHARE) have shown that there is a strong association between poor job quality and poor health (**?**), and that both, poor job quality and reduced well-being are positively related to the intention to retire (Siegrist et al., 2006). Therefore, job quality may have both a direct and an indirect effect – by affecting health – on the decision to stop working or to retire. While there have been studies investigating the impact of job quality on intentions to retire (Siegrist and Wahrendorf, 2009), 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 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, 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, but is not very operative from a policy perspective. Therefore, we use two additional measures of job quality that

should be easier to manipulate and therefore more relevant for policymakers. 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.[1] The second one is derived from the effort-reward imbalance model (Siegrist et al., 2004) and measures the imbalance between a worker's effort and the rewards he or she receives in turn.

2 Data and Empirical Design

We use data from the first two waves of the Survey of Health, Ageing and Retirement in Europe (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 individuals were re-interviewed in 2006/07.[2]

Sampling 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.[3] From these 14,121 individuals, about 48% were working while not receiving any public pension benefits. Since 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. Of those persons, 3,712 were interviewed again in the second wave two years later and completed the questions on their employment status.

Dependent Variables As shown in Figure 1, the majority of the individuals in our sample is still working at the time of the second interview in 2006/07. Regarding retirement, the situation is unclear, because a significant amount of persons already

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[1]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.

[2]See *http://www.share-project.org/* for detailed information on the survey.

[3]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.

claim public pension benefits while still being employed (at least partly): we will classify these persons as "partly retired".
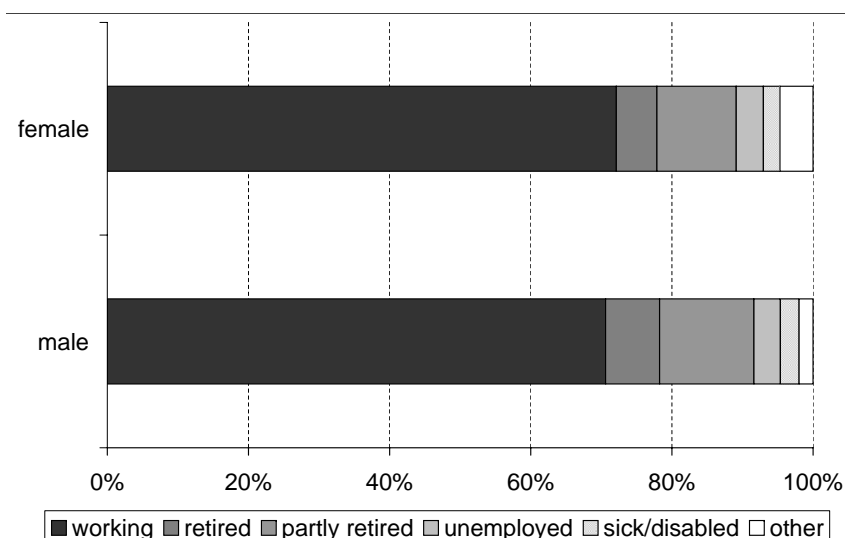

Figure 1: Employment status by gender in 2006/07

17 percent of women and 21 percent of men retired or partly retired between the two waves. About 5 percent of the female workers left employment due to other reasons, e.g. to become homemakers (about 80 percent 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 percent in Switzerland to 64 percent in Spain. The retirement and partial retirement rates vary substantially between European countries. In Austria, Italy and Sweden, 20 percent or more switch to retirement or partial retirement. While most of them are fully retired in Austria (20 percent), Swedes opt more often for partial retirement (nearly 21 percent). 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 decision to stop working within the next two years. We estimate binary and multinomial probit models. In the binary case, our dependent variable is indicating whether a person is still working at the time of the second
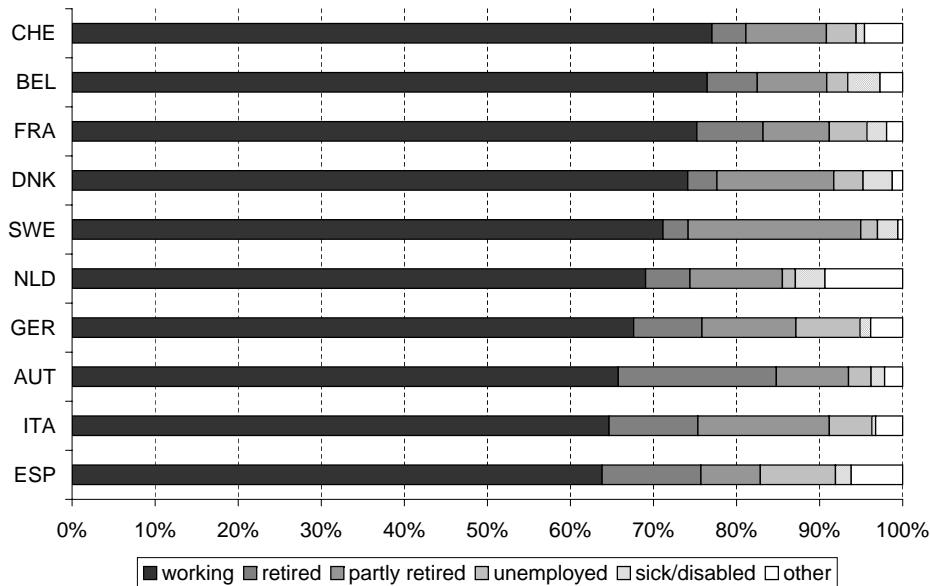
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Figure 2: Employment status by country in 2006/07

interview. On average, 16 percent 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 percent are working or are 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, while a medium quality may result in partial retirement only.

Our first binary dependent variable *working* is 1 for individuals who work and 0 for all other categories. The second variable *working or partly retired* is 1 for all individuals who work, irrespective of whether they receive any public pension benefits. This definition, thus, includes partly retired individuals. About 71 percent of the individuals in our sample are working and 84 percent are working or partly retired.

To analyse in more detail possible transition states of persons who gave up their job between the two waves, we also apply multinomial probit models. In that case, the dependent variable consists of six categories: working, retired, partly retired, unem-

ployed, 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.

Job Quality 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 percent of the respondents strongly agreed, 46 percent agreed, 6 percent disagreed and about 1.5 percent 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 percent vs. 48 percent).

Subjective job satisfaction captures all dimensions of job quality. Since this information cannot be leveraged by policy makers, we use two further measures of job quality. We focus on (i) the match quality between the individuals and their jobs and (ii) the balance between efforts and rewards in the last job. 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, undereducation is defined as having more than one standard deviation fewer years of education than the mean in the corresponding group. This approach is based on the work of Verdugo and Turner-Verdugo (1989). In total, about 17 percent of all respondents are overeducated and about 14 percent are undereducated for their job. Male workers are significantly more likely to be overeducated than their female counterparts (19 percent compared to 15 percent).

For our third measure of job quality, we use the effort-reward imbalance model, developed by Siegrist (1996) and recently applied by Siegrist et al. (2004, 2006); **?**. The model claims that jobs are particularly stressful if they are characterized by a non-reciprocity or imbalance of high efforts made and low rewards received from the job. An occupational effort-reward imbalance is documented to be related to poor self-rated health, depression and the desire to retire as early as possible Siegrist (1996).

In the first wave of SHARE, 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)[4]:

- 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, while 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 vs. 72 percent) and recognition (74 vs. 70 percent) and lower levels of adequacy of earnings (54 vs. 63 percent) and job insecurity (19 vs. 24 percent).

The ERI (effort-reward imbalance) 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. Following Siegrist et al. (2006), we use tertiles of the ratio, which we calculated for each country separately to account for different reporting styles. In our estimation sample, 37 percent of all female workers and 34 percent of all male workers

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

are located in the first tertile (high job quality), 30 percent and 34 percent in the second tertile and 33 percent and 32 percent in the third tertile, which is associated with the poorest job quality. In our regressions, we use the tertiles and the specific items, to document which job characteristics are most relevant for the employment decision within the next two years.

Table 2 shows the correlation between subjective job satisfaction and the other job quality indicators. Surprisingly, 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 and the ERI ratio by country. Job satisfaction as well as the effort-reward-relation is most favourable in Switzerland and least favourable in Italy.
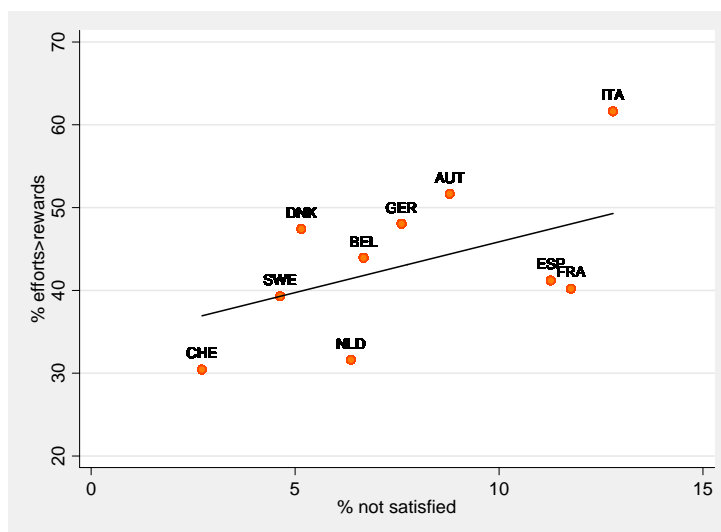
Figure 3: Job Satisfaction and Effort-Reward-Imbalance

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) Since 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 overeducated 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.

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

$$Working^*_{ict+2} = \beta_1 + \beta_2\, JQ_{ict} + \beta_3\, X_{ict} + \upsilon_c + \epsilon_{ict} \tag{1}$$

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

where $Working^*_{ict+2}$ is the latent probability of individual i in country c to work at the time of the second interview $t+2$ (two 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 υ_c are country-specific error terms.

Alternatively, the multinomial probit model can be written as

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$$U_{icat+2} = \beta_{1a} + \beta_{2a}\, JQ_{ict} + \beta_{3a}\, X_{ict} + \nu_{ca} + \epsilon_{icat}, \qquad (3)$$

$$\epsilon_{icat} \sim MVN(0, \Sigma), \qquad (4)$$

$$U_{ic1t+2} = 0 \qquad (5)$$

$$Y_{ict+2} = j \Leftrightarrow U_{icjt+2} > U_{icat+2} \quad \forall \quad a \neq j, \qquad (6)$$

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 β's are set to zero. Therefore, we have five alternative specific β'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 error terms ν_{ca}.

The vector X_{ict} includes individual characteristics (years of education, binary indicators for being married, 10 categories of age, self-perceived health, activity limitations and subjective life-expectancy), job-related characteristics (civil servant, monthly gross wage and number of weekly working hours) and 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). Furthermore, we control for country-specific effects. We estimate the model on the pooled female and male sample and interact all job quality variables with a female dummy. In the tables below we present marginal effects that use either male or female workers of a specific base group as reference for the calculation.[5] 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.[6] Furthermore, the information on some control variables, such as subjective life-expectancy, monthly gross wage and working hours is missing in

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[5]The estimated coefficients of separate estimations for males and females are very similar to the results presented below.

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

some cases. We keep these observations, set the values to zero and control for missing values with binary indicators in the regressions.

3   Results

The results of our empirical analysis on the relationship between job quality and employment decisions are shown in Table 3 for the binary probit model and in Table 4 for the multinomial probit model. All models include the control variables and country indicators described in section 2.

3.1   Results of the binary model

Table 3 presents results from the binary probit model for the two outcomes *working* and *working or partly retired* and the three different measures of job quality – job satisfaction (Panel A), match quality with respect to education (Panel B), and the effort-reward imbalance ratio and its components (Panel C and D). Each panel represents two separate regressions (one 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 correlation between lower levels of overall satisfaction with the job and the probability of working two years later. Female workers who are not satisfied with their job are 14.2 percentage points less likely to be employed than females who are very satisfied with their job. There is no significant difference between females who are very satisfied and females who are satisfied only. For male workers, the correlation is somewhat lower. Being satisfied with the job is related to a 5.5 percentage points lower probability of working compared to being very satisfied. The negative association is somewhat higher (-9.1 percentage points) for males who are not satisfied at all. The stronger reaction of females points to a lower attachment to the labor market as suggested by generally higher labor supply elasticities of female workers compared to male workers.[7]

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[7]See Blundell and MaCurdy (1999) for a review of the literature on labor supply. More recent evidence (e.g. Bishop et al., 2009; Blau and Kahn, 2007; Wernhart and Winter-Ebmer, 2011) shows that women's labor supply elasticity with respect to their own wage has decreased substantially since the early 1980s.

In the remaining two columns we present estimations 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 do not find any significant association between the employment probability and job quality as measured by job satisfaction. Since the estimated coefficients on all satisfaction indicators are closer to zero compared to the model where partly retired individuals are not counted as working, it seems that dissatisfied female workers are more likely to retire only partly instead of leaving the labor market entirely.

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 no significant relationship between being over- or undereducated and the employment probability, neither for males nor for females. Only when including partly retired workers in the working population, we find that overeducated males are less likely to be employed compared to workers who are adequately educated for the job they hold.

Panel C   Results based on the effort-reward imbalance (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 coefficients 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. We find a significant negative relationship between the lack of job security and the employment probability two years later. The effects are somewhat higher for female workers (-15.4 percentage points) than for males workers (-11.8 percentage points). Neither of the other items related

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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, which might imply that workers who face low job security do not go into partial retirement but rather leave the labor market entirely. Moreover, female workers are 4.2 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 7.1 percentage points less likely if their earnings are adequate with respect to their efforts.

3.2 Results of the 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 nonlinear marginal effects calculations. The effects in one line add up to zero.[8]

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 two years later (-14 percentage points). 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 (8.1 percentage points) compared to workers with adequate education (the base group). Undereducated female and male workers also tend to reduce their labor 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 (6.2 percentage points), though these results are not significant. Our estimates are consistent with the

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

literature on the link between educational mismatches and job satisfaction for older workers, as described before.

Panel C Compared to 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 tertile significantly reduced their labor force participation by 6.3 and 8.2 percentage points compared to 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 to 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 to 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 labor 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 labor 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.[9]

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[9]55.6 percent of workers with short-term contracts in the first wave also reported poor job security. Also 20.2 percent of workers with permanent contracts report job security. So we find a positive – but not very strong - correlation (0.2344) between poor job security and having a short-term contract. 31.7 percent of the unemployed workers in wave 2 reported a short-term contract in wave 1 while only 14.2 percent 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.

The effects of the remaining job characteristics differ with respect to gender. Female workers are responsive to support and recognition at their workplace. Females who get adequate support in difficult situations are 3.1 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 to female workers who do not receive recognition for their work. Adequate earnings, on the other hand, seem to reduce labor 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 labor 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 labor force participation decision of males. Poor promotion prospects lead to a significant reduction in labor force participation (-5.7 percentage points) and a significant transition into partial retirement (4.2 percentage points) compared to workers who have good career opportunities.

4   Conclusions

We study the relationship between job quality and retirement using panel data for European countries (SHARE). While 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 the effort-reward imbalance, which measures the imbalance between a worker's effort and the rewards he or she receives in turn.

Our results show that, in particular for females, overall dissatisfaction with a job leads to a pronounced exit from work, either in full or partial retirement, but also out of the labor force. More detailed analyses for particular aspects of working conditions

show that inadequacies between education and the current job does not predict early exit from the labor force to a larger extent. A major predictor for early retirement is the fact, that job security in the current job is especially poor. This can be due to partly involuntary transitions into early retirement, because of a job loss at a later stage in life.

5 Tables

Table 1: Variable Description and Summary Statistics

Variable	Description	All Mean	All Stdev	Means Females	Means Males
Binary outcomes					
working	Individual is working	0.713		0.721	0.706
working or partly retired	Individual is working or partly retired	0.837		0.834	0.840
Multinomial outcomes					
working	Individual is working,	0.713		0.721	0.706
retired	retired,	0.067		0.058	0.076
partly retired	retired and gets public pensions,	0.038		0.039	0.037
unemployed	unemployed or looking for work,	0.025		0.023	0.027
sick or disabled	permanently sick or disabled,	0.123		0.112	0.134
other	homemaker or other (rentier, student etc).	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	effort-reward imbalance 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

to be continued . . .

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Variable	Description	All		Means	
		Mean	**Stdev**	**Females**	**Males**
Control variables					
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
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	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	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
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
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) and for job characteristics (3,639).

Table 2: Job satisfaction, education and effort-reward-imbalance

Variable	Females	Males
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-percent, 5-percent and 10-percent level.

Table 3: Binary probit regressions: Job quality

Variable	*Working*		*Working or partly retired*	
	Females	Males	Females	Males
Panel A (N = 3,703) base: very satisfied				
satisfied	-3.286	-5.552	4.672	3.477
	(3.704)	(3.047)*	(3.560)	(2.571)
not satisfied	-14.183	-9.124	-3.705	-3.803
	(6.700)**	(5.534)*	(6.981)	(5.337)
Panel B (N = 3,635) base: adequately educated				
overeducated	-1.116	-1.732	-6.252	-7.424
	(4.203)	(5.759)	(5.607)	(4.428)*
undereducated	-0.725	-4.796	-1.707	3.452
	(3.494)	(5.063)	(5.877)	(3.191)
Panel C (N = 3,639) base: ERI first tertile				
ERI second tertile	-4.779	5.811	-0.461	4.926
	(4.496)	(3.982)	(3.302)	(3.018)
ERI third tertile	-5.053	-1.198	-0.622	-0.862
	(4.051)	(4.342)	(2.916)	(3.494)
Panel D (N = 3,639)				
physically demanding	-0.786	4.729	1.047	3.489
	(3.444)	(3.330)	(2.642)	(2.393)
time pressure	1.777	1.867	4.234	3.031
	(3.421)	(3.431)	(2.543)*	(2.505)
support	4.490	3.419	0.279	1.210
	(3.713)	(3.990)	(3.070)	(3.052)
recognition	2.383	-1.881	4.451	-0.798
	(3.878)	(4.208)	(2.931)	(3.132)
adequate earnings	-4.368	3.142	-7.141	0.203
	(3.751)	(3.768)	(3.337)**	(2.758)
poor prospects	-4.927	-2.628	-2.280	3.551
	(3.940)	(3.806)	(2.950)	(2.666)
poor job security	-15.350	-11.843	-18.278	-14.014
	(5.443)***	(4.359)***	(5.004)***	(4.196)***

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 males the same applies, marginal effects reported, all control variables and country-indicators included, heteroscedasticity-robust standard errors in parentheses, weights account for differences in sampling probabilities, ***, ** and * indicate statistical significance at the 1-percent, 5-percent and 10-percent level. Control variables as shown in Table 1 are included.

Table 4: Mutinomial 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)

to be continued . . .

Variable	Working	Part-retired	Retired	Unemployed	Sick/disabled	Other
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 (base is always male or female corresponding to reported effect), all control variables and country-indicators included, heteroscedasticity-robust standard errors in parentheses, weights account for differences in sampling probabilities, ***, ** and * indicate statistical significance at the 1-percent, 5-percent and 10-percent level. Control variables as shown in Table 1 are included.

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