Demanding occupations and the retirement age

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HIGHLIGHTS

- We analyse unique Dutch survey data on the public's opinion on what are demanding occupations on the willingness to support an early retirement scheme for such occupations.
- We find that the Dutch think that workers in physically demanding occupations should be able to retire earlier.
- Perceiving an occupation as demanding also translates into a much higher willingness to contribute to an early retirement scheme for that occupation.
- There is some evidence that respondents whose own job is similar to the occupation they evaluate find this occupation more demanding than other respondents but respondents are typically also willing to contribute to early retirement of demanding occupations not similar to their own.

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ABSTRACT

We analyse unique Dutch survey data on the public's opinions on what are demanding occupations, on whether it is justified that someone with a demanding occupation can retire earlier, and on the willingness to contribute to an earlier retirement scheme for such occupations through higher taxes. We find that the Dutch think that workers in physically demanding occupations should be able to retire earlier. A one standard deviation increase in the perceived demanding nature of an occupation translates into a twelve months decrease in the reasonable retirement age and a 30 to 40 percentage point increase in the willingness to contribute to an early retirement scheme for that occupation. There is some evidence that respondents whose own job is similar to the occupation they evaluate find this occupation more demanding than other respondents, but respondents are typically also willing to contribute to early retirement of demanding occupations not similar to their own.

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1. Introduction

Many governments are reforming pension schemes to tackle concerns about their fiscal sustainability, due to ageing of the population. A widely employed and highly visible reform is to increase the statutory retirement age (OECD, 2011) — the age at which individuals are entitled to the 'full' old age pension provided by the state (usually called the first pillar pension). This seems reasonable in most cases, since both life expectancy and "healthy life expectancy" (the number of years spent without any serious disability) have risen and are still increasing (Majer et al., 2013). In other words, the trend is that health at a given age improves, so that in most occupations, workers will be able to work and remain productive longer. These facts taken together naturally lead to the generic policy of increasing the statutory retirement age at which individuals become eligible for the state pension, in order to guarantee the sustainability of the first pillar pension system, with future cohorts paying premiums for a longer time period and claiming benefits for a shorter time period.

Concerns, however, have been raised about the consequences of such a generic policy for workers in demanding occupations, who currently already often stop working before the statutory retirement age to receive early retirement benefits. The policy debate in the Netherlands has, for example, emphasized that low-skilled workers in the construction sector cannot be expected to work longer since their jobs require a level of physical health that they often can no longer maintain at older age, partly because the heavy work they have done during their whole career has deteriorated their health. The government suggested making an exception for this kind of physically demanding occupations.[1] Many also disagreed with this idea however, and pointed at the large costs of such policies (cf. Boldrin et al., 2004).

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[1] See, e.g., http://www.nu.nl/economie/2152950/kabinet-blijft-bij-lijst-zware-beroepen.html

They suggested that occupations should become less demanding by investing in technological improvements. If workers in demanding occupations could get access to early retirement, such investments could become unattractive (OECD, 2007).

In the debate that followed, several other occupational groups have also argued for exceptions, not only based upon physical demands but also because of the mentally demanding nature of their occupation. This is in line with Borghans and ter Weel (2012) who argue that putting up a (subjective) list of heavy occupations will not work in practise, since too many groups will claim they have to be included. On the other hand, it is also not easy to define objectively what constitutes a demanding occupation. Because of these practical considerations, the Dutch government in the end decided to raise the statutory retirement age without making any exceptions. Since 2013 the statutory retirement age is increasing and it will increase further in the near future. The issue of differentiating among occupations may therefore come back on the policy agenda. Moreover, a similar debate seems to have started in Belgium[2] and the UK, where the new Labour leader Jeremy Corbyn stated, "Manual workers in 'physically demanding jobs' should be allowed to retire early."[3] This illustrates that the issue is relevant in many countries where pension systems are reformed and the standard retirement age increases.

As far as we know, there are currently no countries in which the state pension eligibility age explicitly depends upon the demanding nature of the occupation.[4] On the other hand, there are many countries in which state pension eligibility depends upon the number of years individuals have contributed pension premiums (Germany, Italy and Spain, for example; see the appendix in Mazzonna and Peracchi, 2014, or OECD, 2015, Section 2.2), so that those who entered the labour market at a younger age can retire earlier. This will often apply to low educated workers in physically demanding occupations. In the Netherlands, this is not the case: the state pension eligibility age does not depend on labour market history at all, possibly making the issue more pressing in the Netherlands than elsewhere.

This study analyses the opinion of the Dutch on early retirement arrangements of demanding occupations, where data on the people's views were collected at the time when the policy debate on demanding occupations was taking place. It contributes to the literature as it directly elicits survey respondents' attitudes and beliefs concerning a specific reform of the pension system. This is important since the shape and implementation of social security reforms in general and pension reforms in particular often depends on the opinion of the general public (Cremer and Pestieau, 2000; O'Donnell and Tinios, 2003). For the political feasibility of differentiation in the statutory retirement age, the public's willingness to accept such an arrangement and its views on what it should look like may therefore play a crucial role. We study whether the Dutch population is willing to contribute to early retirement schemes for specific occupations. We investigate which characteristics make an occupation demanding in the public's view, and how the perceived burden of an occupation affects the reasonable retirement age and the willingness to contribute to an occupation-specific early retirement scheme. Moreover, we analyse whether people are only willing to contribute to a scheme for occupations similar to their own (possibly reflecting self-interest) or also to schemes for other occupations, where they cannot expect direct gains for themselves. The latter would reflect some kind of social preferences (see, e.g., DellaVigna, 2009).[5]

The survey questions used in this study refer to pensions in general and not specifically the first pillar. Many workers with physically demanding jobs are low-paid workers.[6] In the Dutch system, first pillar pensions play a much larger role for low income than for higher income groups. This is because the first pillar provides an essentially flat basic income, which is the main source of income for those with low lifetime earnings, but only a limited part of total pension income for higher lifetime earnings groups who have built up a second pillar occupational pension (mandatory for almost all employees). This implies that the effects of an increase in the statutory retirement age are heterogeneous, reducing total retirement wealth by a much larger fraction for low income than for high-income individuals. It also means that "repairing" the increase in the eligibility age for state pensions for low-income earners through an earlier occupational pension is relatively expensive – this pension has to be much higher in the years before the state pension can be claimed.

Several earlier studies have proposed to differentiate the statutory retirement age. Life expectancy increases with income.[7] Bovenberg et al. (2006) therefore argue that the statutory retirement age should not be uniform but linked to the (remaining) life expectancy of the socio-economic group. Ravesteijn et al. (2013) analyse the relation between occupation and health, and conclude that workers whose poor health was caused by occupational characteristics should be exempted from an increase in the statutory retirement age if their occupational health damage was not compensated through a wage premium.

The Dutch reforms of the system of disability benefits since the 1990s also make the issue more relevant, since the alternative for older workers with health problems to enter disability has become much more difficult and less financially attractive for individuals as well as firms. Access rules have been tightened, benefits have been reduced, and experience rating has made it costly for firms if many of their workers enter disability. As a consequence, inflow rates into disability insurance have fallen substantially (see, e.g. García-Gómez et al., 2011). By largely eliminating the alternative exit route through disability insurance, early retirement has become more important, particularly for older individuals with demanding occupations for whom work limiting health problems are more prevalent.

Our findings lead to clear conclusions on what the public considers a demanding occupation. Respondents attach a large weight to physical effort while mental effort or job stress is not important. They see "construction worker" as a burdensome occupation, while "teacher" and "desk job" are not. This also implies a lower reasonable retirement age and a higher willingness to contribute to an early retirement scheme for construction workers than to a scheme for other occupations. The data show that people are willing to contribute to early retirement schemes of construction workers even if this occupation is not similar to their own job. For other occupations, such as desk jobs or teacher, this is much less the case. This suggests that self-interest is not the only thing driving the support for early retirement of demanding occupations — at least part of it is due to other factors such as social preferences.

The remainder of this paper is organized as follows. Section 2 discusses some background literature and Section 3 describes the relevant institutional framework in the Netherlands. Section 4 describes the survey design and the data. Section 5 introduces the econometric model and discusses the empirical results. Section 6 concludes.

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[2] e.g., http://pvda.be/artikels/regering-wil-debat-met-sociale-partners-over-zware-beroepen-maar-niet-echt

[3] http://www.telegraph.co.uk/news/politics/Jeremy_Corbyn/11837898/Jeremy-Corbyn-Manual-workers-in-physically-demanding-jobs-should-be-allowed-to-retire-early.html

[4] In many countries, very specific occupations such as the military or the police force have their own retirement system with a younger eligibility age. In this paper we do not pay attention to these specific cases and refer to demanding occupations more in general.

[5] Of course, the arrangement could be in the interest of a family member or friend who has such an occupation.

[6] See, e.g., the following list of earnings by occupation: http://www.gemiddeld-inkomen.nl/gemiddeld-salaris-per-beroep/. Rho (2010) demonstrates a strong negative association between earnings and physical job demands for older workers in the US.

[7] For example, Kalwij et al. (2013) find that low-income individuals have an approximately 2.5 years shorter remaining life expectancy at 65 years of age than high-income individuals.

2. Related literature

There is a vast literature on the economic and non-economic determinants of retirement. Gruber and Wise (1999, 2004), among many others, analysed the interplay between retirement benefits and exit rates from the labour market in various countries. More relevant for the current study is the role of health. Individuals could find themselves unable to continue working due to health problems. Indeed, structural models of retirement behaviour often control for health status. See, for instance, Gustman and Steinmeier (2005) or Rust and Phelan (1997).

Case and Deaton (2005) add a link between occupation and health. If workers can generate earnings from their health capital or human capital, lower-educated workers may find it optimal to let their health stock depreciate more quickly as they do not have access to a large stock of human capital. Examples could be stressful or physically demanding occupations. Fletcher et al. (2011) find a detrimental impact of physically demanding job conditions on health, particularly for females and older workers. The theory of compensating wage differentials predicts that workers in physically demanding jobs would get a higher wage to compensate for this health loss, but the empirical literature does not find convincing evidence for this. In additional estimations Fletcher et al. (2011) add the cumulative number of hours worked and cumulative labour income and find that adding these reduces the effect of physical demands on health.

In other studies on compensating wage differentials, the evidence is mixed. For Finland, Böckerman and Ilmakunnas (2006) find that a job disamenity has a negative effect on job satisfaction but much less on individual wages. On the other hand, Böckerman et al. (2011) find that higher job insecurity is associated with a higher individual wage, while it has no effect on job satisfaction. They conclude that the higher wage compensates for this job disamenity. Bryson et al. (2012) find that wages in Britain are positively correlated with job anxiety but also with non-pecuniary job satisfaction. This is inconsistent with an explanation of compensating wage differentials, which would imply that job characteristics leading to lower non-pecuniary job satisfaction should be compensated by a higher wage. At the same time Leeth and Ruser (2003), find that high compensating wage differentials are paid for risky jobs.

The possible absence of compensating wage differentials for demanding occupations, which may be due to the difficulty of assessing future health costs of current choices, creates scope for policy intervention. Creating an opportunity for earlier retirement seems a particularly effective way of compensating individuals for their demanding occupations since people in demanding occupations may find it difficult to continue working when they get older due to health issues. Neumark and Song (2012) indeed find that physical challenges in the job form a barrier to extending work lives. Holden (1988) finds that for men in the US, working in a physically demanding job is associated with lower chances of working after retirement (that is, when receiving retirement benefits), but she finds no such association for women. De Grip et al. (2013) find that older cohorts of Dutch public sector employees expect to retire earlier if they have a physically demanding job.

An important segment of the literature focuses on the public's opinion about pension policies and analyses the attitudes toward reforming pensions, specifically considering changes in the retirement age. Boeri et al. (2002) survey the opinion of European citizens on reforms aimed at maintaining the sustainability of state pensions. They find high opposition against reforms and suggest that this is at least to some extent due to selfishness. Van Groezen et al. (2009) show that European citizens, also because of the allowed retirement age, more often report a preference for a public rather than a private pension system. Jaime-Castillo (2013) finds that participants in pension schemes with more solidarity are more willing to contribute to the system.

Of course stated willingness to pay might diverge from actual behaviour. In our current survey the payments are hypothetical, and respondents may not take account of the economic constraints of their

choices. Still, existing studies in the environmental literature suggest that the two types of data may have different noise levels but lead to very similar substantive conclusions (see, e.g., Carlsson and Martinsson, 2001, or Cameron et al., 2002). Joulain and Mullet (2001) analyse French survey data on what people consider the "appropriate" minimum and maximum retirement ages for a large number of occupations, with varying physical and mental demands. Unlike our survey, their questions do not refer to pension reforms or other retirement policies. Moreover, they do not use vignettes and cannot correct for self-identification. They focus on the variation in occupations and their characteristics; the only respondent characteristic they analyse is age. They find a lower "appropriate" retirement age for occupations perceived as physically demanding, while no effect was found of cognitive or social and organizational demands of the occupation. They argue that this is in line with the fact that older workers are perceived as cognitively able and socially responsible until long after the usual retirement age.

Why would individuals be willing to contribute to early retirement schemes for demanding occupations? As stated in the introduction, this can have two reasons: self-identification with these occupations, or social preferences not driven by self-interest. Such social preferences can take various forms, like altruism, inequality aversion or reciprocity. Fehr and Schmidt (2006) define altruism as kindness unconditional on payoffs received by others.[8] On the other hand, inequality averse individuals take the distribution of outcomes into account and prefer a higher payoff for another individual only if this reduces inequality. Charness and Rabin (2002) show with lab experiments that individuals are willing to sacrifice own resources to increase the pay-offs of other participants, especially the least well-off participants. Tyran and Sausgruber (2006) find that a model with agents who are inequality averse better predicts the voting outcomes in a redistribution experiment than a model with rational and self-interested agents. Fehr and Gächter (2000) define reciprocity as conditional kindness: people behave more cooperatively in response to nice and friendly behaviour of others.

3. Dutch retirement institutions

The pension and retirement system in the Netherlands is relevant as it provides the context in which the survey questions were answered. Pensions are organized in three pillars. The first pillar is the state pension. The benefits in this system are paid from the social security premiums paid by current workers. Every resident of the Netherlands is entitled to these benefits from the statutory retirement age. Since 2009, a public policy debate revolved around increasing this age. In spring 2012, the government decided to increase this age in steps, from 65 years of age in 2013 to 67 years of age in 2021. After that, the statutory age will be linked to life expectancy. The benefit level depends on the number of years one has lived in the Netherlands and is independent of (lifetime) income. The state pension provides a basic income for the elderly that is usually enough to keep them out of poverty and explains why poverty among the elderly is low (except for specific groups such as immigrants or people with large debts; see Ministry of Social Affairs and Employment, 2013). This covers all residents in the Netherlands, who mature their entitlement in the 50 years preceding their retirement (2% per year).

Company or sector-level retirement schemes represent the second pillar. Participation in these schemes is generally mandatory for employees, explaining why 95% of all employees is covered, compared to only 5% of the self-employed. The second pillar schemes can be either Defined Contribution (DC) or Defined Benefit (DB). The benefit level is mainly determined by the wage and by how long the employee has

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[8] Altruism is a broad notion. It can also contain 'impure' altruism: the warm-glow effect (Andreoni et al., 2006). For instance, individuals may donate money to charity because it makes them feel better about themselves. Put this way giving to charity can be considered as selfish.

contributed. Earlier or later take-up of pensions is often possible so that the claiming age can differ from the statutory retirement age. The military has mandatory retirement at a much younger age, and accordingly has a special (second pillar) pension arrangement, but this does not apply to demanding occupations in general.

Finally, voluntary pension contributions are possible in the third pillar. These are tax-deductible under certain conditions (implying that income used for these savings is not taxed during the accumulation phase, while the benefits are taxed in the pay-out phase).

The fact that the first pillar state pensions are paid for by current workers implies that individuals with various backgrounds and occupations contribute to each other's retirement schemes. On the other hand, the second pillar is capital-funded and organized at the company or sector level. Calculations of Knoef et al. (2016) show that on average, the first and second pillar pensions are of similar magnitude. Together, they would imply a median retirement income replacement rate of 68%. Voluntary pension products and other financial wealth raise this to 77%.

4. Data and study design

We have fielded a one-time survey on demanding occupations (DO) in the CentERpanel. This panel is based upon a representative sample of the Dutch adult population who are interviewed weekly over the Internet on a large variety of topics. People without access to Internet get the necessary equipment to participate so that also the non-Internet part of the population is covered. The fact that there are no personal interviews minimizes the risk that the answers suffer from social desirability bias. The CentERpanel also incorporates the annual DNB Household Survey (DHS), in which respondents answer questions related to different aspects of their financial situation, like income and wealth. This readily provides us with many background characteristics of the respondents. 2840 household members above the age of 15 were asked to participate in the DO survey and 1845 of them took part, giving a participation rate of 65%.[9] Data collection took place in the week of May 11 through May 16 2012, at a time when an increase of the statutory retirement age was under consideration (see Section 3). The descriptive statistics we present are weighted by age, gender, education and individual annual income to correct for unit non-response and obtain a representative view of the Dutch population.

In the DO survey, respondents were asked what they thought about the demanding nature of specific occupations and about reasonable retirement ages for these occupations. They were also asked whether they would be willing to contribute to an early retirement scheme for such occupations. Respondents were first given an introduction into five fictive vignette persons with various occupations, emphasizing that these persons all had the same income and age and the same work experience – The only difference was their occupation. The five specific occupations were construction worker, teacher, nurse, person with a desk job, and fireman.[10] All respondents answered questions about all these five occupations. Online Appendix A shows the exact wording of the questions. The order of the questions and the gender of the vignette persons were randomized over the respondents, with the exception of construction worker and fireman. For these two occupations, all respondents got

male names. An example of the first type of questions, on the reasonable retirement age, is the following:

John has worked for 30 years at a desk job. What do you think is a reasonable retirement age for John?

Respondents could answer 'younger than 60', '60', '61', …, '70', or 'older than 70'.

The other questions of this type replace "desk job" by another occupation. Fig. 1 presents the sample distribution of the answers.

The large differences across occupations seem plausible and raise confidence that respondents understood the questions. The answers indicate that according to most respondents, early retirement is reasonable for construction workers, whereas people with desk jobs should retire later. The mean reasonable retirement age for the occupations ranges from almost 62 for construction worker to almost 66 years for desk jobs. For the occupations of teacher, nurse and fireman the means of the reported reasonable retirement ages were 64.3, 63 and 62.5 years of age, respectively. These differences are substantial and already suggest that the government's one-age-fits-all state pension eligibility age policy is not the Dutch population's point of view.

After answering some other questions (not considered in this study), the respondents indicated whether they were willing to contribute, by paying higher income taxes, to early retirement schemes for each of the five fictive persons. Respondents answered on a five point scale ranging from 'certainly not' to 'certainly yes'. Fig. 2 shows the distribution of the answers.

Approximately 50% of the respondents indicate they are certainly or probably willing to contribute to an early retirement scheme for construction workers, much more than for any of the other four occupations. It is possible that respondents show high willingness to pay, because they expect to be able to benefit themselves of such a scheme. On the other hand, as we will discuss below, the data also show that only 9% of the respondents consider their own occupation similar to that of 'construction worker', suggesting that many respondents are willing to contribute even if they do not expect to benefit directly.

The last vignette-related question asked how demanding respondents considered the occupations of the five fictive persons. For example:

'*Do you think that the occupation of John (has a desk job) is demanding?*'

Respondents could answer on a five-point scale ranging from 'undemanding' to 'demanding'.

Fig. 3 shows that respondents think that construction workers have the most demanding of the five occupations, followed by nurses and
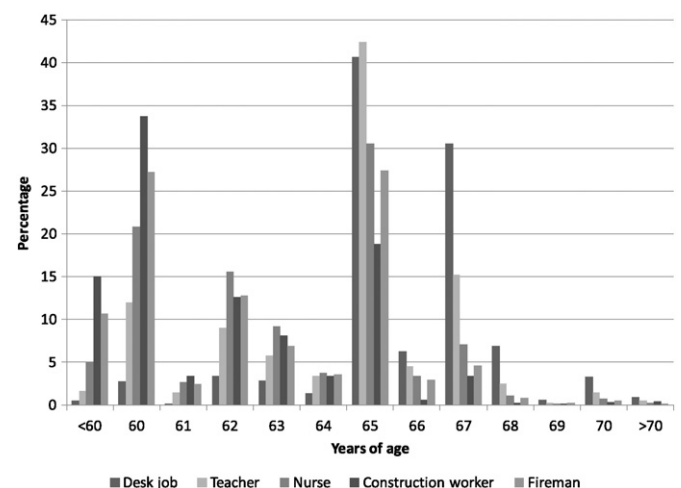
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[9] Women, young people, and lower educated respondents have a lower probability to participate. These are the same groups that tend to be less interested in and less knowledgeable of pension and retirement issues in general. Bellemare et al. (2008) find that inequity aversion rises with age, but falls with education and does not differ between genders. Thus demographics do not affect response behaviour and inequity aversion (and thus perhaps also support for early retirement schemes of demanding occupations) in the same way. Our results could still be biased if unobservables driving response and support for early retirement schemes are related.

[10] These five occupations were chosen in order to benchmark the generic description of "desk job" to professions with more specific attributes, where for instance teaching could be seen as mentally demanding, fire-fighting as risky, construction worker as physically demanding and nursing as unpleasant because of working in shifts.

Fig. 1. Reasonable retirement ages. Explanation: Distribution of answers to the question: 'What do you think is a reasonable retirement age for … (fictive name with listed occupation)?' N = 1840.
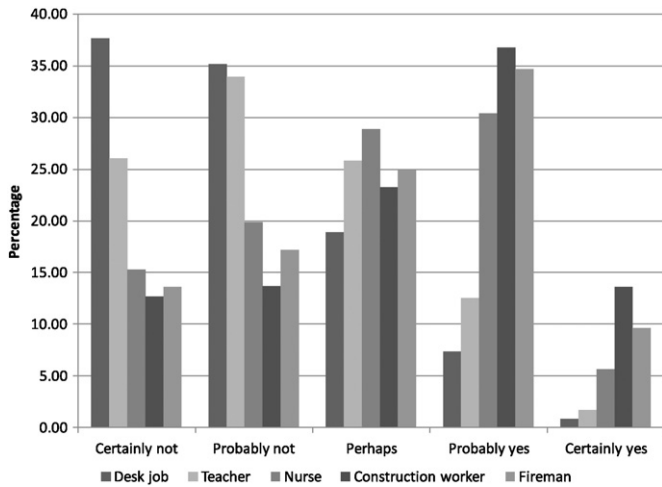Source: DO, own computations.

Fig. 2. Willingness to contribute to early retirement schemes. Explanation: Answers to the question: 'Are you willing to contribute as a tax payer to an early retirement scheme for … (fictive name with listed occupation)?' $N = 1835$.
Source: DO, own computations.

firemen. The occupations of teachers and especially desk jobs are considered much less demanding.

The next questions asked to what extent certain job properties make an occupation demanding. The properties range from physically demanding work to working under time pressure. Fig. 4 shows that occupations are primarily considered demanding due to the physical workload, followed by working in shifts and working long hours or in an irregular manner.

Finally, the respondents were asked which occupation resembles their own occupation most closely. They had to choose one of the five occupations. Fig. 5 shows that the majority of the respondents find their own job closest to a desk job, in line with the notion that desk job (our benchmark) is a much more general connotation than the other job titles.

Note that the survey questions are hypothetical and not incentivized. When, for example, respondents say they would be willing to contribute to an early retirement scheme of a certain occupation, we cannot guarantee that they would actually contribute to such a scheme if given the actual choice. The questions also do not provide information on how much they should contribute, so the answers do not reflect an actual
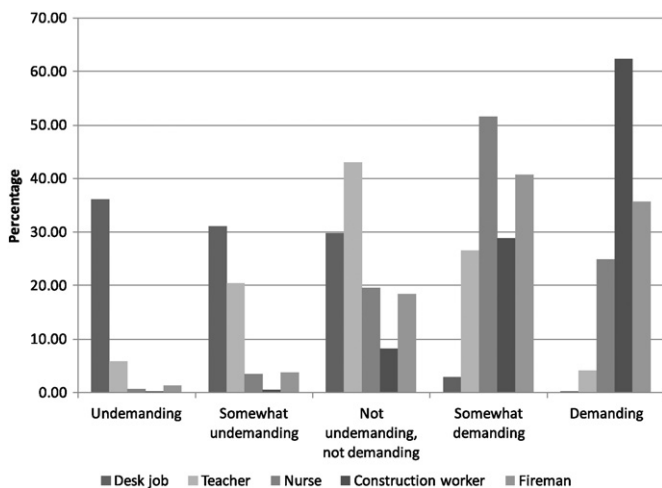

Fig. 3. How demanding is each occupation? Explanation: Answer to the question: "Do you think that the occupation of … (fictive name with listed occupation) is demanding?" $N = 1835$.
Source: DO, own computations.

trade-off but an attitude toward special arrangements for some occupations and not for others. The literature on revealed versus stated preferences (see Section 2) suggests that more value should be attached to the qualitative differences across the five occupations in subjective assessments such as willingness to contribute than to their absolute levels.

The descriptive statistics above suggest that most respondents find it reasonable that workers with physically demanding occupations retire earlier than others retire, and are willing to contribute to this by paying more taxes. The relationship between physical burden, demanding occupations and reasonable retirement ages is in line with Joulain and Mullet (2001) who found that "appropriate" retirement ages are lower for occupations perceived as more physically demanding (cf. Section 2). In the next section, we will use econometric models to analyse the factors that drive the reported reasonable retirement age and willingness to contribute.

5. Model and results

5.1. Demanding occupations and reasonable retirement age

We use the following model to investigate the relationship between the extent to which certain occupations are perceived to be demanding and the associated reasonable retirement ages. Respondents evaluate how demanding the five occupations are according to Eq. (1):

$$y_{ij}^* = X_i'\delta_j + Z_i\alpha_j + W_i'\lambda_j + \vartheta_i + u_{ij} \qquad (1)$$

The latent dependent variable y_{ij}^* increases in the extent that respondent i ($i = 1,…, N$) thinks occupation j ($j = 1,…, 5$) is demanding. This depends on respondent characteristics (X_i), on which of the five jobs the respondent identifies with (Z_i), and on which characteristics make a job demanding in the view of the respondent (W_i). Unobserved heterogeneity across respondents is captured by ϑ_i; for a given respondent, this is the same for all occupations and represents the respondent's tendency to see any occupation as demanding. Finally, an idiosyncratic error term is included, assumed to be drawn from a standard normal distribution ($u_{ij} \sim N(0,1)$), independent of the other terms on the right hand side of Eq. (1) and independent across occupations.

The latent dependent variable is not observed. Instead, the observed answer is categorical, from 'undemanding' (1) to 'demanding' (5). This is captured with an ordered response equation:

$$Y_{ij} = k \text{ if } c_{k-1} < y_{ij}^* \le c_k \qquad (2)$$

with $1 \le k \le 5, c_0 = -\infty$ and $c_5 = \infty$

The equation for the reasonable retirement ages for the five occupations is given by:

$$R_{ij} = \gamma_j y_{ij}^* + X_i'\eta_j + Z_i\beta_j + \rho_i + \varepsilon_{ij} \qquad (3)$$

The reasonable retirement age R_{ij} for respondent i and occupation j depends on the same variables as in Eq. 1, except that it does not include the variables W_i referring to the respondent's view on which job characteristics make an occupation demanding. These variables are assumed to affect the reasonable retirement age only through their effect on how demanding an occupation is considered (y_{ij}^*), which seems plausible. This exclusion restriction makes the model identified, even if the unobservables in the two equations are allowed to be correlated. It seems better to include y^* than dummies for the observed categorical outcome Y, since Y depends on the scale that happens to be used in the survey. Unobserved respondent specific heterogeneity is denoted by ρ_i. The idiosyncratic errors ε_{ij} are assumed to be drawn from $N(0,\sigma_\varepsilon^2)$, independent of each other and of the other terms on the right hand side of Eqs. 1 and 3.
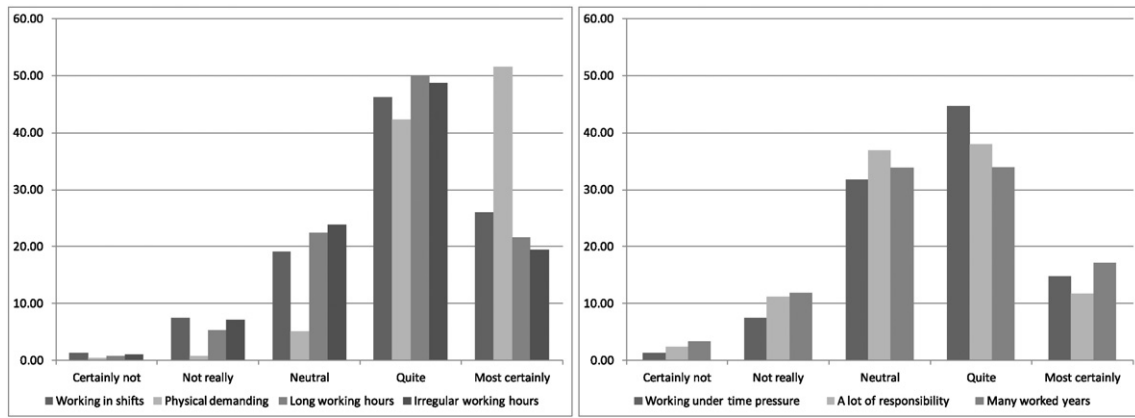
Fig. 4. What makes an occupation demanding? Explanation: Answer to the question: "What attribute makes an occupation demanding in your view?" $N = 1834$. Source: DO, own computations.

Combining Eqs. (1) and (3) leads to:

$$R_{ij} = W_i'\gamma_j\lambda_j + X_i'\left(\gamma_j\delta_j + \eta_j\right) + Z_i\left(\beta_j + \alpha_j\gamma_j\right) + \rho_i + \gamma_j\vartheta_i + \varepsilon_{ij} + \gamma_j u_{ij} \tag{4}$$

Eq. (4) shows that with the identifying assumption that W_i does not influence the reasonable retirement age directly, γ can be identified. The unobserved heterogeneity terms in Eqs. 1 and 3 are assumed to be drawn from a bivariate normal distribution, independent of the error terms and all explanatory variables in Eq. (4):

$$\begin{pmatrix} \vartheta_i \\ \rho_i \end{pmatrix} = N\left(\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} \sigma_\vartheta^2 & \tau\sigma_\rho\sigma_\vartheta \\ \tau\sigma_\rho\sigma_\vartheta & \sigma_\rho^2 \end{pmatrix}\right)$$

This implies that the unobservable parts of Eqs. 1 and 3 are correlated if τ is not equal to zero. The parameters of the model are estimated simultaneously using maximum simulated likelihood with 100 Halton draws.[11] Online Appendix B presents details of the (simulated) likelihood. The independence assumptions on the error terms imply that the conditional likelihood given the unobserved heterogeneity terms can be written as the product of five contributions for the five occupations, each of which as the product of a density (for R_{ij}, using Eq. (4)) and a conditional probability (for Y_{ij} given R_{ij}, using Eq. (1)). The
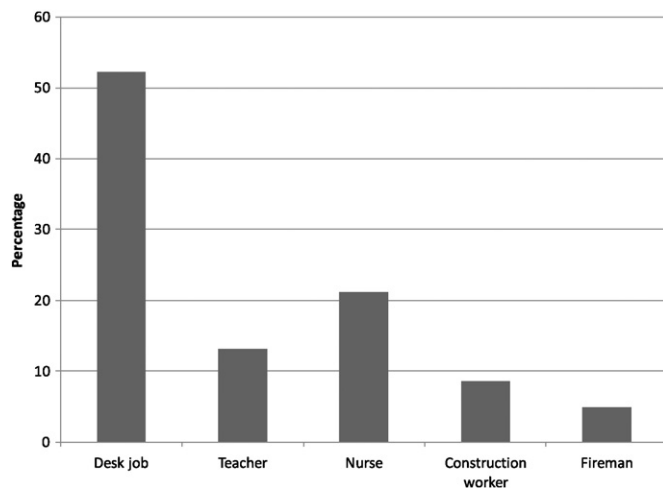

Fig. 5. Which of the five occupations is most similar to the respondent's occupation? Explanation: Answer to the question: "Which of the five occupations is most similar to your own occupation?" $N = 1787$. Source: DO, own computations.

unconditional likelihood is the expected value of the conditional likelihood over the unobserved heterogeneity terms and it can be approximated using a simulated mean.[12]

Table 1 presents the estimates of Eq. (1).[13] The respondents tend to focus on physical demands: predictions based upon the estimates in Table 1 show that construction workers have the most demanding occupation, followed by firemen, nurses, teachers, and individuals with a desk job,[14] in line with Fig. 3. The coefficients on "Physical" confirm the importance of physical burden: respondents thinking that a physical burden certainly makes a job demanding evaluate construction worker as more demanding and desk job as less demanding than other respondents. The importance attached to other attributes also play a role, like working in shifts, many years worked, and irregular working hours in the case of nurses. Respondents who are convinced that a lot of responsibility makes a job demanding, tend to evaluate a desk job as more demanding than other respondents.

The bottom part of Table 1 shows that, keeping perceived job characteristics constant, self-identification matters. Respondents who find their own job similar to a desk job, teacher, or fireman consider this job as more demanding than other respondents. On the other hand, all respondents, regardless of their own job, think that construction worker is a demanding occupation. Interestingly, teachers consider the job of a nurse as more demanding than nurses themselves do. Teachers, nurses, construction workers and firemen consider desk jobs as less demanding than those with a desk job do. Gender of the vignette person also matters: for the three occupations where we used male or female names, the jobs of female fictive persons were evaluated as more demanding than the same jobs held by a male person.

Table 2 shows the estimation results for the reasonable retirement age (Eq. (3)). The significantly negative estimates of the γ-coefficients show that respondents think that workers with demanding jobs should be able to retire earlier than others. To illustrate the magnitude of the effect: on average, an increase of one standard deviation in how demanding an occupation is (y^*) would reduce the reasonable retirement with one year. The magnitude of the effect can also be computed comparing two benchmark respondents who think a particular occupation is

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[11] For Halton draws the STATA programme mdraws is used (see Cappellari and Jenkins, 2006). Using 200 draws has negligible effects on the results.

[12] An alternative would be to first estimate Eq. (1) and the reduced form of Eq. (4) separately, and then perform minimum distance to estimate the structural parameters in a second step by minimum distance. An advantage of the (simulated) ML approach is that it also gives the estimated covariance matrix of the unobservables.

[13] Online Appendix D presents the descriptive statistics of the background variables for the estimation sample.

[14] The calculation involves computation of the mean of the predicted values for the latent variable of Eq. (1). Fireman and nurse are close to each other for the second place in this ranking.

Table 1
Key estimation results for evaluation how demanding occupations are (Eq. (1)).

	Evaluation how demanding occupations are				
	(1) Desk job	(2) Teacher	(3) Nurse	(4) Construction worker	(5) Fireman
Shifts: quite	0.167** (0.079)	0.119 (0.077)	0.192** (0.078)	0.025 (0.087)	0.235*** (0.078)
Shifts: certainly yes	0.051 (0.100)	0.164* (0.096)	0.373*** (0.099)	0.042 (0.113)	0.326*** (0.099)
Physical: quite	−0.662*** (0.133)	−0.194 (0.130)	0.196 (0.131)	0.986*** (0.134)	0.602*** (0.131)
Physical: certainly yes	−0.927*** (0.136)	−0.189 (0.132)	0.504*** (0.134)	2.195*** (0.143)	1.067*** (0.134)
Time pressure: quite	0.383*** (0.075)	0.268*** (0.072)	−0.001 (0.074)	−0.217*** (0.084)	−0.185** (0.074)
Time pressure: certainly yes	0.475*** (0.117)	0.486*** (0.113)	0.275** (0.118)	−0.335** (0.135)	−0.300** (0.117)
Responsibility: quite	0.285*** (0.074)	0.277*** (0.071)	0.247*** (0.073)	0.027 (0.083)	0.106 (0.073)
Responsibility: certainly yes	0.571*** (0.127)	0.444*** (0.124)	0.415*** (0.130)	0.078 (0.148)	0.276** (0.129)
Irregular working hours: quite	−0.007 (0.079)	0.160** (0.077)	0.219*** (0.079)	0.084 (0.088)	0.158** (0.079)
Irregular working hours: certainly yes	0.016 (0.121)	0.121 (0.118)	0.496*** (0.122)	0.074 (0.140)	0.415*** (0.122)
Long working hours: quite	0.113 (0.077)	0.086 (0.074)	0.097 (0.076)	0.037 (0.084)	0.122 (0.076)
Long working hours: certainly yes	−0.152 (0.111)	0.047 (0.107)	−0.070 (0.110)	0.308** (0.129)	0.305*** (0.111)
Many worked years: quite	0.025 (0.070)	0.150** (0.068)	0.248*** (0.070)	0.200** (0.078)	0.139** (0.070)
Many worked years: certainly yes	0.003 (0.095)	0.216** (0.091)	0.545*** (0.096)	0.451*** (0.115)	0.109 (0.095)
Fictive person female	0.127** (0.057)	0.126** (0.056)	0.214*** (0.058)	–	–
Teacher (self-identification)	−0.215** (0.089)	0.426*** (0.087)	0.193** (0.090)	0.111 (0.104)	0.005 (0.090)
Nurse (self-identification)	−0.417*** (0.082)	−0.188** (0.079)	0.010 (0.082)	−0.064 (0.095)	−0.064 (0.082)
Construction worker (self-identification)	−0.267** (0.110)	−0.283*** (0.105)	−0.345*** (0.108)	0.010 (0.128)	−0.191* (0.108)
Fireman (self-identification)	−0.244* (0.143)	−0.140 (0.138)	−0.226 (0.142)	0.048 (0.166)	0.310** (0.145)
σ_{ϑ}			0.610*** (0.021)		
Log likelihood			−26,494		
Number of observations			1771		

Standard errors in parentheses, *** significant at 1% level, ** significant at 5% level, * significant at 10% level. Baseline respondent answers the questions with a male name for the fictive person, self-identifies with having a desk job and considers the extent to which various job attributes make a job demanding to be 'certainly not', 'not really' or neutral. Background controls (gender, education, age, age squared, employment status and household income) are included. For complete results (including coefficients on background controls), see online Appendix E.

demanding and undemanding, both high educated males with a net household income larger than 2600 Euros. The resulting difference between the reasonable retirement ages given by these two respondents amounts to almost three years earlier retirement in the case of fireman and 1.6 years for people with desk jobs.[15] This is the same order of magnitude as the increase in the statutory retirement age in the Netherlands (see Section 3).

Combining the estimates in Tables 1 and 2 shows that the reasonable retirement age for a construction worker decreases by 1.6 years if the respondent thinks physical work certainly makes an occupation demanding compared to when the respondent does not think physical work makes a job demanding.[16]

Female fictive persons are allowed to retire about three months earlier than male fictive persons with the same job and whose job is evaluated as equally demanding.

Keeping all other variables constant (including y^*) construction workers are allowed to retire at the earliest age. To which of the five occupations the respondent's job is most similar is not important here, as none of the coefficients is significant at the 5% level. Still, there is an indirect effect: The respondent's own job influences how demanding the five occupations are evaluated, and this affects the reasonable retirement age of an occupation - as indicated by the significant γ-coefficients. Combining the direct and indirect effect, the largest effect

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[15] The baseline respondent who thinks that an occupation is somewhat undemanding is defined at the average of the first two thresholds (= 0.39; see Appendix D). The baseline respondent who thinks that an occupation is somewhat demanding is defined at the average of the last two thresholds (= 3.21). The difference (2.824) is multiplied with the various γ's to get the estimated effect on the reasonable retirement age. For fireman the effect is largest: 2.7 years earlier retirement; for desk jobs it is the smallest: 1.6 years earlier retirement. For nurse, teacher and construction worker, the effects are 2.4, 2.3 and 2.1 years, respectively.

[16] This is the difference between answering the highest category ('most certainly') and the three lowest categories ('certainly not', 'not really' or 'neutral'). Table 1 shows the effect on y^*: 2.195. This leads to ab effect $\gamma_j * 2.195 = -0.738 * 2.195 = -1.62$ years, ceteris paribus.

Table 2
Key estimation results for evaluation of the reasonable retirement age.

	Evaluation of reasonable retirement age				
	(1) Desk job	(2) Teacher	(3) Nurse	(4) Construction worker	(5) Fireman
γ_j	−0.552***	−0.815***	−0.836***	−0.738***	−0.960***
	(0.036)	(0.031)	(0.032)	(0.032)	(0.030)
Gender of fictive person	−0.258***	−0.248***	−0.241***	–	–
(=1 if female)	(0.080)	(0.081)	(0.082)		
Teacher (self-identification)	−0.091	−0.061	0.052	0.031	0.021
	(0.145)	(0.147)	(0.148)	(0.152)	(0.148)
Nurse (self-identification)	−0.129	−0.175	−0.211	−0.142	−0.100
	(0.132)	(0.133)	(0.134)	(0.138)	(0.135)
Construction worker (self-identification)	−0.056	0.029	−0.110	0.228	−0.099
	(0.185)	(0.186)	(0.187)	(0.193)	(0.188)
Fireman (self-identification)	0.052	−0.283	−0.253	0.010	0.032
	(0.242)	(0.243)	(0.245)	(0.252)	(0.248)
σ_ε			1.365***		
			(0.010)		
σ_ρ			1.587***		
			(0.03)		
τ (correlation coefficient)			0.051		
			(0.033)		
Log likelihood			−26,494		
Number of observations			1771		
Standard deviation (sd) increase in	−0.751***	−1.042***	−1.118***	−1.066***	−1.254***
demanding occupation ($=\gamma_j^* sd$)	(0.050)	(0.039)	(0.042)	(0.046)	(0.040)

Standard errors in parentheses, *** significant at 1% level, ** significant at 5% level, * significant at 10% level. Baseline respondent has a desk job and answers the questions with a male name for the fictive person. Background controls (gender, education, age, age squared, employment status and household income) are included. For full set of results (including background controls), see online Appendix E. The bottom row shows $\gamma_j^* sd$.

of self-identification with one of the five occupations is found for teachers evaluating teachers. Compared to other respondents, teachers think teachers should be able to retire about five months earlier, because teachers and non-teachers have a different view on the demanding nature of the occupation of a teacher. Those who identify with another occupation also often tend to support earlier retirement for that occupation, but these effects are much smaller.

Unobserved heterogeneity is significant in both equations. In Eq. (1), the estimated standard deviation of the unobserved heterogeneity terms is 0.61 (Table 1), while the standard deviation of the idiosyncratic error term is equal to one (by normalization). In Eq. (3), the error term has estimated standard deviation 1.37, whereas the standard deviation of the unobserved heterogeneity term amounts to 1.59 (Table 2). Unobserved heterogeneity and error terms are thus of the same order of magnitude. The unobserved heterogeneity terms are slightly positively correlated, but the correlation is not significant, implying that, keeping observed characteristics constant, respondents who systematically evaluate occupations as more demanding, do not systematically report higher or lower reasonable retirement ages for other reasons than this.

In a robustness check, we included the opinion of the respondents about the increase of the statutory retirement age in the Netherlands as an additional regressor, since such an opinion could matter for what respondents consider reasonable retirement ages. For instance, respondents who disagree with this reform might indicate that each fictive person should be allowed to retire early. In a previous survey, the same respondents were asked to choose among several measures to make the first pillar pension scheme sustainable. The measures included lower benefits, a higher pension premium, and an increase in the statutory retirement age. Online Appendix G lists the exact question and the distribution of the answers, as well as the complete estimates of a full model in which the answer to this question is added on the right hand side of the equation for the reasonable retirement age. These results show that, as expected, respondents who think that the statutory retirement age should be increased also give higher reasonable retirement ages than respondents who prefer other measures. Inclusion of this in

the model, however, does not change any of the results on the variables of interest.

5.2. Demanding occupations and willingness to contribute to an early retirement scheme

In this section, we model the relationship between the extent to which an occupation is perceived to be demanding and whether respondents are willing to contribute to an early retirement scheme for that occupation by paying additional (income) taxes. This model closely resembles the model of the previous section. Respondents ($i = 1,...,N$) evaluate how demanding certain occupations ($j = 1,...,5$) are according to Eqs. (1) and (2). The extent to which they are willing to contribute to an early retirement scheme for these professions, with five ordered possible answers, is also modelled using an ordered response equation:

$$C_{ij}^* = \kappa_j y_{ij}^* + X_i' \mu_j + Z_i \eta_j + \phi_i + \psi_{ij} \qquad (5)$$

$$C_{ij} = l \; if \; d_{l-1} < C_{ij}^* \leq d_l \\ with \; 1 \leq l \leq 5, d_0 = -\infty \; and \; d_5 = \infty \qquad (6)$$

The willingness to contribute to an early retirement scheme C_{ij}^* for respondent i and occupation j depends on the same variables as in Eq. (3). Similarly as before, identification relies on the plausible assumption that W_i can be excluded from Eq. (5). The respondent specific unobserved heterogeneity term in this equation is denoted by ϕ_i. The idiosyncratic error ψ_{ij} is assumed to follow a standard normal distribution.

Since unobserved individual characteristics explaining the opinion about demanding occupations could be related to those determining the willingness to contribute to an early retirement scheme, we assume, the two unobserved heterogeneity terms are bivariate normal, independent of the covariates:

$$\begin{pmatrix} \vartheta_i \\ \phi_i \end{pmatrix} \sim N(\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} \sigma_\vartheta^2 & \omega\sigma_\phi\sigma_\vartheta \\ \omega\sigma_\phi\sigma_\vartheta & \sigma_\phi^2 \end{pmatrix})$$

This implies a correlation between the unobservables Eqs. (1) and (5) if the parameter ω is not equal to zero. Eqs. (1), (2), (5) and (6) are estimated simultaneously using Simulated Maximum Likelihood with 100 Halton draws (see Cappellari and Jenkins, 2006).[17] Online Appendix C provides details of the likelihood.

Table 3 presents the results. If respondents find an occupation more demanding, they are also willing to contribute more to an early retirement scheme for that occupation (κ_j).[18] Table 4 shows the implied marginal effects on the probability to answer "probably yes" or "certainly yes". It shows an average respondent is 28 to 39 percentage points more likely to contribute to the early retirement scheme if the extent to which the occupation under consideration is more demanding increases by one standard deviation. These are large effects: Similar calculations as in Section 5.1 show that the ceteris paribus difference between the probability of answering "probably yes" or "certainly yes" for benchmark respondents evaluating a given occupation as demanding and not demanding ranges from 0.6 to 0.8, implying that the willingness to pay is to a large extent determined by whether a job is considered demanding.

Unobserved heterogeneity is significantly present and more important than in Eqs. (1) and (3). The estimated standard deviation of the unobserved heterogeneity term of the willingness to contribute amounts to 2.73, so that unobserved heterogeneity captures 88% of the unsystematic variation in willingness to contribute (the standard deviation of the idiosyncratic error term is normalized to 1). Moreover, a sizeable and significant correlation between the unobserved heterogeneity terms in Eqs (1) and (4) of 0.52 is found. This indicates that the same respondents, who typically evaluate occupations as more demanding, also tend to report a higher general willingness to contribute, keeping the demands (y^*) and other characteristics of the occupation constant.

Table 3 also shows that, keeping other variables (including y^*) constant, self-identification with a teacher or a fireman does not lead to a higher willingness to contribute for any other occupation compared to the benchmark (self-identification with a desk job). Nurses are the other extreme case: Respondents whose occupation is similar to that of a nurse are willing to contribute to an early retirement scheme of every occupation.

Construction workers are willing to contribute significantly more than respondents with a desk job to retirement schemes of nurses, construction workers and firemen. The combinations of direct and indirect effects are presented in Table 5. It shows that, overall, respondents tend to be more willing to contribute to retirement schemes for a given occupation if that occupation resembles their own. They then probably expect to benefit themselves from such arrangements.[19]

We can conclude that whether the occupation is similar to that of the respondent ("self-identification") plays some role, but how much of the support for early retirement schemes does it explain? Fig. 6 shows whether people are willing to contribute to retirement schemes of occupations that are *not* similar to their own occupation. Almost half of the respondents *not identifying themselves with construction worker* indicate that they are probably or certainly willing to contribute to an early retirement scheme for construction workers. The willingness to contribute to such a scheme for firemen (among non-firemen) is somewhat smaller, and it is substantially smaller for the other three occupations (among those whose job is not similar to that occupation). Only 6% of the respondents not in a desk job are probably or certainly willing to contribute to an early retirement scheme for desk jobs. Respondents are apparently willing to contribute to the retirement schemes of other occupations, if they perceive these occupations as demanding. This suggests that willingness to contribute stems not only from self-interest.

This finding is in line with the support for policies that rely on social preferences (see Section 2). Altruistic respondents will be willing to support a scheme for workers that are no longer able to work and would end up in poverty without early retirement benefits. According to Fong et al. (2005), this is particularly the case if the problems of workers in heavy occupations are considered as something they cannot be blamed for themselves ("strong reciprocity"). Reciprocity could also be an argument for respondents who believe that workers in physically demanding occupations should be compensated for their contribution to society at the cost of their own health. Respondents may also interpret the scheme as an insurance system against a loss of earnings capacity for workers in demanding occupations, and may see it as a task of society to support such a system, particularly if they are risk averse.[20]

6. Conclusion

This paper relates perceptions of what makes an occupation demanding to what is considered a reasonable retirement age and the willingness to contribute to an early retirement scheme for demanding occupations. This is motivated by the policy debate on differentiating the state benefits eligibility age by making an exception for demanding occupations. Such a debate took place in the Netherlands a few years ago and is currently taking place in other countries.

Our first main finding is that the respondents generally think that a high physical burden makes an occupation demanding, while mental or cognitive aspects such as time pressure or a lot of responsibility are much less important. Accordingly, they evaluate the jobs of construction worker and firefighter as much more demanding than a desk job or the job of teacher. In line with this, what respondents consider a reasonable retirement age ranges from almost 62 for a construction worker to almost 66 years for a desk job.

Second, most Dutch think it is justified that a worker in an occupation that is considered demanding retires 1.6 to 2.7 years earlier than someone whose occupation is not demanding. Third, we find that the Dutch are willing to contribute to an early retirement scheme for physically demanding occupations by paying higher income taxes.

Although we find that respondents are more willing to contribute to a scheme for an occupation if their own job is similar to that occupation, the support and willingness to contribute are also substantial for jobs that are not similar to their own job. For instance, almost half of the respondents whose job is not similar to that of a construction worker indicate that they are probably or certainly willing to contribute to a retirement scheme for construction workers.

What do our findings imply for public policy? As discussed in Section 1, a debate on differentiation of the eligibility age for the Dutch first pillar state pensions took place but ended with the conclusion that implementation of such a policy was infeasible in practise. Moreover, such a policy might reduce incentives for employers to invest in new technology or other ways to keep people at work longer. It also could lead to strategic behaviour of employees who can switch occupations at a later age to qualify for earlier retirement (Ravesteijn et al., 2013). Alternatively, it could prevent workers in demanding occupations to change to a less demanding job at a later age, increasing labour market rigidity. On the other hand, the suggested solution of repairing the gap in first pillar pensions through the second pillar is expensive, particularly for employees in poorly paid physically demanding jobs who largely rely on the state pension.

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[17] A higher number of draws hardly affects the estimates.

[18] The estimates of the coefficients in Eq. (1) are very similar to those in Table 1 and are therefore not presented here.

[19] Re-estimation of this model with the opinion about the pension reform in the Netherlands as an additional regressor gives virtually the same results. See Appendix G.

[20] We re-estimated the model including measures of risk aversion, based upon the extent to which respondents agree with the statement "I would never invest in shares since I consider this too risky", also used by, for example, van Rooij et al. (2012). The dummies for different risk aversion levels are, however, insignificant in both equations, and the other estimates hardly change. We therefore do not present these alternative estimates in detail.

Table 3
Key estimation results for the willingness to contribute to (early) retirement schemes.

	Evaluation of willingness to contribute				
	(1) Desk job	(2) Teacher	(3) Nurse	(4) Construction worker	(5) Fireman
κ_j	1.492***	1.294***	0.766***	0.564***	0.654***
	(0.073)	(0.060)	(0.042)	(0.037)	(0.035)
Gender of fictive person	−0.123	−0.014	0.126	–	–
(=1 if female)	(0.093)	(0.086)	(0.078)		
Teacher (self-identification)	0.149	−0.061	−0.021	−0.059	−0.032
	(0.189)	(0.185)	(0.184)	(0.189)	(0.185)
Nurse (self-identification)	0.716***	0.333**	0.375**	0.421**	0.370**
	(0.175)	(0.168)	(0.168)	(0.173)	(0.170)
Construction worker (self-identification)	0.381	0.364	0.545**	0.656***	0.590**
	(0.239)	(0.232)	(0.231)	(0.237)	(0.232)
Fireman (self-identification)	0.552*	0.235	0.463	0.198	0.468
	(0.302)	(0.293)	(0.290)	(0.297)	(0.293)
Constant	–	−0.749	−0.966	−0.304	−0.003
		(0.578)	(0.606)	(0.653)	(0.630)
σ_ϕ			2.731***		
			(0.077)		
ω (correlation coefficient)			0.516***		
			(0.021)		
Number of observations			1771		
Log likelihood			−18,096		

Standard errors in parentheses. *** significant at 1% level, ** significant at 5% level, * significant at 10% level. Baseline respondent self-identifies their job with a desk job and has a male name for the fictive person in answering the questions. Background controls (gender, education, age, age squared, employment status and household income) are included. For complete results (including background controls), see online Appendix F.

Table 4
Impact of one standard deviation increase in the perceived demanding nature of an occupation (y^*) on willingness to contribute to early retirement scheme.

Desk job	Teacher	Nurse	Construction worker	Fire man
28.38***	39.44***	38.12***	33.03***	33.70***
(1.38)	(1.83)	(2.09)	(2.18)	(1.78)

Standard errors in parentheses. *** significant at 1% level, ** significant at 5% level, * significant at 10% level. Each marginal effect is evaluated for the proportion of the sample that considers the occupation in the column to be somewhat demanding or demanding. Numbers are in percentage points. The baseline respondent has a job similar to a desk job and has a male name for the fictive person in answering the questions.

An alternative policy would be to make the first pillar eligibility age a function of the number of years worked over the lifetime, possibly with adjustment for, e.g., involuntary unemployment, disability, or career interruptions due to young children. This is the system recently introduced in Germany (OECD, 2013, p. 257), where the statutory retirement age is 67 but people with 45 years of insured employment can retire at age 65 without benefit reduction (or even at age 63 but then with reduced benefits).[21] Such a policy is easier to implement and induces less problems concerning strategic behaviour. Individuals with physically demanding occupations would benefit from such an arrangement, since they often have low education level and start working at a relatively early age. Similar policies could also use other proxies to differentiate the statutory retirement age, such as (lifetime) income.

It is important to note, however, that such policies also entail costs. For instance, a lower retirement age for demanding occupations may diminish incentives for the employer to make occupations less demanding, for example by reducing heavy lifting or hazardous or stressful activities, as employers might find it easier or cheaper to redirect their employees into early retirement than go through the costly process of firing them or trying to make them eligible for disability benefits. It is up to policy makers to strike a balance in this trade-off. Further research is needed to evaluate the advantages and drawbacks of such policies. These may depend on the nature of the pension system and what may

be optimal in the German setting is not necessarily optimal in other countries.

More research seems warranted also on alternative (supplementary) policies. Investing in the technological improvement of demanding occupations, increasing flexibility of the job market or the workers in demanding occupations at later ages, or pricing compensating differentials differently, are some of the candidates. The efficiency of such policies, possibly in combination with a policy of differentiated statutory retirement ages, remains unstudied so far. For example, a future survey could address whether the public would rather be willing to pay for reschooling and training of workers in demanding occupations so that they can do different tasks instead of for an early retirement scheme.

This study has several limitations that may be overcome in future research. Although the literature show that stated preferences and revealed preferences often lead to the same conclusions, our survey questions may not induce respondents to fully incorporate the costs of contributing to an early retirement scheme. We only investigated willingness to pay more taxes at the extensive margin. It would be interesting to investigate the response of the public at the intensive margin;

Table 5
Marginal effects of self-identification on the willingness to contribute to (early) retirement schemes.

	Self-identifies with:			
Evaluation of the fictive person as:	Teacher	Nurse	Construction worker	Fireman
Desk job	−2.03	2.43	−0.03	4.72
	(3.27)	(3.01)	(4.08)	(5.22)
Teacher	12.71**	3.30	1.05	3.94
	(5.00)	(4.70)	(6.33)	(8.02)
Nurse	5.51	15.72**	11.15	12.80
	(7.47)	(6.87)	(9.38)	(11.85)
Construction worker	0.35	16.19**	27.17***	9.85
	(7.84)	(7.20)	(9.77)	(12.36)
Fireman	−0.56	13.54*	19.05**	28.53**
	(7.76)	(7.14)	(9.72)	(12.31)

Standard errors in parentheses, *** significant at 1% level, ** significant at 5% level, * significant at 10% level. The magnitude of the marginal effect evaluated for the proportion of the sample that considers the occupation in the row to be demanding or very demanding. Numbers in percentage points. Benchmark: respondents self-identifying with having a desk job.

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[21] In case of a serious disability, early retirement in Germany can start at age 60.
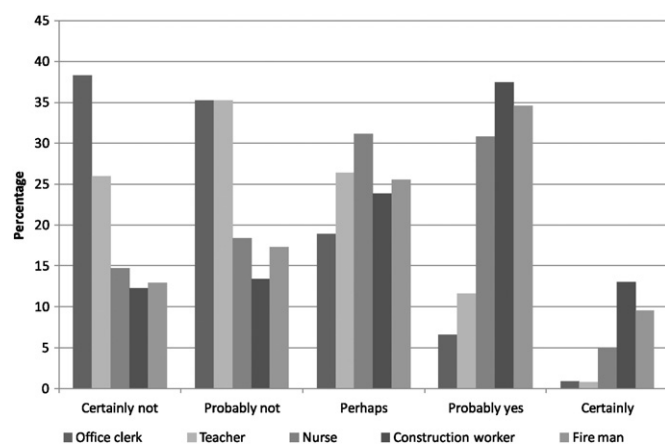
Fig. 6. Respondents willing to contribute to retirement schemes of occupations other than the one most similar to their own. Explanation: For the evaluation of the willingness to contribute for the occupations, respondents with the same occupation are omitted. For instance, in the evaluation of office clerk the respondents self-identifying with office clerks are left out.
Source: descriptive statistics (DO), own computations

showing high costs (in terms of additional taxes) might seriously decrease the stated willingness to pay. Second, our job titles do not specify the details of the jobs of the hypothetical workers in the survey. As a consequence, we cannot assign exactly why a respondent finds a job demanding or what kind of social preferences drive the willingness to support an early retirement scheme for a specific job. A longer list of specific occupations with detailed characteristics would be needed for that purpose.

Acknowledgements

Online Appendix

An Online Appendix to this article can be found at http://dx.doi.org/10.1016/j.labeco.2016.05.020.

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