Full or partial retirement? Effects of the pension incentives and increasing retirement age in the Netherlands and the United States[†]

Tunga Kantarcı[‡], Arthur van Soest[§]

The share of the older workers in the labor force has increased due to population aging and pension reforms in many countries. However, rules of the public and private pension schemes and restrictions from the employers still require large populations of older workers with possibly heteregenous work preferences to retire fully at a given age. We study the preferences of older people for a rich set of retirement trajectories charactersitced by early or delayed full retirement as well as partial retirement at various ages in the Netherlands and the United States. Two in five prefer partial retirement over early or delayed abrupt full retirement. This suggests that partial retirement can substantially increase the utility derived from work in old age. Furthermore, we study the effects of the pension incentives and increasing retirement age on the preferences to delay retirement fully or partially as means of reducing public expenditure. Individuals want to use partial retirement to extend their work lives if deferring pension rights are made actuarially attractive or if pension accruals are made less generous. On the other hand, as the retirement age increases, individuals want to retire early or work part-time instead of full-time. The comparison of the results between the Netherlands and the United States shows that while people in the Netherlands are responsive to a substitution effect of higher pensions, people in the United States are responsive to an income effect of higher pensions.

Keywords: older worker; gradual retirement; phased retirement; pension; vignette

1 Introduction

Improved life expectancy has increased the population base of older people available for work in the last decades in all OECD countries. Moreover, many countries have changed their social security regulations to reward continued employment and pe-nalise early retirement to increase the labor market participation among older people. As a result of this demographic change and the pension reforms, in the OECD countries, the average employment rate has increased from 50.1 percent in 2000 to 59.7 percent in 2013 in the age group 55-64, and it has increased from 11.0 to 13.5 in the age group 65 and older (OECD, 2014). The most common retirement scenario among these large populations of older workers is going from a full-time job into full retirement at the statutory retirement age, also referred to as "cliff-edge" retirement. This retirement scenario has become the tradition but this is not because large populations of older workers have homogenous work preferences. Studies that aim at explaining retirement decisions provide strong empirical evidence that mandatory retirement and programme incentives in the public and private pension schemes induce individuals to retire at the statutory early or normal retirement ages (Blau, 1994; Coile and Gruber, 2007; Rust and Phelan, 1997; Stock and Wise, 1990). Besides, restrictions from employers limit the opportunities of workers to reduce their number of work hours in a gradual manner before they leave the labor market (Gustman and Steinmeier, 1983; Hurd, 1996; Hutchens, 2010; Latulippe and Turner, 2000). For example, fixed employment costs discourage employers to permit part-time work, jobs that require members of a team to interact in the same place at the same time make part-time work difficult, or older workers face discrimination based on their age or for some other reason. This shows that institutional regulations and restrictions induce older workers to retire from a full-time job at a given age and limit their opportunities for alternative retirement trajectories that allow them to optimally combine work, leisure, income and consumption. Moreover, they limit the scope of policy reforms that aim at increasing labor market participation among older people. The first aim of this paper is to analyse the preferences of older people for a rich set of retirement scenarios that is not restricted to abrupt retirement from full-time work before, at, or after the normal retirement age, but includes partial retirement at these ages.

In a partial retirement scenario, as an alternative to the traditional abrupt full-retirement scenario, employees phase out from the labor market by reducing their work hours or by changing to a less demanding job with usually lower earnings.[1] Partial retirement programmes may be expected to become more common in the future for at least the following reasons. First, many em-

‡ Department of Econometrics and Operations Research, Tilburg University, Warendelaan 2, 5037 AB, Tilburg, The Netherlands; Network for Studies on Pensions, Aging and Retirement (Netspar), Warandelaan 2, 5037 AB, Tilburg, The Netherlands. E-mail: kantarci@uvt.nl

§ Department of Econometrics and Operations Research, Tilburg University, Warendelaan 2, 5037 AB, Tilburg, The Netherlands; Network for Studies on Pensions, Aging and Retirement (Netspar), Warandelaan 2, 5037 AB, Tilburg, The Netherlands. E-mail: a.h.o.vansoest@uvt.nl

[1] Following Gustman and Steinmeier (1984a), some of the subject studies use the term partial retirement to refer to reducing work effort outside of the career job, and phased retirement to refer to reducing work effort within the career job. Other studies use the term gradual retirement to describe work effort reduction in general. Although in our analysis we sometimes differentiate between phased and partial retirement with respect to employer change, we also use partial retirement as a generic term to differentiate it from full retirement.

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ployees state an interest in working part-time before retirement. In a US Internet survey in 2005, 38% of the respondents ages 50 and older who were currently working stated interest in participating in partial retirement (Brown, 2005). In the Netherlands, in a survey conducted in 2006, about 55% of the men ages between 51 and 65 who were currently working stated an interest to work part-time (Kantarcı and van Soest, 2008). Second, partial retirement allows employees to gradually adjust to a possibly lower income in retirement by combining part-time work income with a partial pension, especially in the case of early retirement when benefits are reduced substantially due to early claiming (Kantarcı et al., 2013). Third, partial retirement allows employers to retain people with precious skills that are difficult to replace (Ghent et al., 2001; Laczko, 1988; Latulippe and Turner, 2000; Munzenmaier and Paciero, 2002; Olmsted and Smith, 1994). Fourth, partial retirement may extend the employment years by facilitating work after the effective retirement age or by restraining early withdrawal from the labor market, and sustain the pension system by extending the contribution periods and reducing the number of years during which full benefits are claimed (Wadensjö, 2006). This also seems to be the main reason why many countries are currently considering ways to remove impediments to partial retirement, as part of a package of policy measures to increase retirement flexibility (see, e.g., Shultz and Henkens (2010) and other studies in the same special issue). On the other hand, stimulating partial retirement may of course also have the reverse effect of reducing total labor supply, if workers use partial retirement as an alternative to full-time work rather than full retirement.

The economic literature explains the labor supply behaviour of older workers in a life cycle framework, where workers choose the optimal combination of work, leisure, income and consumption, taking account of the future by maximising expected utility over the life cycle (Hurd, 1990; Lazear, 1987; Lumsdaine and Mitchell, 1999). The models developed to explain the retirement decisions of older workers are typically estimated using data on actual retirement decisions (Rust and Phelan, 1997; Stock and Wise, 1990). From such data, however, it is difficult to identify the retirement options available to employees because it is not clear which options could have been chosen, or because features of the options that are not chosen are typically not completely observed. This is a particular problem for partial retirement plans, since it is often unclear whether an employer offers such a plan, and, if there is a plan, which trajectory of earnings and pension incomes it implies. Indeed, Hutchens (2010) indicates that partial retirement arrangements are often informal agreements negotiated between an employee and employer. A comparison of the survey data on the actual and preferred number of work hours by older workers shows that older workers want to work fewer hours but actually work full time or not at all suggesting that indeed the data based on the actual work hours decisions substantially underestimates the true preferences of older workers for partial retirement. In the United States, studies based on the observed retirement outcomes in the HRS show that 15% to 25% participate in partial retirement or some form of it (Gustman and Steinmeier, 2000; Scott, 2004; Cahill et al., 2006), while surveys based on stated preference data show that 38% to 60% of the

respondents state an interest to participate in partial retirement (Brown, 2005; Roper Starch Worldwide, 2004; Watson Wyatt Worldwide, 2004). In the Netherlands, a survey conducted in 2006 shows that, among men in the age group 51-65, about 55% indicate that they want to work part-time, while less than 25% of the men in the same age group actually work part-time (Kantarcı and van Soest, 2008).

To avoid these problems and investigate the true preferences of older workers for partial and full retirement plans, we draw on stated preference data. As stated by Louviere et al. (2000), stated preference data can capture a wider and broader array of preference-driven behaviours than data on actual behaviour, allowing for experiments with choice opportunities that do not yet exist in the market. This is precisely the approach we take in this study. We analyse retirement plans that do not yet exist, or for which we do not know whether workers have access to them. We present the respondents of two Internet panel surveys representative of the adult populations in the Netherlands and the United States with a choice set of hypothetical full and partial retirement plans of hypothetical people, irrespective of whether their own employer actually offers partial retirement. The hypothetical plans focus on the trade-off between working more hours or more years with a higher pension level versus working less with a lower pension. The labor market states considered are working full-time, working part-time with a partial pension, and full retirement; alternative exit routes such as unemployment or disability do not play a role in the scenarios and are not analysed in this study. Each retirement plan has its own earnings and pension income trajectory. Respondents make leisure versus income trade-offs to choose their favourite plan and also indicate how attractive they find each plan.

The second aim of this paper is to analyse the impact of the pension incentives and increasing retirement age not only on full retirement decisions, as done in earlier studies, but also on partial retirement decisions. Policy makers are interested in economic measures that could extend the employment years beyond the early or normal retirement ages and reduce the raising cost of pensions. For the economist, however, it is difficult to observe institutional changes in the social security systems that cause sufficiently large and systemic variations in retirement income or retirement age to investigate their effects on labour supply and whether they can be considered as policy measures to increase labour supply among older workers. We implement a controlled randomised experiment where we randomly assign survey respondents different amounts of pension income and ages of retirement in the hypothetical full and partial retirement plans presented to them to study the impact of the pension incentives and increasing retirement age on the preferences for retiring full-time or part-time at a later age. We vary the pension income amounts either in terms of the incentives for delaying retirement, to study the substitution effect of higher pensions, or in terms of the generosity irrespective of the retirement age, to study the income effect of higher pensions. As we increase the ages of retirement in the full and partial retirement scenarios, the level of the pension income and the actuarial increase in pension rights for delayed claiming increase.

The final aim of this paper is to investigate the impact of in-

stitutional settings on retirement behaviour. Several studies argue that comparing retirement behaviour across countries can help to understand retirement behaviour because the differences in institutional settings across countries can predict the differences in retirement behaviour across these countries (Gruber and Wise, 1999). However, comparing retirement behaviour across countries using data on actual retirement decisions is difficult because institutions in given countries may be endogenous to individual preferences. We conduct our stated preference experiment in the Netherlands and in the United States and ask the respondents of Internet panel surveys in these countries to evaluate the same hypothetical retirement plans and subject them to the same treatments with respect to pension incentives and increasing retirement age. This makes it possible to investigate whether the labour supply responses to the same pension incentives and changes in retirement age differ across the two countries and to attribute this difference to the peculiar differences in the social security rules and work disciplines between the two countries that make full or partial retirement attractive or unattractive.

We have several findings. First, we document that the two in five respondents prefer partial retirement over early or delayed abrupt full retirement regardless of whether partial retirement starts at an early or later retirement age and regardless of the differences in the social security systems or work cultures in the two countries compared. Second, we find that if deferring pension rights are made actuarially attractive or if pension accruals are made less generous, individuals want to work full-time or part-time beyond the traditional early and normal retirement ages which might help to reduce the cost of pension benefits. Besides the pension incentives, increasing retirement age, as a means of reducing public expenditure, induces individuals to work part-time or not at all. Third, the comparison of the results between the Netherlands and the United States shows that while people in the Netherlands are responsive to a substitution effect of higher pensions, people in the United States are responsive to an income effect of higher pensions. Finally, we show that, as non-economic motives, age, gender, education and attachment to work for itself more than for money have significant effects on choosing partial retirement instead of full abrupt retirement.

The paper proceeds as follows. Section 2 describes the data and the experimental design. Section 3 presents descriptive statistics on the stated preferences for full and partial retirement plans. Section 4 describes the econometric model and Section 5 presents the estimation results. Section 6 compares the results obtained in the Netherlands with those in the United States. Section 7 conducts sensitivity analyses. Section 8 discusses policy implications and concludes.

2 Data and experimental design

The survey is fielded in 2014 in the LISS panel (Longitudinal Internet Studies for the Social sciences) administered by CentERdata at Tilburg University in The Netherlands. The panel is based on a true probability sample of households drawn from the population register and hence is representative of the population. It consists of 5000 households comprising 8000 individuals who participate in monthly Internet surveys of about 15 to 30 minutes

in total and are paid for each completed survey. One member in the household provides the household data and updates this information at regular time intervals. Households that could not otherwise participate are provided with a computer and Internet connection. A longitudinal survey is fielded in the panel every year, covering a large variety of domains including work, education, income, housing, time use, political views, values and personality. In this paper the sample is restricted to the respondents ages 40 and older since younger respondents would not have given much thought to their retirement plans yet. The sample includes 4066 respondents. Table 1 presents summary statistics on background characteristics.

The survey consisted of two main parts. The first part included questions on background characteristics and several aspects of work and social life. The questions in the second part aimed at measuring preferences for abrupt and partial retirement scenarios. Details on the survey questions can be found at http://www.lissdata.nl/dataarchive/study_units/view/500.

Figures 1 shows the question on preferences for retirement scenarios as they appeared on the screens of the respondents. The question aims to elicit preferences for full and partial retirement at different ages and whether partial retirement involved changing jobs or not. The question starts with an introductory text explaining the topic and then describes three retirement scenarios. Each scenario is described by means of a short text followed by a timeline showing the number of hours worked and the amounts of work and retirement income earned by a hypothetical employee at the corresponding ages on the timeline. Respondents are asked to choose their favourite retirement scenario, and in the follow-up screen they are asked to rate each scenario on a 10 point scale where 1 denotes "not interesting at all" and 10 denotes "perfect". Prior to the question, an instructions page is presented where the layout of the retirement scenarios is described in detail.

The retirement scenarios take the form of a vignette. A vignette is a short description of a hypothetical situation. Vignettes have been used for a long time in the social sciences and more recently also in economics. See for an early example van Beek et al. (1997). Our vignettes are short descriptions of hypothetical retirement scenarios of hypothetical people. The main reason for using vignettes with hypothetical people is that respondents for whom some of the retirement scenarios seem rather unrealistic in their actual situation can still answer the questions. For example, the long-term unemployed may get upset and not respond if we ask them to imagine they have a permanent job until retirement age, but will take it less personal if we describe a hypothetical person and ask them to evaluate this person's retirement plan from the point of view of their own preferences.

Each of the retirement scenarios presented is characterised by four attributes: age of retirement, number of hours worked, work income, and pension income. The age at which the employee retires is fictitious, that is, completely independent of the respondent's own employment situation, age, or other characteristics. The number of hours worked is also fictitious where we assume that the employee works 40 hours a week during full-time work

and 20 hours a week during partial retirement.[2]

The work income and pension income take realistic values considering the respondent's own employment situation. Work income in the vignette questions is based upon the actual work income of the respondent,[3] which is asked in an earlier categorical question on last monthly income from work. The pension income is computed as a percentage of work income, starting from a given replacement rate. In the scenarios as they are presented to the respondents, however, pension income and work income are shown in absolute amounts and the replacement rates are not shown.

The replacement rates are based upon the typical replacement rates in full and partial retirement in the Netherlands computed by Kantarcı et al. (2013). The replacement rates are scaled down to account for the fact that replacement rates in the Netherlands might get lower in the near future due to the policy measures currently being taken to individualise the pension income. Another reason for scaling down of the replacement rates is to keep them at the same level in the same survey conducted in 2010 in the United States so that respondents in the two countries can respond to the same question and the differences in the responses can be attributed to the differences in the pension systems and work disciplines surrounding the respondents making retirement decisions in the two countries. For example, in the case of abrupt retirement at age 65, the net replacement rate is reduced from 102% to 70% which is approximately the net replacement rate of an American worker with average earnings participating in the public pension scheme as well as in a voluntary defined benefit pension scheme (OECD, 2009, pp. 119-121). In the hypothetical scenarios, the replacement rate increases by an average of 8% for each year full retirement is delayed, which is the same as the reward in the US for delaying Old Age Social Insurance benefits.

The following three attributes of the vignette scenarios are randomised: the retirement age, the pension income, and the wage rate during partial retirement.[4] For the retirement age, one of three regimes, denoted as 65, 63, and 61 are randomly assigned. Each regime defines particular ages of full and partial retirement in the three retirement scenarios that a respondent is asked to compare; see Table 2. For example, for regime 65, in the first (abrupt) retirement scenario the full retirement age is 65, in the second (gradual) retirement scenario the partial retirement age is 65 and the full retirement age is 70, and in the third (abrupt) retirement scenario the full retirement age is 70. Randomisation in the retirement age aims to create variation in the scenario choices with respect to the timing of retirement.[5]

For the second attribute, pension income (or replacement rate), one of nine regimes are assigned, where each regime is characterised by low, middle or high replacement rates in all three scenarios and by low, middle, or high rewards for retiring later. The variation in the level of the replacement rates, irrespective of the retirement age, is used to estimate the *income effect* of retirement income on the retirement decision. If leisure is a normal good, higher replacement rates are expected to lead to less labor supply and therefore to earlier full retirement or partial retirement instead of late abrupt retirement. This randomised regime allocation is referred to as the "income effect" regime. The replacement rates in the middle income effect regime assume a pension accrual rate of 2.05% which is the effective accrual rate in the Netherlands. The "low income effect regime" considers a lower accrual rate and the "high income effect regime" considers a higher accrual rate which, respectively, lead to lower and higher replacement rates. The variation in the rewards for retiring later changes the price of leisure and can therefore be used to estimate a *substitution effect*. This regime choice is therefore referred to as the "substitution effect regime". The middle substitution effect regime gives approximately actuarially fair rewards for later retirement (and actuarially fair penalties for early retirement). In other words, the changes in the expected net present value of total pension income are approximately equal to the net present value of the additional premiums that are paid. The "high substitution effect regime" gives more than actuarially fair rewards for later retirement, or positive "accruals". The "low substitution effect regime" gives less than actuarially fair rewards for later retirement, or negative accruals.

Table 2 presents the replacement rates for the nine regimes, the combinations of the three income and the three substitution effect regimes. The first, second and third row always indicates a low, middle or high substitution, and the first, second and third column correspond to the low, middle, or high income. For example, the group low (accruals)/low (income) with retirement age regime 65 has replacement rates 60% for early retirement, (as of age 70) 75% for partial retirement, and 90% for late retirement. For the group high (accruals)/low (income), the replacement rates are 60%, 85% and 110%, respectively. The group high/low therefore gets a much higher reward for retiring later, or, in other words, pays a higher price for more leisure (in the form of retiring early). This group is therefore expected to substitute expensive leisure for relatively cheap consumption and in analogy to the labor supply literature, the difference between choices in the first row and the third row are referred to as the (uncompensated) substitution effect. On the other hand, if the replacement rates for the group low/low are compared with those of the group low/high (first row, last column: 80%, 95%, 110%), the compensation (in %-points) for retiring later (the "price of leisure") is the same, but the pension income levels are much higher for the low/high group. Following the labor supply literature, the difference between the choices of low/high and low/low group are referred to as an income effect.[6]

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[2] In the Netherlands, in 2014 the average full-time worker worked about 41 hours a week and the average part-time worker worked about 23 hours a week among the respondents of the DNB Household Survey 40 years old and older. In the United States, in 2002 the average full-time worker worked about 45 hours a week and the average partial retiree worked about 27 hours a week (Chen et al., 2006).

[3] This is done to avoid the alienation bias that might arise if respondents have problems evaluating choices that are too far from their own situation (Hanemann, 1994; Whittington, 2002).

[4] Moreover, the order in which the first and the last retirement scenarios were presented are randomised.

[5] One might argue that it would also be interesting to compare the partial retirement scenario in this example with abrupt retirement at age 67 or 68. This is

not done in the questions, but exploiting the variation in retirement ages, such a comparison could be made with a structural model estimated using these data.

[6] The substitution effect can be compared to the *price effect* of pension benefits and the income effect can be compared to the *wealth effect* of pension benefits in

The levels of the replacement rates associated with a particular pension income regime depend on the retirement age regime in two respects. First, the replacement rates decrease through earlier retirement age regimes 63 and 61 because pension benefits are actuarially adjusted for earlier claiming and because those who retire earlier accumulate less pension rights. Second, at the earlier retirement age regimes, the increase in the replacement rates for delaying retirement is smaller because the actuarial increase for delaying benefits is smaller at earlier retirement ages (due to the fact that life expectancy is longer at earlier ages).

Several studies showed that labor market rigidities force employees to partially retire outside their main job where they work at a lower wage rate (Gordon and Blinder, 1980; Gustman and Steinmeier, 1984b, 1985; Hutchens, 2010; Latulippe and Turner, 2000; Ruhm, 1990). For example, it is more costly that a particular job is performed by an older worker than by a younger worker, or by a part-time worker than by a full-time worker, which discourage employers to offer partial retirement opportunities. Therefore, employers are more likely to agree on a partial retirement arrangement if the hourly wage of the partial retiree is lower than that of an average worker performing the same or a similar job. We investigate how the elderly evaluate partial retirement when it is associated with a reduced wage rate or not. To this purpose, for the third attribute, wage rate in partial retirement, two regimes are defined. In the first regime the employee reduces hours in the same job and for the same wage rate (*phased retirement*), while in the second regime he reduces his hours by changing to a different but less demanding job with a wage rate that is 20 percent lower than the wage rate at the old job (*partial retirement*, in the narrow definition; see Section 1).

3 Descriptive results

Respondents were first asked to choose among three scenarios of early abrupt retirement, partial retirement and late abrupt retirement, and were then asked to rate each scenario on a 10 point scale. Overall, merging all regimes, 28.2% chose the early abrupt retirement scenario, 42.3% chose the partial retirement scenario, and 29.4% chose the late abrupt retirement retirement scenario. This shows that individual preferences for retirement are heterogeneous in terms of both the age of retirement and the type of retirement. The retirement scenarios are respectively rated 5.4, 6.1 and 5.4 on average (with statistically significant differences). To check if respondents consistently tend to rate the retirement scenario they chose in the first question higher than the other two retirement scenarios, the average ratings given to each scenario conditional on choice are calculated. The average ratings for early abrupt retirement, partial retirement, and late abrupt retirement are 7.4, 4.9, and 4.2 for those who choose early abrupt retirement; 5.1, 7.6, and 5.0 for those who choose partial retirement; and 3.9, 4.9, and 7.5 for those who choose late abrupt retirement. These figures show that, on average, respondents give the highest rating to the retirement scenario of their choice, suggesting that, on average, respondents are consistent in their answers.

Table 3 shows the percentage of respondents who choose a particular retirement scenario and the average of the ratings for the regimes defined by retirement age and pension income (see Table 2). In the left hand panel, the columns with the three income levels (low/middle/high) are merged so that the differences reflect substitution effects. The columns "choice" and "rating" show the percentage of respondents who choose the particular retirement scenario and the average rating given to each scenario. As the incentives to work beyond age 65 increases, more people choose partial retirement while fewer people choose late retirement. We obtain a similar pattern at earlier retirement ages. Therefore the particular finding is that the expected substitution effect is observed for partial retirement rather than full retirement. The differences in the average ratings confirm this result. In the right hand panel, substitution effect levels (low/middle/high) are merged so that differences reflect income effects. The last two columns show the choice percentages and average ratings. We do not observe any clear pattern in the choices or average ratings when the general level of pension income increases.

The randomisation of the wage rate in partial retirement reveals the following result (not presented in the table). The percentages of the people who choose early abrupt retirement, partial retirement and late abrupt retirement are, respectively, 28.9%, 41.6%, and 29.5% when partial retirement does not involve a 20 percent reduction in the wage rate; they are 27.6%, 43.1%, and 29.3% when partial retirement involves a reduction in the wage rate. This shows that a change to a less demanding job in partial retirement, accompanied by a decrease in the wage rate, causes 4.5% of the respondents to prefer to continue to work part time at a different but less demanding job with a lower wage rate who otherwise would have retired early from their former job. The average ratings for the three retirement scenarios are, respectively, 5.4, 6.1, and 5.4, when partial retirement does not involve a reduction in the hourly wage, and 5.4, 6.2, and 5.4 when partial retirement involves a reduction. The null hypothesis of the equality of the average ratings across the two groups is not rejected at the 0.10 significance level in the cases of early or late abrupt retirement, as expected since these scenarios are the same in the two cases (the wage reduction only applies during partial retirement). However, the null is also not rejected at the 0.10 significance level for the partial retirement rating.

4 Empirical approach

As described in Section 2, respondents choose one of the three scenarios presented to them. We assume that the choice is based upon a random utility model, with the utility from retirement scenario s for respondent i given by:

$$U_{is} = z_i^{'}\gamma_s + x_i^{'}\beta_s + u_{is} \qquad (1)$$

$z_i^{'}$ is a vector of seven treatment variables (the scenario characteristics). In particular, it has dummies for the medium and high substitution effect and income effect regimes (the low one is the base category) and for the retirement age regimes 63 and 65 (with 61 as the base category), and a dummy indicating that

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Euwals et al. (2010). The income effect can also be comapred to the effect of a wealth shock through inheritance receipt on retirement behaviour in Brown et al. (2010).

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the hourly wage in partial retirement is lower than before partial retirement (the base category is that the hourly wage remains the same). x_i' includes the variables on respondent's background characteristics and socioeconomic status. u_{is} is a random utility term.

It is assumed that the respondent chooses the scenario with the highest utility U_{is}. Under the assumption that the random terms u_{is} are independently and identically type-I extreme value distributed, this leads to the standard multinomial logit model (Cameron and Trivedi, 2005; Winkelman and Boes, 2006). Since only one choice (among three vignettes) of each respondent is analysed, the unit of observation in this model is the respondent; there are no multiple observations per respondent. The model is estimated with maximum likelihood.

Note that the z_i in equation (1) are *individual specific* but not alternative specific; γ_s measures the effect of a change in one of the randomised treatment variables on the utilities of scenario s. However, attributes of the retirement scenarios are by definition *alternative specific*. This makes the model different from a conditional logit model, where the explanatory variables would reflect the characteristics of the scenarios. The modelling approach therefore has the advantage that γ_s immediately gives the effect of a treatment variable upon the utility of scenario s. For example, take a dummy for the high reward for later retirement (the high substitution effect regime), which is one of the variables in z_i. Respondents who are randomised into this regime pay a higher price for retiring earlier. Therefore it is expected that they choose late abrupt retirement more often, but also to choose partial retirement (starting at the early retirement age) over early retirement more often than in the benchmark case with less than actuarially fair rewards. This implies that the parameters in γ_{LR} and γ_{PR} on the dummy for the high substitution effect regime are expected to be positive. Note that these parameters are assumed to be the same for all respondents, so the model imposes uniform treatment effects for all respondents in terms of utility differences.

After respondents have made their choice, they rate each scenario on a ten point scale from 1 (not interesting at all) to 10 (perfect). The ratings given to each scenario are analysed using a standard linear regression model estimated by ordinary least squares. It is then analysed whether the effects of the covariates on the probability of choosing a retirement scenario are in line with the effects on the ratings given to that retirement scenario.

5 Estimation results

Table 4 presents the marginal effects of the explanatory variables on the probability of choosing a particular retirement scenario. Marginal effects are based on the estimates from a multinomial logit regression evaluated at the mean values of the explanatory variables (discrete changes from 0 to 1 for dummy variables). Note that the marginal effects for the three retirement scenarios add up to zero by construction.[7]

There is no universally accepted goodness of fit measure for

discrete choice models (Kennedy, 2009). To assess the model fit, three measures are considered. The McFadden R-squared compares the log likelihood value of an unrestricted model with that of an intercept only model. Values of 0.2 to 0.4 indicate an excellent fit (McFadden, 1979). The model leads to a value of only 0.010. The count R-squared indicates the proportion of correctly classified observations. We obtain a value of 0.384. As a final indicator, the minimum and maximum of the predicted probabilities of a given outcome are analysed. A wider range between the two quantities indicates that the model performs better in predicting the outcome (Cameron and Trivedi, 2005). In case of a perfect fit, the model would correctly predict all cases of 0 when a given outcome is not chosen and all cases of 1 otherwise so that the range would be at its maximum. We find that the predicted choice probabilities range between 0.179 and 0.374 for early abrupt retirement, between 0.235 and 0.680 for partial retirement, and between 0.140 and 0.428 for late abrupt retirement. This shows that there is considerable variation in the predicted probabilities of partial retirement suggesting that the model performs reasonably well in predicting the choice of partial retirement. The model does not perform as well in predicting the choices of the other retirement scenarios. Table 5 shows small values for the R-squared which indicates a poor fit for the linear regression model explaining the ratings given to each retirement scenario.

Model significance is assessed using the likelihood ratio statistic which shows that the regressors are jointly significant at the 0.01 significance level. The standard F-statistic leads to a similar conclusion in the linear regression model.

The multinomial logit model is based on the assumption of independence of irrelevant alternatives (IIA) which implies that the odds of comparing two alternatives is independent of the third alternative. If the assumption is violated, the multinomial logit model is misspecified. We employ the Hausman test of the IIA assumption comparing the estimates of a model where all alternatives are considered with those of a model where the third alternative (considered as irrelevant) is excluded. If the excluded alternative is indeed irrelevant to the comparison of the other two alternatives, the coefficient estimates from the two models should not be statistically different from each other. According to the p-values in Table 4, we do not reject this null hypothesis, suggesting that the IIA assumption is not violated.

5.1 Treatment effects

Table 4 shows the effects of the substitution effect regimes, in particular the effects of middle and high rewards for late retirement (and delayed claiming) compared to the reference of less than actuarially fair rewards. Two effects are statistically significant at the 0.05 level and have opposite signs with offsetting magnitudes. Respondents less often choose late abrupt retirement while they more often choose partial retirement when delayed retirement is rewarded with actuarially generous increases in pension rights compared to when it is rewarded with less than actuarially fair increases. On the other hand, no significant effect is found when delayed retirement is rewarded with actuarially fair increases. This suggests that people are responsive to a

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[7] We do not present the estimation results on the multinomial logit coefficients since it is difficult to give a direct interpretation to the coefficient estimates in the multinomial logit model.

generous increase but not to a fair increase in the pension rights for delayed claiming. The table quantifies the effect as follows. The probability of delaying retirement partially by five years increases on average by 4.3 percentage points when the actuarial increase in pension rights due to delaying retirement partially is 10 percentage points higher than if the actuarial increase was less than fair. In contrast, the probability of delaying full retirement by five years decreases on average by 4.3 percentage points when the actuarial increase in pension rights due to delayed claiming is 20 percentage points higher than if the actuarial increase was less than fair. To asses whether the magnitudes of these effects are large, they can be compared to the amounts of the changes in the fractions of respondents choosing the late abrupt retirement and partial retirement scenarios across the substitution effect regimes shown in Table 3. The table shows that, merging retirement age regimes, when going from the low to the high substitution effect regime, the fraction of respondents choosing partial retirement increases from 40.6% to 44.5%. This suggests that the found marginal effects represent notable shifts in the labor supply preferences. The existing literature shows that individuals are responsive to incentives for retiring later (Burbidge and Robb, 1980; Euwals et al., 2010; Fields and Mitchell, 1984; French and Jones, 2012; van Soest and Vonkova, 2014). The current results show that individuals are responsive to incentives but prefer to delay leisure time only partially, if they are provided with the option, and not fully. The effects of the substitution effect regimes on the choice probabilities are in line with the effects on the scenario ratings. Table 5 shows that when late retirement is rewarded with a more than actuarially fair increase in pension rights, respondents give significantly lower ratings to the early and late abrupt retirement scenarios. They also give lower ratings to the late abrupt retirement scenario when delaying retirement is rewarded with an actuarially fair increase only.

The effects of the substitution effect regimes may depend on the retirement age, since the increase in the replacement rate for delaying retirement is smaller for earlier retirement ages (see Table 2). Therefore we allow two dummy variables that indicate the middle and high rewards for delaying retirement to interact with three dummy variables indicating the three regimes of retirement age (65, 63, 61). In this specification we also allow other treatment variables to interact with the retirement age regimes. The results (not presented) show that actuarially fair increases in pension rights in retirement age regime 65 decreases the probability of late abrupt retirement by –0.058 with a p-value of 0.059, and increase the probability of early abrupt retirement by 0.050 with a p-value of 0.090. Generous increases in pension rights in retirement age regime 63 increase the probability of partial retirement by 0.083 with a p-value of 0.007, and decreases the probability of late retirement by –0.079 with a p-value of 0.007. These results suggest that individuals are especially responsive to pension incentives to delay leisure time by means of partial retirement at age 63 whereas the actuarial increase for delaying retirement in this retirement age regime is not as high as that in the retirement age regime 65. It implies that financial incentives for delaying leisure time with partial retirement could be effective if they target those individuals who would tend to retire few years before the statutory retirement age of 65.

Table 4 shows no significant marginal effects for the income effect regimes. However, we find significant effects when we allow the income effect regimes to interact with the three retirement age regimes, in line with the results obtained in Table 3. The probability of early abrupt retirement at age 65 increases by 5.4 percentage points while the probability of delaying retirement partially by five years from age 65 decreases by 7.1 percentage points when the replacement rates are 10 percentage points higher compared to the reference replacement rates. The p-value of the former effect is 0.065 and that of the latter effect is 0.031. It suggests that when individuals achieve a level of pension income that they consider sufficient at the normal retirement age, they do not want to continue to work even at reduced hours but retire. The finding is in line with Fields and Mitchell (1984) who showed that an increase in the worker's pension income available for retirement at age 60 induced earlier retirement in the US. It is also in line with more recent studies which show that an increase in pension wealth or a positive wealth shock through inheritance receipt increase the odds of retirement (Brown et al., 2010; Euwals et al., 2010). However, these studies analysed the income effect on the binary decision of working versus full retirement. The current results show that the income effect does not only exist at the extensive margin but also influences the number of hours worked at the intensive margin. This suggests that some individuals would use partial retirement to adjust their labour supply in a flexible manner in response to a change in the generosity of the pension accruals or in the level of their pension income for some other reason. On the other hand, the probability of late abrupt retirement at age 70 increases by 5.4 percentage points when the replacement rates are 20 percentage points higher compared to the reference replacement rates but the effect is significant only at the 0.10 level while the probabilities of the other two retirement scenarios have negative signs but no significant effects. This income effect regime provides a particularly high replacement rate at age 70 which might explain the tendency of respondents to favour working until this age.

For the retirement age regimes, Table 4 shows a significant marginal change for the probability of partial retirement and late abrupt retirement but not for early abrupt retirement. Respondents are more likely to choose partial retirement while less likely to choose late abrupt retirement in retirement age regime 63 compared to in retirement age regime 61. An explanation might be that in retirement age regime 61 people want to work at least until the normal retirement age because of a social norm, or at these ages the disutility of work is small due to (expected) health, or because they consider that their pension income is not as high as they would have liked it to be and want to remain employed full-time to accrue additional pension rights. On the other hand, in retirement age regime 63 people do not want to work full time beyond the statutory retirement age but to work at reduced hours perhaps because at these ages partial retirement allows them to continue to work while at the same provides leisure time for social activities. These results are generally in line with the results on the scenario ratings. Table 5 shows that respondents give higher ratings to partial retirement at retirement age regime 63 although the effect is marginally significant at the 0.10 level. On the other hand, respondents give lower ratings

especially to late abrupt retirement and partial retirement at retirement age regime 65.

Table 4 shows no significant effect of a reduced hourly wage accompanied by a job change in partial retirement. The effect of a reduced hourly wage might depend on the retirement age. Therefore we allow the wage rate regime to interact with the three retirement age regimes. We find no significant effect. These results suggest that a lower wage rate accompanied by a job change in partial retirement does not discourage people to participate in partial retirement as otherwise they would have preferred to retire fully or remain employed full-time.

5.2 Background characteristics

The lower panel of Table 4 shows the effects of socioeconomic and other background variables. We find significant effects with intuitively plausible signs for all variables. First, older respondents less often prefer partial retirement and more often prefer late abrupt retirement. A model with dummies for age categories 50-59, 60-69 and 70-96 shows that the probability of choosing partial retirement decreases and the probability of choosing late abrupt retirement increases in magnitude through older age categories with statistically significant effects compared to the reference category of 40-49. An explanation can be that older respondents want to remain employed and continue to accrue pension rights to attain a desired level of pension income.

Second, male respondents are less likely to choose partial retirement whereas they are more likely to choose late abrupt retirement. It might be that the types of work done by men are not suitable for part-time jobs, or that male workers do not need to combine work and family responsibilities as much as females, making them less likely to opt for a flexible work schedule.

Third, respondents with more education more often prefer partial retirement over late abrupt retirement. It might be that those with more education are ambitious or attached to their work and therefore tend to remain employed but prefer to remain employed part-time because the type of work they do is suitable for a part-time job.

Fourth, we asked survey respondents to which extent they agree with the statement *I would keep working even if money were not needed*. Higher levels of agreement with the statement significantly increase the odds of remaining employed in a part-time job. This suggests that individuals who are attached to labor market for non-economic reasons are significantly more likely to remain employed but by means of a part-time job only. While our findings on the substitution and income effects in Section 5.1 have shown that economic reasons play an important role, the current finding provides evidence that non-economic reasons also matter in the choice of partial retirement.

Finally, we analyse the effect of house ownership. If house ownership is a proxy for private wealth and leisure is a normal good, we expect that those who own the house they live in want to retire earlier or at least want to work less due to an income effect. Table 4 shows that house ownership increases the odds of partial retirement but the effect is significant only at the 0.10 level. House ownership also decreases the odds of late abrupt retirement but the effect is not significant. These results seem in

line with the expected income effect but the insignificant effects do now allow to draw a clear conclusion.

The lower panel of Table 5 shows the results on scenario ratings. Many of the significant effects confirm the significant effects found on the choice probabilities in the lower panel of Table 7. For example, respondents who are female or have more years of education give higher ratings to partial retirement.

Several variables that have no significant effects on the choice probabilities have significant effects on the scenario ratings. The results on these variables can be taken as suggestive rather than conclusive since their effects have no statistical significance on the choice probabilities. First, respondents living in households with more members give higher ratings to early abrupt retirement perhaps because households with more members require greater time investment towards household activities or family responsibilities. Second, respondents with higher (former) earnings give higher ratings to partial retirement and lower ratings to late abrupt retirement. This might be due to an income effect since those respondents with higher earnings are assigned higher levels of pension income by the survey design. This income effect corresponds to our previous finding that respondents who are randomised into a higher retirement income regime in the retirement scenarios are more likely to choose early retirement. Third, compared to those who are active in the labour market, those who are disabled or out of the labour force significantly give higher ratings to early abrupt retirement. This result seems plausible since those who are out of the labor force would have less incentive to engage in work activities.

5.3 Job characteristics and satisfaction

In the survey we have also asked questions on job characteristics and several dimensions of job satisfaction. Wordings of these questions are given in the Appendix. We find significant effects for two among the six job characteristics. First, respondents working in larger companies in terms of the number of employees less often prefer partial retirement but more often prefer early abrupt retirement. The marginal effects (not presented) are, respectively, –0.010 and 0.009 and the associated p-values are 0.022 and 0.045. Several factors might contribute to this finding. Larger companies are more likely to have formal rules and procedures and therefore are less flexible in accommodating preferences for reducing work hours (Hutchens and Papps, 2005; Siegenthaler and Brenner, 2000). Larger companies may incur higher administrative costs per worker and therefore have lower proportions of part-time workers (Montgomery, 1988). Larger companies may also involve more team-work and raise the number of work hours above part-time (Jondrow et al., 1983a,b). The analysis based on the scenario ratings confirm this result. We find that those working in larger companies significantly give lower ratings to partial retirement, with a marginal effect of –0.065 and an associated p-value of 0.001. Second, respondents whose job requires keeping up with the pace of others less often prefer partial retirement perhaps because the nature of their job requires full-time presence. The marginal effect in this case is –0.026 and the associated p-value is 0.010.

We find significant effects for four among eight dimensions

of job satisfaction. First, (former) workers who find their work attractive more often choose partial retirement and less often choose early abrupt retirement. This suggests that satisfaction with the work itself increases the odds of remaining employed by means of a part-time job. The marginal effects are, respectively, 0.028 and –0.025 with associated p-values 0.052 and 0.058. Second, respondents who report higher levels of job security more often choose partial retirement while they less often choose early or late abrupt retirement. The magnitude of the former effect is 0.019 and the associated p-value is 0.055 while the other two effects are insignificant due to offsetting effects. It might be that individuals who have more job security have greater power in bargaining for a flexible retirement programme. On the other hand, respondents who have more freedom in deciding how they do their work less often choose partial retirement and more often choose the other two retirement scenarios. In this case the marginal effect for partial retirement is –0.028 and the associated p-value is 0.043. It might be that those who already have freedom in taking decisions and choosing tasks less often seek flexible work arrangements such as partial retirement. Also, respondents who have better promotion prospects less often choose partial retirement while they more often choose the other two retirement scenarios. The marginal effect for partial retirement is –0.021 and the associated p-value is 0.077. An explanation can be that those with better promotion prospects are expected to be present at the workplace on a full-time basis because, for example, they have supervisory roles. This result is in line with the finding on scenario ratings that respondents who have better promotion prospects significantly give lower ratings to partial retirement. The magnitude and the p-value of the regarding effect is –0.126 and 0.012.

6 Comparison with the United States

Several studies have shown that differences in retirement behaviour across a large number of industrialised countries are largely in line with the effects of retirement incentives on retirement decisions in the national social security and pension systems (Gruber and Wise, 1999). If the utility functions underlying the work preferences of older people in different countries are the same, or at least share some common features, cross-national variation helps to obtain or improve identification of the underlying factors that affect retirement decisions. However, cross-national comparison of the retirement attitudes using data on actual retirement decisions is difficult because institutions in given countries may be endogenous to individual preferences. For example, restrictions on the minimum number of hours worked from the employer may affect worker preferences for partial retirement in different countries to different extents and such restrictions are typically not observable by the researcher. Using the vignette methodology, respondents in different countries with different social security systems or work cultures can be asked to evaluate a same choice set of retirement plans that are exogenous to the institutional settings in these countries so that differences in retirement preferences can be attributed to the differences in

the pension systems or work cultures only.[8]

In such a comparative evaluation of the retirement preferences across countries, the factors affecting the retirement preferences are better identified if cross-national variation in the pension systems and work cultures is larger. The pension system in the United States has long been dominated by defined contribution plans where individuals themselves decide on when and how much to save for retirement and differs drastically from the pension systems in the Netherlands or other European countries where pension plans are typically of the defined type which require fixed monthly contributions over the life cycle. Moreover, the average annual hours worked per person in the United States is higher by 408 hours than that in the Netherlands, being the largest difference when compared to any other European country (OECD, 2014). These empirical accounts point to peculiar differences in the pension systems and work disciplines between the Netherlands and the United States. We expect that these peculiar differences in the institutional settings drive variation in the retirement preferences between the two countries.

To compare the retirement preferences of people between the two countries, the same survey study conducted in the Netherlands is repeated in the United States. The survey is fielded in 2010 in the American Life Panel (ALP) administered by the RAND Cooperation. The ALP is an Internet panel of respondents representative of the total population but the sample is relatively highly educated due to the high non-response rate of the less educated respondents. Respondents that could not otherwise participate are provided with a computer and Internet connection who complete online questionnaires twice a month and are paid an incentive of about $20 per thirty minutes of interviewing. As for the Netherlands, the sample is restricted to the respondents ages 40 and older which generated 2028 responses. Details on the survey can be found at `https://mmicdata.rand.org/alp/index.php?page=data&p=showsurvey&syid=71`

6.1 Scenario choices and ratings

The same analyses on scenario choices and ratings carried out in Sections 3 and 5 are reproduced for the United States for comparison. Overall, merging all regimes, 21.7% chose the early abrupt retirement scenario, 41.3% chose the partial retirement scenario, and 37.1% chose the late abrupt retirement retirement scenario. The retirement scenarios are respectively rated 5.1, 6.3 and 5.8 on average (with statistically significant differences). On average, respondents give the highest rating to the retirement scenario of their choice, suggesting that, on average, respondents are consistent in their answers. In general, these figures compare to those obtained in the Netherlands and show that individual preferences for retirement are heterogeneous in terms of both the age of retirement and the type of retirement. The main difference is that fewer people prefer early abrupt retirement and instead prefer late abrupt retirement and give, respectively, lower and higher ratings to the two retirement scenarios in the United

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[8] See the use of the vignette methodology in international comparisons of work-limiting health status in Kapteyn et al. (2007), political efficacy in King et al. (2004), or job satisfaction in Kristensen and Johansson (2008).

States. This is in line with the empirical facts that workers spend more hours in the labor market or retire later in the United States.

Table 6 shows the percentage of respondents who choose a particular retirement scenario and the average of the ratings for the regimes defined for retirement income and retirement age. In the left hand panel, the differences due to substitution effect regimes show that as the incentives to work beyond age 65 increase more people prefer partial retirement over early abrupt retirement, while about the same number of people choose the late abrupt retirement scenario. At earlier retirement ages, more people prefer late abrupt retirement over early abrupt retirement or partial retirement. Apart from an age effect, these are in general the substitution effects we would expect. The differences in the average ratings confirm these results. This result compares with that obtained in the Netherlands where the expected substitution effect is observed more often for partial retirement than for late abrupt retirement. In the right hand panel, the differences due to income effect regimes show that as the general level of retirement income increases, more people prefer early abrupt retirement and fewer people prefer late abrupt retirement. This is in line with the expected negative income effect, i.e. confirming that leisure is a normal good. We find no clear effect on partial retirement. The results based on the average ratings are in line with these results. This result contrasts with that obtained in the Netherlands where no such clear income effect is observed.

The randomisation of the wage rate in partial retirement shows that the percentages of the people who choose early abrupt retirement, partial retirement and late abrupt retirement are, respectively, 21.5%, 43.6% and 34.9% when partial retirement does not involve a 20 percent reduction in the wage rate; they are 21.9%, 39.0% and 39.1% when partial retirement involves a reduction in the wage rate. This shows that a change to a less demanding job in partial retirement, accompanied by a decrease in the wage rate, deters 12% of the respondents who otherwise would have participated in partial retirement so that they instead prefer to continue to work full time without changing jobs. The average ratings under the two wage rate regimes are somewhat at odds with the choice percentages, however. The average ratings given to the three retirement scenarios are, respectively, 5.0, 5.7, and 6.4 when partial retirement does not involve a reduction in hourly wage, and 5.1, 5.8, and 6.3 when partial retirement involves a reduction. The null hypothesis of the equality of the average ratings across the two groups is rejected at the 0.10 significance level for partial retirement.

When compared to the Netherlands, the results show that the effect of the decrease in hourly wage is much larger and has the the opposite sign in the United States. This might suggest that when deciding on partial retirement, respondents evaluate job change from different perspectives in the two countries: while respondents are responsive to a change in hourly wage in the United States, they seem responsive to a change in how demanding the job is in the Netherlands. This finding might correspond to our earlier finding in the analysis of the effect of financial incentives that when provided with higher rewards for delaying retirement, while respondents tend to delay retirement fully in the United States, they seem to value leisure time more and delay retirement only partially in the Netherlands.

6.2 Treatment effects

We use the same regression model presented in Section 4 to perform multivariate analysis. The model performs slightly better in terms of data fit when the US data is applied. In particular, we obtain larger magnitudes for the two R-squared measures and in general the predicted choice probabilities lie in wider ranges compared to when the Dutch data is applied in Section 5. We find that the McFadden R-squared is 0.066, the count R-squared is 0.450, and the predicted choice probabilities range between 0.018 and 0.710 for early abrupt retirement, between 0.186 and 0.640 for partial retirement, and between 0.091 and 0.776 for late abrupt retirement. The likelihood ratio statistic of model significance indicates that the regressors are jointly significant at the 0.01 level. The IIA assumption is not violated according to the Haussmann test with a p-value close to 1 when any alternative considered irrelevant is excluded. The linear regression model that explains the ratings given to each retirement scenario also performs relatively better in terms of data fit according to the R-squared statistic in Table 8. The standard F-statistic indicates that the model is significant at the 0.01 level in all three regressions.

Table 7 reproduces the analysis of the treatment effects of pension income and retirement age for the United States. The results on the substitution effect regimes show that respondents less often choose early abrupt retirement while they more often choose late abrupt retirement when delayed retirement is rewarded with actuarially fair and generous increases in pension rights compared to when it is rewarded with less than actuarially fair increases. The effects have plausible signs but are significant only at the 0.10 level. The table quantifies the effects as follows. The probability of retiring at a given early retirement age decreases on average by 4.4 percentage points while the probability of delaying retirement fully from that age by five years increases on average by 5.2 percentage points when the actuarial increase in pension rights due to delayed claiming is 20 percentage points higher than if the actuarial increase was less than fair. We find a similar positive effect for late abrupt retirement when delayed claiming is rewarded with actuarially fair increases, although it is marginally significant at the 0.10 level suggesting that people are more responsive to a generous increase than just a fair increase. We find no significant effect for partial retirement. These results suggest that people are somewhat responsive to increasing rewards for later retirement at the extensive margin and want to delay retirement until late retirement ages. Table 8 shows that the results on the scenario ratings confirm the results on the choice probabilities. Respondents significantly give lower ratings to the early abrupt retirement scenario and higher ratings to the late abrupt retirement scenario when delaying retirement is rewarded with actuarially generous increases in pension rights compared to when it is rewarded with less than actuarially fair increases. They also give lower ratings to the early abrupt retirement scenario when delaying retirement is rewarded with actuarially fair increases only.

By our experimental design, the increase in the replacement rates for delaying retirement is smaller for earlier retirement ages and therefore we allow the substitution effect regimes that reward delayed retirement with fair and generous increases in pen-

sion rights to interact with the three retirement age regimes. We find that actuarially fair increases in pension rights in retirement age regime 63 increases the probability of late abrupt retirement by 0.072 with a p-value of 0.090 but has no effect on the other retirement scenarios. Generous increases in pension rights in retirement age regime 61 decreases the probability of early abrupt retirement by –0.080 with a p-value of 0.079, and increases the probability of late abrupt retirement by 0.089 with a p-value of 0.051. These results suggest that people are responsive to pension incentives for delaying retirement fully especially at age 61 although the actuarial increase in pension rights for delayed claiming is smallest for this retirement age regime. This implies that financial incentives for delaying retirement fully could be effective if they target people who want to retire at the traditional early retirement ages.

When we compare the preceding results on the substitution effect to those obtained in the Netherlands in Section 5.1, we find that in both countries people are responsive to actuarially fair or generous increases in pension rights when compared to less than fair increases, but they respond to these incentives at different margins of labour supply or at different retirement ages. In the Netherlands, people are responsive to generous increases in pension rights at age 63 at the intensive margin and do not want to delay retirement fully but only partially. To some extent they are also responsive to fair increases at age 65 at the extensive margin. On the other hand, in the United States, people are responsive to generous increases in pension rights at age 61 at the extensive margin and want to delay retirement fully until age 66. To some extent they are also responsive to fair increases at age 63 at the extensive margin.

Table 7 shows significant effects for the income effect regimes. Respondents more often choose early abrupt retirement while they less often choose partial retirement when pension accruals are fair, or they less often choose late abrupt retirement when pension accruals are generous compared to when pension accruals are less than fair. The table quantifies the effects of fair and generous pension accruals as follows. The probability of retiring at a given early retirement age increases by 7.2 percentage points while the probability of delaying retirement partially from that age by five years decreases by 5.9 percentage points when the replacement rates are 10 percentage points higher compared to the reference replacement rates. The probability of retiring at a given early retirement age increases by 12.5 percentage points while the probability of delaying retirement fully from that age by five years decreases by 9.6 percentage points when the replacement rates are 20 percentage points higher compared to the reference replacement rates. These results show that, at a given retirement age, people want to reduce their number of work hours when the level of the pension income is higher, and even want to stop working all together when the level of the pension income increases further, perhaps because they consider that the provided partial or full pension income is sufficient to meet their ends.

When we allow the income effect regimes to interact with the three retirement age regimes, we find significant effects in all retirement age regimes. In retirement age regime 65, respondents more often choose early abrupt retirement while they less often choose partial retirement. The magnitudes and the p-values

of the effects are 0.114 and 0.004 for early abrupt retirement, and –0.092 and 0.073 for partial retirement. In retirement age regime 63, respondents more often choose early abrupt retirement while they less often choose late abrupt retirement. The magnitudes and the p-values of the effects are 0.128 and 0.000 for early abrupt retirement and –0.158 and 0.001 for late abrupt retirement. In retirement age regime 61, respondents more often choose early abrupt retirement while they less often choose late abrupt retirement. The magnitudes and the p-values of the effects are 0.131 and 0.003 for early abrupt retirement and –0.093 and 0.038 for late abrupt retirement. Besides, we also find that in retirement age regime 63, respondents more often choose early abrupt retirement when the replacement rates are 10 percentage points higher compared to the reference replacement rates. The magnitude and the p-value of the effect is 0.082 and 0.030. These results are in line with the raw choice probabilities in Table 6.

When we compare the preceding results on the income effect to those obtained in the Netherlands in Section 5.1, we find that in both countries people are responsive to the changes in the generosity of pension accruals at the intensive margin at the oldest retirement age regime, suggesting that at late retirement ages partial retirement programmes provide workers with the opportunity to adjust their labour supply in a flexible manner in response to a change in the generosity of pension provisions. On the other hand, the two countries differ in that at earlier retirement ages people are responsive at the extensive margin in the United States, while no such response is observed in the Netherlands.

Table 7 shows significant marginal changes for the retirement age regimes with plausible signs. Respondents less often choose late abrupt retirement while more often choose early abrupt retirement in retirement age regime 63 compared to retirement age regime 61. Respondents less often choose late abrupt retirement while more often choose early abrupt retirement or partial retirement in retirement age regime 65. These age effects are in line with those obtained in the Netherlands where respondents less often choose late abrupt retirement but more often choose partial retirement in retirement age regime 63 compared to retirement age regime 61. Taken together, these results show that in both countries people do not want to work full-time after the normal retirement age, but want to retire at the normal retirement age or continue to work only part-time for several years past the normal retirement age. Similar explanations given for the findings in the Netherlands might hold in the United States. Respondents want to work at least until the normal retirement age because this is the social norm, or at these ages the disutility of work is small, or they still want to accrue pension rights to maintain a desired level of pension income. However, after the normal retirement age some respondents favour partial retirement perhaps because it allows them to combine work with social activities. These results are mostly in line with the results on scenario ratings presented in Table 8.

Table 7 shows that a decrease in hourly wage, accompanied by a change to a less demanding job, in partial retirement has a significant effect on the probability of partial retirement and late abrupt retirement. When the hourly wage decreases by 20 percent, the probability of choosing partial retirement decreases

by 4.7 percentage points while the probability of choosing late abrupt retirement increases by an almost equal amount. This shows that a reduced wage rate and a job change in partial retirement discourage many people to participate in partial retirement so much so that they prefer to remain employed full-time. This result is important because a stylised empirical fact in the United States is that partial retirement often involves a reduction in the wage rate and a change in employer or type of work (Gustman and Steinmeier, 1983, 1984b, 1986; Honig and Hanoch, 1985; Hutchens, 2010; Johnson and Neumark, 1996; Quinn and Burkhauser, 1993; Ruhm, 1990; Siegenthaler and Brenner, 2000).

The effect of the decrease in hourly wage in partial retirement might depend on the retirement age. When we estimate a model where we allow the wage rate regime to interact with the three retirement age regimes, we find that respondents prefer late abrupt retirement over partial retirement particularly at older retirement ages when partial retirement involves a reduced wage rate and job change. At retirement age regime 65, the probability of choosing late abrupt retirement increases by as much as 9.2 percentage points when partial retirement involves a reduced wage rate. This result is striking given the fact that the average respondent prefers to retire early when given the retirement scenarios with later retirement ages.

The comparison of the results on the wage rate treatment between the Netherlands and the United States shows that while in the United States people appear particularly responsive to a reduction in the hourly wage in partial retirement, no such response is observed in the Netherlands. In fact, Section 3 showed that the fraction of respondents choosing partial retirement slightly increases when partial retirement involves a reduction in the hourly wage. It might be that in the Netherlands the advantage of working in a different job with less demanding tasks during partial retirement is offsetting the disadvantage of a reduced hourly wage in that job.

6.3 Background characteristics

The lower panel of Table 7 shows the effects of a set of socio-economic and other background characteristics. Several variables which were found to have significant effects in the lower panel of Table 4 in the Netherlands appear to have similar effects in the United States. Older respondents less often prefer early abrupt retirement and more often prefer late abrupt retirement. A model with dummies for age categories 50-59, 60-69 and 70-96 reveals that the age effect is significant only for the 70-96 category when compared to the reference category 40-49. Respondents of this youngest age category also less often prefer partial retirement. These results differ from those obtained in the Netherlands where the age effect is evident for all age categories rather than only for the 70-96 category. Furthermore, the age effect is evident for partial and late abrupt retirement in the Netherlands rather than for early and late abrupt retirement in the United States. However, in both countries a continuous linear function of age is significant suggesting that older individuals prefer late abrupt retirement over early abrupt retirement or partial retirement.

Male respondents less often choose partial retirement and more often choose late abrupt retirement. Table 4 showed a similar effect for the Netherlands.

For those who value work for itself more than for money, the odds of remaining employed in a part-time job and especially in a full-time job are significantly higher. This result differs from that obtained in the Netherlands where the odds of remaining employed increases in a part-time job only.

Finally, house ownership significantly decreases the odds of late abrupt retirement by a large magnitude of 13.2 percentage points while it increases the odds of early abrupt retirement and partial retirement by almost equal magnitudes. These results show that higher levels of private wealth lead to less labor supply and therefore to earlier full retirement or partial retirement instead of late abrupt retirement and confirm that leisure is a normal good. These results are also in line with those obtained in Section 6.2 where respondents who are randomised into a higher pension income regime in the retirement scenarios less often choose late abrupt retirement but more often choose early abrupt retirement. However, Section 6.2 also showed that the respondents who are randomised into a higher pension income regime less often choose partial retirement. This suggests that pension wealth and private wealth have opposite effects on retirement at the intensive margin.

Two variables that had no significant effects in the Netherlands appear to have significant effects in the United States. First, compared to those who are active in the labor market, those who are retired are more likely to choose early abrupt retirement while less likely to choose late abrupt retirement. This might suggest that once individuals leave the labor market, they seem to have no incentive to return to work. Second, respondents living in households with more members are more likely to choose late abrupt retirement perhaps due to the simple economic reason that a larger household requires a higher income to maintain a given standard of living.

The lower panel of Table 8 presents the results on scenario ratings which confirm the significant effects found on the choice probabilities in the lower panel of Table 7. For example, male respondents significantly give lower ratings to partial retirement confirming the gender effect on the probability of choosing partial retirement.

Several variables that have no significant effects on the choice probabilities are found to have significant effects on the scenario ratings. First, married individuals give higher ratings to early abrupt retirement and lower ratings to late abrupt retirement. It might be that the work or pension income of the spouse sufficiently supplements the household income so that there is less incentive to work full-time. Second, respondents with more education give higher ratings to partial retirement and lower ratings to early abrupt retirement. It might be that those who have more years of education are more ambitious or more attached to their work and therefore are more likely to remain employed, yet they prefer to remain employed part-time because the type of work they do is suitable for part-time work. Third, respondents with higher (former) earnings give higher ratings to early abrupt retirement or partial retirement perhaps because they are more likely to meet their income needs. This income effect cor-

responds to our previous finding that respondents who are randomised into a higher pension income regime in the retirement scenarios are less likely to delay retirement.

6.4 Job characteristics and satisfaction

As in Section 5.3, we analyse the effects of a set of job characteristics and several dimensions of job satisfaction. We find that job characteristics do not seem to be particularly important. The only significant result is that respondents whose job requires intense concentration less often prefer partial retirement, perhaps because the nature of their job requires full-time presence. The magnitude and the p-value of the marginal effect is –0.035 and 0.026.

Several dimensions of the job satisfaction interact with late abrupt retirement. First, (former) workers who find their work attractive less often choose late abrupt retirement. It might be that those who are attached to their work spend more time at work and therefore are less likely to remain employed in a full-time job. The magnitude and the p-value of the marginal effect is –0.033 and 0.043. This result contrasts with that obtained in the Netherlands which suggested that those who are attached to their work are more likely to remain employed, although in a part-time job. Second, respondents who are satisfied with their pay less often choose late abrupt retirement. In this case the marginal effect is –0.023 and the associated p-value is 0.059. This is in line with the previous finding that high income earners are less likely to remain employed. In fact, the marginal effect of the labour income on late abrupt retirement becomes smaller and less significant if satisfaction with pay is controlled for in the regression. Finally, (former) workers who are satisfied with their relationship with their supervisor and colleagues more often prefer late abrupt retirement and less often prefer early abrupt retirement. The magnitudes and p-values of the marginal effects are, respectively, 0.027 and 0.085 for late abrupt retirement, and –0.036 and 0.004 for early abrupt retirement. This suggests that job satisfaction, in terms of the relationships with colleagues, encourages individuals to remain employed in a full-time job. The latter two dimensions of job satisfaction had no significant effect in the Netherlands suggesting that workers in the two countries somewhat differ in their motivations to remain employed in a part-time or full-time job.

7 Sensitivity analysis

Sections 5.1 and 6.2 analysed the effect of the financial incentives on retirement behaviour. The retirement effects of actuarially generous and fair increases in pension rights for delaying the claim of pension rights are compared to the effects of an actuarially less than fair increase, to investigate the substitution effect of higher pensions. The retirement effects of accruing pension rights with moderate and generous accrual rates are compared to the effect of accruing rights with a low accrual rate to study the income effect of higher pensions. Significant substitution and income effects are found in the Netherlands and the United States. Tables 4 and 7 have shown that the substitution effect is most evident when pension rights increase in an actuarially generous manner than in an actuarially less than fair manner, or the income effect is most evident when pension rights grow with a generous accrual rate than with a low accrual rate. Table 2 shows that each type of increase in the pension rights correspond to a 20 percentage points increase in the replacement rates in full retirement when compared to the baseline replacement rates. As it is not analysed in the earlier sections, we check whether a substitution effect also exists when pension rights increase in an actuarially generous manner compared to when they increase in a fair manner, or whether an income effect exists when pension rights grow with a generous accrual rate compared to when they grow with a moderate accrual rate, where each type of increase in the pension rights correspond to a 10 percentage points increase in the replacement rates in full retirement when compared to the alternative baseline replacement rates. Furthermore, Sections 5.1 and 6.2 have analysed the impact of increasing retirement age on the behaviour of later retirement. Labour supply effects of delaying retirement at age 63 and 65 are compared to the effect of delaying retirement at age 61. Tables 4 and 7 have shown significant effects both for age 63 and age 65. As it is not analysed in the earlier sections, we check whether a retirement age effect also exists when delaying retirement at age 65 is compared to delaying retirement at age 63.

In Section 5.1 significant substitution effects are found in the Netherlands for partial and late abrupt retirement when pension rights increase in an actuarially generous manner for delayed claiming compared to when they increase in a less than fair manner. Furthermore, a significant substitution effect is found when the substitution effect regimes that correspond to generous and fair increases in pension rights are allowed to interact with the three retirement age regimes. We find no effect for partial and late abrupt retirement when pension rights increase in an actuarially generous manner compared to when they increase in an actuarially fair manner. However, we find significant effects when we interact the substitution effect regimes that correspond to generous and less than fair increases in pension rights with the three retirement age regimes. Respondents more often choose partial retirement while they less often choose late abrupt retirement in retirement age regime 63 when pension rights increase in an actuarially generous manner compared to when they increase in a fair manner. The magnitude and the p-value of the effect is 0.073 and 0.016 for partial retirement, and –0.053 and 0.077 for late abrupt retirement. This finding compares to that in Section 5.1 where respondents make the same retirement plan choices at the same retirement age regime when pension rights increase in an actuarially generous manner compared to when they increase in a less than fair manner suggesting that the found substitution effect at the intensive margin is robust to a smaller change in the price of leisure.

In Section 5.1 no significant effect is found for the income effect treatment. However, significant effects are found when the income effect regimes are allowed to interact with the three retirement age regimes. We find only a marginally significant effect for early abrupt retirement when pension rights grow with a generous accrual rate compared to when they grow with a moderate accrual rate. The magnitude and the p-value of the effect is –0.032 and 0.077. When we interact the income effect regimes that feature generous and low pension accrual rates with the three

retirement age regimes, we find that at retirement age 61 respondents less often choose partial retirement while they more often choose late abrupt retirement when pension rights grow with a low accrual rate compared to when they grow with a moderate accrual rate. The magnitude and the p-value of the effect is –0.073 and 0.028 for partial retirement, and they are 0.051 and 0.086 for late abrupt retirement.

The treatment with respect to the retirement age shows that respondents less often choose partial retirement when delaying retirement at age 65 is compared to delaying retirement at age 63. The magnitude and the p-value of the effect is –0.053 and 0.007. The effects on the other retirement scenarios have positive signs but are not significant. In Section 5.1 no effect was found when delaying retirement at age 65 is compared to delaying retirement at age 61. On the other hand, it was found that respondents less often choose partial retirement while instead more often choose late abrupt retirement when delaying retirement at age 61 is compared to delaying retirement at age 63. Taken together, there results suggest that in the Netherlands individuals derive less utility from full-time or part-time work as the retirement age increases beyond the normal retirement age but prefer a gradual retirement process that starts after an early retirement age and extends beyond the normal retirement age.

In the United States, as in the Netherlands, no substitution effect is found when pension rights increase in an actuarially generous manner compared to when they increase in an actuarially fair manner. However, we find a marginally significant effect when we interact the substitution effect regimes that correspond to generous and less than fair increases in pension rights with the three retirement age regimes. Respondents less often choose late abrupt retirement in retirement age regime 63 when pension rights increase in a less than fair manner compared to when they increase in a fair manner. The magnitude and the p-value of the effect is 0.082 and 0.072.

As for the income effect, we find a significant effect for early abrupt retirement and late abrupt retirement when pension rights grow with a generous accrual rate compared to when they grow with a moderate accrual rate. The magnitudes and p-values of the effects are, respectively, 0.053 and 0.017 for early abrupt retirement, and –0.083 and 0.003 for late abrupt retirement. When we interact the income effect regimes that feature generous and low pension accrual rates with the three retirement age regimes, we find that at retirement age regime 63 and 61 respondents less often choose late abrupt retirement when pension rights grow with a generous accrual rate compared to when they grow with a moderate accrual rate. The magnitude and the p-value of the effect is –0.121 and 0.009 for retirement age regime 63, and it is –0.089 and 0.045 for retirement age regime 61. These findings compare to those in Section 6.2 where respondents make the same retirement plan choices when pension rights grow with a generous accrual rate compared to when they grow with a low accrual rate suggesting that the found income effect is robust to a smaller change in the accrual rate.

The treatment with respect to the retirement age shows that respondents less often choose late abrupt retirement while they more often choose early abrupt retirement when delaying retirement at age 65 is compared to delaying retirement at age 63.

The magnitudes and p-values of the effects are –0.068 and 0.017 for late abrupt retirement, and 0.045 and 0.044 for early abrupt retirement. This result is in line with the results obtained in Section 6.2 which suggested that respondents less often choose late abrupt retirement while they more often choose early abrupt retirement or partial retirement when delaying retirement at age 65 is compared to delaying retirement at age 61, or they less often choose late abrupt retirement while more often choose early abrupt retirement when delaying retirement at age 63 is compared to delaying retirement at age 61. Taken together, these results suggest that in the United States people derive less utility from full-time work but favour part-time work as the retirement age increases beyond the normal retirement age.

Sections 5.1 and 6.2 presented regression results on the treatment effects based on the field experiment where individuals are randomly assigned to certain regimes of retirement income and retirement age to analyse the effects of financial incentives and retirement age on the choice of delaying retirement fully or partially beyond the traditional retirement ages. Random assignment of the respondents to the treatment regimes ensures that differences in outcomes can be attributed to treatment effects and are independent of any respondent characteristic. This means that the magnitudes and significance of the effects of the treatment regimes should remain unaffected when other controls on respondent characteristics are excluded from the regression equation. However, the treatment variables defined for the retirement income depend on the actual work income of the respondent by the experimental design. That is, in the vignettes presented to a respondent, the levels of the work income and retirement income assigned to a respondent, according to the randomisation of the respondent into a retirement income regime, are bound to the level of the actual work income of that respondent (see Section 2). This means that the work income and income related variables should be controlled for in the multivariate regression analyses to obtain unbiased estimates of the treatment effects. In fact, Sections 5 and 6 showed that retirement income treatments and the actual work income of the respondent cause similar income effects and omission of the income level would give rise to biased estimates of the treatment effects. To check the sensitivity of the estimated coefficients of the treatment variables to exclusion restrictions, we compare the results from the estimation of the regression model given by Equation (1) with the results from the estimation of the same model with exclusion restrictions on individual characteristics.

In the Netherlands, when compared to the effects found in Table 4, the magnitudes of the effects of the substitution effect regime for actuarially fair rewards for later retirement slightly reduce to 0.038 for partial retirement and to –0.034 for late abrupt retirement, and they become less significant with p-values 0.045 and 0.053, respectively, when all background characteristics are excluded from the regression equation. When the actual work income of the respondent is not included in the exclusion restrictions, the magnitudes and significance of the effects of the same substitution effect regime remain the same or slightly increase confirming our expectation that other background characteristics have no influence on the effects of the treatment variables. Furthermore, the effects of the retirement age regime 63 found

in Table 4 remain largely unchanged with only small increases in the magnitudes and statistical significance. Similar tests on the sensitivity of the estimated treatment effects to exclusion restrictions in the regressions of the scenario ratings shows that when all background characteristics are excluded from the regression equation, the statistical significance of the income effect regime for middle replacement rates and those of the retirement age regimes 63 and 65 generally increase for early abrupt retirement and partial retirement. Similar results are obtained when the income variable is not included in the exclusion restrictions.

In the United States, the estimated coefficients on the treatment effects remain largely unaffected except that the magnitude of the effect of the income effect regime for middle replacement rates for partial retirement reduces to –0.024 and becomes insignificant with a p-value of 0.357, and the effect of the retirement age regime 65 reduces to 0.034 and becomes insignificant with a p-value of 0.205 when all background characteristics are excluded from the regression equation. Contrary to our expectation, similar changes are obtained when the observed work income is not included in the exclusion restrictions. However, when house ownership is not included in the exclusion restrictions alongside the work income, the effects largely preserve their magnitudes and statistical significance suggesting that house ownership is an important correlate of the earnings level. Tests on the sensitivity of the estimated treatment effects in the regressions of the scenario ratings shows that almost all the variables preserve their effects when exclusion restrictions include or exclude the actual work income of the respondent.

8 Conclusion

We have taken a stated preference approach to study preferences for (hypothetical) abrupt and partial retirement plans, circumventing the problem that actual retirement choices may be based upon restricted choice. We have implemented a controlled randomised experiment to study the effects of pension incentives and increasing retirement age on the preferences for retiring full-time or part-time at a later age since it is difficult to observe policy reforms that provide sufficiently large and systemic variations in retirement income or retirement age. We carried out a cross-country analysis and implemented a vignette methodology in the Internet surveys conducted in the Netherlands and the United States to study whether individuals in the two countries differ in their retirement preferences with respect to the same changes in retirement income and retirement age which shall owe to the differences in the social security systems or work disciplines between the two countries.

We show that among the people 40 years old or older, most prefer a partial retirement trajectory where they work part-time for several years before they enter into full retirement, instead of an abrupt retirement trajectory where they stop working full-time all at once. This is true whether the choice is made at an early retirement age of 61 or at the normal retirement age of 65 or in between these ages. This is also true whether the choice is made by people in a country with an extensive social security system or in a country with much more limited welfare state programmes. In line with earlier studies, we provide evidence that individuals are responsive to changes in retirement income, either in terms of the incentives for delaying retirement (substitution effect) or in terms of the generosity irrespective of the retirement age (income effect). We provide additional evidence that financial incentives affect retirement behaviour not only at the extensive margin but also at the intensive margin. We also compare the Netherlands with the United States and show that while people in the Netherlands are responsive to a substitution effect of higher pensions, people in the United States are responsive to an income effect of higher pensions. Besides, we show that individuals are responsive to increasing retirement age both at the extensive and intensive margins.

Our findings suggest scope for policy interventions to place particular emphasis on partial retirement plans which provide flexible solutions to employees optimising their retirement paths. In the Netherlands, among others, two policy measures are considered to have the potential to reduce the raising cost of pensions due to population ageing. First, the pension accrual rate of the mandatory occupational pension schemes in the Netherlands is among the highest in OECD countries and could be reduced to reduce the cost of pensions (Goudswaard et al., 2010; Kantarcı et al., 2013). Our findings suggest that a reduction in the pension accrual rate from its current level may indeed promote full-time employment beyond the early retirement age or part-time employment beyond the normal retirement age and hence help reduce the costs of pensions. Second, in the last ten years two proposals have been put forward to allow the state pension participants delay their pension claims in part or in full beyond the normal retirement age up to five years to encourage employment among older workers and increase the contribution periods (Kamerstukken II, 2007/08, 2011/12). The proposals offer that pension rights are actuarially increased by 18.94 percent on average for each year pension rights are deferred from age 65 until 70. The occupational pension schemes offer an actuarially fair increase of 25.66 percent on average. Our findings suggest that an actuarially generous increase in pension rights would promote part-time employment that starts before and extends beyond the normal retirement age. This means that the proposed actuarial increase in the state pension scheme is far below the level that is actuarially fair, and in the light of the behavioural responses suggested by our results, it is also far below the level that would induce individuals to work beyond the normal retirement age. This suggests that the actuarial rewards for delaying retirement should be substantially increased to make later retirement attractive to the pension plan participants.

In the United States, the occupational pension system is dominated by the defined contribution schemes where employees themselves decide on how much and when to save for retirement. Therefore, pension incentives could be implemented through tax incentives for employers to enable them offer actuarially attractive pension schemes to promote part-time or full-time employment beyond the traditional retirement ages. In both countries, our findings suggest that a combination of a reduction in the pension accrual rate and an increase in the generosity of the actuarial increases when pension rights are deferred has the potential to increase employment at the intensive and extensive margins in old age. Such a policy intervention does not necessarily imply a

burden on the public finances since the costs that would be saved from the reduction of the pension accrual rate could be directed to fund the actuarial increases for delaying pension rights.

Acknowledgments

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Appendix

Information on job characteristics are collected as follows. Respondents are asked to indicate how often the following characteristics about their [current/last] job are true. 1. Lots of physical effort such as lifting heavy loads, stooping, kneeling, or crouching, 2. Intense concentration or attention, 3. Frequent or close communication with other members of a group, 4. Keeping up with the pace of others, 5. Doing the same things over and over, and 6. Learning new things. For each item the respondent is allowed to choose among the following frequency alternatives: 1. (Almost) none of time 2. Some of the time, 3. Most of the time, and 4. (Almost) all of the time. Depending on the labor market status of the respondent, the wording of the questions changed with respect to the selection in the brackets. If the respondent never had a job, he or she is allowed to skip the question.

Information on job satisfaction is collected as follows. Respondents are asked to indicate how satisfied they [are/were] with the following aspects of their [current/last] job. 1. Total pay, 2. Actual work itself (if the work is attractive), 3. Freedom to decide how you do your work, 4. Work schedule, 5. Promotion prospects, 6. Help and supervision from supervisor or manager 7. Relationship with your supervisor and coworkers, and 8. Job security (for example, risk of lay off). For each item the respondent is allowed to choose among the following scales of satisfaction: 1. Very dissatisfied, 2. Dissatisfied, 3. Neutral, 4. Satisfied, and 5. Very satisfied.

Many employees retire fully after working full-time; the age they retire can differ. Other employees go into partial retirement where they work part-time for several years before full retirement.

Below we describe the retirement plans of three employees. All employees are currently working 40 hours a week and earning €3000 a month. Their retirement plans differ in the following respects:

- Age of retirement
- Pension income (including eventual state pension)
- Type of retirement (partial or full retirement)

Please compare the plans presented below.

Judith plans to retire at age 65. Her pension income will be €2100 a month. This plan can be summarised as follows:

Age	62	63	64	65	66	67	68	69	70	71	72
		Work					Retirement				
Hours worked		40 hours					0				
Work income		€3000					0				
Pension income		0					€2100				

Maria plans to reduce her hours to 20 hours a week and continue in the same job from age 65 to 69. She will earn €1500 a month and receive a partial pension income of €1050 a month. While working part time, she will continue to build pension benefits for full retirement. She will retire fully at age 70. Her pension income will be €2700 a month. This plan can be summarised as follows:

Age	62	63	64	65	66	67	68	69	70	71	72
		Work			Partial retirement				Retirement		
Hours worked		40 hours			20 hours				0		
Work income		€3000			€1500				0		
Pension income		0			€1050				€2700		

Nicole plans to retire at age 70. Her pension income will be €3300 a month. This plan cab be summarised as follows:

Age	62	63	64	65	66	67	68	69	70	71	72
		Work							Retirement		
Hours worked		40 hours							0		
Work income		€3000							0		
Pension income		0							€3300		

Based on your own preferences, which plan do you find the most attractive?

○ Judith's plan
○ Maria's plan
○ Nicole's plan

Figure 1. Survey representation of competing retirement scenarios

Table 1

Background characteristics in the NL and the US (%)

Characteristic	Attribute	NL	US
Age	40-49	22.92	26.87
	50-59	25.55	36.64
	60-69	31.19	24.16
	70+	20.34	12.23
Gender	Female	51.52	57.75
	Male	48.48	42.25
Marital status	Married or living with a partner	72.53	66.39
	Single (divorced, widowed, etc.)	27.47	33.61
Education level	Primary school	8.32	2.37
	Secondary and prep. uni./high school	38.03	41.52
	Vocational education/college	45.71	13.07
	University	7.95	42.95
Work status	Working for an employer	38.93	50.67
	Working self-employed	6.57	9.33
	(Partially) disabled	6.57	5.93
	Retired	31.73	22.07
	Other	22.77	11.90
Income level	0-1000	28.92	16.78
	1001-2000	43.96	20.60
	2001-3000	20.77	20.20
	3001-4000	4.61	13.48
	4001-5000	0.91	9.50
	5000+	0.83	19.35

Notes: 1. Number of observations is about 4066. 2. Income levels represent self-reported last monthly income from work, after taxes and other deductions. The amounts are in Euros for the Netherlands and in US dollars for the United States. 3. Totals may not add due to rounding error.

Table 2
Competing retirement scenarios with associated replacement rates

Retirement age regime	Type of retirement	Ret. age	Rep. rate during PR	Rep. rate during FR
65	FR	65		0.60/0.70/0.80 0.60/0.70/0.80 0.60/0.70/0.80
	PR	65-69	0.20/0.30/0.40 0.25/0.35/0.45 0.30/0.40/0.50	0.75/0.85/0.95 0.80/0.90/1.00 0.85/0.95/1.05
	FR	70		0.90/1.00/1.10 1.00/1.10/1.20 1.10/1.20/1.30
63	FR	63		0.50/0.60/0.70 0.50/0.60/0.70 0.50/0.60/0.70
	PR	63-67	0.15/0.25/0.35 0.20/0.30/0.40 0.25/0.35/0.45	0.60/0.70/0.80 0.65/0.75/0.85 0.70/0.80/0.90
	FR	68		0.70/0.80/0.90 0.80/0.90/1.00 0.90/1.00/1.10
61	FR	61		0.40/0.50/0.60 0.40/0.50/0.60 0.40/0.50/0.60
	PR	61-65	0.10/0.20/0.30 0.15/0.25/0.35 0.20/0.30/0.40	0.45/0.55/0.65 0.50/0.60/0.70 0.55/0.65/0.75
	FR	66		0.50/0.60/0.70 0.60/0.70/0.80 0.70/0.80/0.90

Notes: 1. PR and FR denotes partial and full retirement, respectively. 2. Looking at the replacement rates row-wise, the first, second and third rows refer, respectively, to the low, middle and high substitution effect regimes. Looking at the replacement rates column-wise, the first, second and third columns refer, respectively, to the low, middle and high income effect regimes.

Table 3
Percentage of choices and average ratings under the substitution and income effect regimes in the NL

Ret. age regime	Type of retirement	Retirement age	Substitution effect regimes	Replacement rates	Choice (%)	Rating (avg.)	Income effect regimes	Replacement rates	Choice (%)	Rating (avg.)
65	FR	65	L	0.60/0.70/0.80	27.9	5.5	L	0.60/0.60/0.60	27.6	5.3
	PR	65-69		0.75/0.85/0.95	38.6	6.0***		0.75/0.80/0.85	43.6	6.1***
	FR	70		0.90/1.00/1.10	33.5	5.4		0.90/1.00/1.10	28.9	5.2
	FR	65	M	0.60/0.70/0.80	31.3	5.4	M	0.70/0.70/0.70	32.0	5.4
	PR	65-69		0.80/0.90/1.00	41.0	6.0***		0.85/0.90/0.95	39.3	5.9***
	FR	70		1.00/1.10/1.20	27.6	5.2***		1.00/1.10/1.20	28.7	5.1**
	FR	65	H	0.60/0.70/0.80	27.2	5.0***	H	0.80/0.80/0.80	26.9	5.3*
	PR	65-69		0.85/0.95/1.05	43.8	6.0***		0.95/1.00/1.05	40.6	6.1***
	FR	70		1.10/1.20/1.30	29.0	5.3**		1.10/1.20/1.30	32.5	5.5***
63	FR	63	L	0.50/0.60/0.70	26.6	5.5	L	0.50/0.50/0.50	27.1	5.3*
	PR	63-67		0.60/0.70/0.80	46.2	6.3***		0.60/0.65/0.70	48.2	6.0***
	FR	68		0.70/0.80/0.90	27.1	5.5		0.70/0.80/0.90	24.7	5.1***
	FR	63	M	0.50/0.60/0.70	26.3	5.3*	M	0.60/0.60/0.60	27.6	5.5
	PR	63-67		0.65/0.75/0.85	44.0	6.1***		0.70/0.75/0.80	44.5	6.4***
	FR	68		0.80/0.90/1.00	29.7	5.4		0.80/0.90/1.00	27.8	5.5
	FR	63	H	0.50/0.60/0.70	25.7	5.3*	H	0.70/0.70/0.70	23.9	5.2**
	PR	63-67		0.70/0.80/0.90	50.1	6.4***		0.80/0.85/0.90	47.5	6.4***
	FR	68		0.90/1.00/1.10	24.2	5.2***		0.90/1.00/1.10	28.6	5.5
61	FR	61	L	0.40/0.50/0.60	30.0	5.5	L	0.40/0.40/0.40	29.3	5.3
	PR	61-65		0.45/0.55/0.65	37.1	6.1***		0.45/0.50/0.55	35.5	6.0***
	FR	66		0.50/0.60/0.70	32.9	5.6		0.50/0.60/0.70	35.3	5.5
	FR	61	M	0.40/0.50/0.60	28.6	5.5	M	0.50/0.50/0.50	30.2	5.5
	PR	61-65		0.50/0.60/0.70	40.5	6.1***		0.55/0.60/0.65	41.6	6.3***
	FR	66		0.60/0.70/0.80	30.9	5.4		0.60/0.70/0.80	28.2	5.4
	FR	61	H	0.40/0.50/0.60	30.3	5.5	H	0.60/0.60/0.60	29.4	5.7
	PR	61-65		0.55/0.65/0.75	39.7	6.2***		0.65/0.70/0.75	40.4	6.2***
	FR	66		0.70/0.80/0.90	30.0	5.4		0.70/0.80/0.90	30.2	5.6

Notes: FR and PR denotes full and partial retirement, respectively. L, M and H respectively refer to low, middle and high regimes. In the table, for the partial retirement scenario, the replacement rates during the period of partial retirement are not shown but only those during full retirement. About 450 respondents choose one of the three retirement plans and rate each of them under each regime of the substitution and income effects, under each age regime. Totals of choices may not add due to rounding error. 1, 2 and 3 asterisks denote significance respectively at 10%, 5% and 1% based on the test of the null hypothesis that the mean rating is equal to 5.5. The null hypothesis that the means of the ratings given to the three retirement scenarios are equal to each other is rejected at the 1% level in all of the 18 cases associated with the substitution and income effect regimes in the table.

Table 4

Multinomial logit model explaining the probability of choosing a retirement scenario in the NL

	Early abrupt retirement		Partial retirement		Late abrupt retirement	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
Treatment variables						
Substitution effect middle	0.015	0.396	0.013	0.518	−0.028	0.120
Substitution effect high	0.001	0.969	0.043	0.029	−0.043	0.017
Income effect middle	0.013	0.443	−0.005	0.782	−0.008	0.652
Income effect regime high	−0.018	0.313	0.007	0.712	0.011	0.539
Retirement age 63	−0.026	0.154	0.066	0.001	−0.040	0.026
Retirement age 65	0.001	0.971	0.013	0.504	−0.014	0.440
Wage rate low	−0.012	0.411	0.018	0.256	−0.006	0.677
Background characteristics						
Age	0.001	0.477	−0.003	0.002	0.003	0.010
Male	0.015	0.350	−0.044	0.010	0.029	0.063
Married or living with a partner	0.002	0.929	−0.016	0.485	0.014	0.504
Household size	0.001	0.923	−0.002	0.860	0.000	0.928
Highly educated	−0.022	0.199	0.053	0.003	−0.031	0.069
Value work more than money	−0.009	0.070	0.015	0.003	−0.006	0.179
High income earner	0.014	0.665	0.012	0.727	−0.026	0.434
House owner	−0.010	0.575	0.034	0.086	−0.024	0.178
Retired	−0.004	0.901	−0.038	0.338	0.043	0.218
Partially or fully disabled	0.011	0.663	0.027	0.316	−0.038	0.131
Unemployed, homemaker, etc.	−0.016	0.485	0.025	0.297	−0.009	0.681
Observations	3771					
Log-likelihood	−4027.015					
Count R-squared	0.423					
LR test of model significance (p-value)	0.000					
Hausman test of IIA (p-value)	0.983		1.000		0.995	

Note: All the treatment variables are dummy variables which take a value of 1 to indicate the respective regime of the retirement income, retirement age or the wage rate effects, and 0 otherwise.

Table 5

Linear regression model explaining the ratings given to a retirement scenario in the NL

	Early abrupt retirement		Partial retirement		Late abrupt retirement	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
Treatment variables						
Substitution effect middle	−0.101	0.273	−0.071	0.383	−0.211	0.022
Substitution effect high	−0.229	0.014	0.104	0.201	−0.224	0.017
Income effect middle	0.139	0.133	0.130	0.102	0.009	0.925
Income effect high	0.067	0.471	0.200	0.015	0.204	0.028
Retirement age 63	−0.118	0.199	0.132	0.099	−0.117	0.206
Retirement age 65	−0.163	0.080	−0.154	0.058	−0.212	0.023
Wage rate low	−0.016	0.835	0.098	0.140	−0.040	0.595
Background characteristics						
Age	−0.000	0.958	−0.007	0.116	0.009	0.079
Male	−0.056	0.485	−0.173	0.014	−0.004	0.963
Married or living with a partner	−0.037	0.734	0.020	0.835	0.078	0.474
Household size	0.099	0.027	0.007	0.852	0.063	0.162
Highly educated	−0.074	0.390	0.282	0.000	0.039	0.658
Value work more than money	0.049	0.053	0.116	0.403	0.050	0.766
High income earner	0.249	0.137	0.200	0.015	−0.171	0.064
House owner	−0.063	0.483	0.128	0.000	0.050	0.048
Retired	−0.034	0.854	−0.265	0.132	−0.070	0.710
Partially or fully disabled	0.401	0.003	0.061	0.595	−0.107	0.413
Unemployed, homemaker, etc.	0.272	0.017	0.038	0.707	0.100	0.393
Constant	5.102	0.000	5.832	0.000	4.810	0.000
Observations	3771		3771		3771	
R-squared	0.011		0.031		0.009	
F test of model significance (p-value)	0.002		0.000		0.009	

Notes: 1. All the treatment variables are dummy variables which take a value of 1 to indicate the respective regime of the retirement income, retirement age or the wage rate effects, and 0 otherwise. 2. The models also include a constant term.

Table 6
Percentage of choices and average ratings under the substitution and income effect regimes in the US

Ret. age regime	Type of retirement	Retirement age	Substitution effect regimes	Replacement rates	Choice (%)	Rating (avg.)	Income effect regimes	Replacement rates	Choice (%)	Rating (avg.)
65	FR	65	L	0.60/0.70/0.80	30.8	5.6	L	0.60/0.60/0.60	23.0	5.1**
	PR	65-69		0.75/0.85/0.95	39.9	6.4***		0.75/0.80/0.85	47.1	6.3***
	FR	70		0.90/1.00/1.10	29.3	5.4		0.90/1.00/1.10	29.9	5.2
	FR	65	M	0.60/0.70/0.80	26.7	5.4	M	0.70/0.70/0.70	27.8	5.5
	PR	65-69		0.80/0.90/1.00	44.3	6.3***		0.85/0.90/0.95	42.2	6.4***
	FR	70		1.00/1.10/1.20	29.0	5.3		1.00/1.10/1.20	30.0	5.5
	FR	65	H	0.60/0.70/0.80	25.8	5.2*	H	0.80/0.80/0.80	32.3	5.5
	PR	65-69		0.85/0.95/1.05	44.5	6.3***		0.95/1.00/1.05	39.7	6.3***
	FR	70		1.10/1.20/1.30	29.7	5.4		1.10/1.20/1.30	27.9	5.3
63	FR	63	L	0.50/0.60/0.70	23.3	5.6	L	0.50/0.50/0.50	15.1	4.8***
	PR	63-67		0.60/0.70/0.80	44.7	6.4***		0.60/0.65/0.70	40.9	6.4***
	FR	68		0.70/0.80/0.90	32.0	5.5		0.70/0.80/0.90	44.0	5.8*
	FR	63	M	0.50/0.60/0.70	21.5	5.0***	M	0.60/0.60/0.60	20.6	4.8***
	PR	63-67		0.65/0.75/0.85	39.3	6.4***		0.70/0.75/0.80	40.8	6.2***
	FR	68		0.80/0.90/1.00	39.3	5.8**		0.80/0.90/1.00	38.5	5.8
	FR	63	H	0.50/0.60/0.70	21.1	4.7***	H	0.70/0.70/0.70	30.4	5.6
	PR	63-67		0.70/0.80/0.90	41.3	6.3***		0.80/0.85/0.90	43.0	6.4***
	FR	68		0.90/1.00/1.10	37.6	5.8		0.90/1.00/1.10	26.6	5.6
61	FR	61	L	0.40/0.50/0.60	19.1	5.3	L	0.40/0.40/0.40	11.3	4.4***
	PR	61-65		0.45/0.55/0.65	41.2	6.4***		0.45/0.50/0.55	39.3	6.3***
	FR	66		0.50/0.60/0.70	39.6	5.9**		0.50/0.60/0.70	49.4	6.4***
	FR	61	M	0.40/0.50/0.60	17.7	4.6***	M	0.50/0.50/0.50	16.4	4.8***
	PR	61-65		0.50/0.60/0.70	37.9	6.3***		0.55/0.60/0.65	38.0	6.3***
	FR	66		0.60/0.70/0.80	44.3	6.0***		0.60/0.70/0.80	45.6	6.3***
	FR	61	H	0.40/0.50/0.60	10.5	4.3***	H	0.60/0.60/0.60	20.6	5.1**
	PR	61-65		0.55/0.65/0.75	39.3	6.4***		0.65/0.70/0.75	41.3	6.4***
	FR	66		0.70/0.80/0.90	50.2	6.6***		0.70/0.80/0.90	38.1	5.7

Notes: FR and PR denotes full and partial retirement, respectively. L, M and H respectively refer to low, middle and high regimes. In the table, for the partial retirement scenario, the replacement rates during the period of partial retirement are not shown but only those during full retirement. About 200 respondents choose one of the three retirement plans and rate each of them under each regime of the substitution and income effects, under each age regime. Totals of choices may not add due to rounding error. 1, 2 and 3 asterisks denote significance respectively at 10%, 5% and 1% based on the test of the null hypothesis that the mean rating is equal to 5.5. The null hypothesis that the means of the ratings given to the three retirement scenarios are equal to each other is rejected at the 1% level in all of the 18 cases associated with the substitution and income effect regimes in the table.

Table 7

Multinomial logit model explaining the probability of choosing a retirement scenario in the US

	Early abrupt retirement		Partial retirement		Late abrupt retirement	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
Treatment variables						
Substitution effect middle	−0.032	0.151	−0.013	0.647	0.046	0.099
Substitution effect high	−0.044	0.062	−0.008	0.795	0.052	0.066
Income effect middle	0.072	0.003	−0.059	0.040	−0.013	0.626
Income effect high	0.125	0.000	−0.029	0.326	−0.096	0.001
Retirement age 63	0.069	0.004	0.032	0.269	−0.101	0.000
Retirement age 65	0.114	0.000	0.054	0.058	−0.169	0.000
Wage rate low	0.002	0.931	−0.047	0.045	0.046	0.043
Background characteristics						
Age	−0.004	0.008	−0.002	0.238	0.006	0.001
Male	0.008	0.687	−0.066	0.008	0.058	0.013
Married or living with a partner	0.014	0.512	0.011	0.693	−0.025	0.325
Household size	−0.015	0.108	−0.010	0.357	0.025	0.014
Highly educated	−0.021	0.300	0.022	0.379	−0.001	0.978
Value work more than money	−0.042	0.000	0.010	0.084	0.031	0.000
High income earner	0.024	0.273	0.009	0.719	−0.033	0.184
House owner	0.066	0.032	0.065	0.067	−0.132	0.000
Retired	0.118	0.000	−0.055	0.160	−0.063	0.087
Partially or fully disabled	0.073	0.114	−0.009	0.867	−0.063	0.253
Unemployed, homemaker, etc.	0.013	0.698	−0.026	0.516	0.013	0.731
Observations	1702					
Log-likelihood	−1689.738					
Count R-squared	0.450					
LR test of model significance (p-value)	0.000					
Hausman test of IIA (p-value)	1.000		0.5813		0.7817	

Note: All the treatment variables are dummy variables which take a value of 1 to indicate the respective regime of the retirement income, retirement age or the wage rate effects, and 0 otherwise.

Table 8
Linear regression model explaining the ratings given to a retirement scenario in the US

	Early abrupt retirement		Partial retirement		Late abrupt retirement	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
Treatment variables						
Substitution effect middle	−0.557	0.000	−0.141	0.247	0.130	0.379
Substitution effect high	−0.762	0.000	−0.135	0.294	0.369	0.016
Income effect middle	0.330	0.015	−0.137	0.275	0.100	0.503
Income effect high	0.709	0.000	−0.011	0.928	−0.212	0.165
Retirement age 63	0.381	0.005	0.061	0.615	−0.588	0.000
Retirement age 65	0.602	0.000	0.041	0.740	−0.987	0.000
Wage rate low	0.114	0.310	−0.198	0.052	0.064	0.603
Background characteristics						
Age	−0.044	0.000	−0.003	0.643	0.022	0.015
Male	−0.014	0.902	−0.343	0.002	0.141	0.271
Married or living with a partner	0.242	0.058	0.058	0.616	−0.337	0.018
Household size	−0.146	0.003	−0.044	0.349	0.111	0.042
Highly educated	−0.230	0.060	0.252	0.021	0.123	0.354
Value work more than money	−0.203	0.000	0.126	0.000	0.296	0.000
High income earner	0.402	0.001	0.216	0.057	0.116	0.393
House owner	0.338	0.042	0.116	0.428	−0.695	0.000
Retired	0.914	0.000	−0.273	0.118	−0.258	0.212
Partially or fully disabled	−0.042	0.874	−0.032	0.894	−0.091	0.762
Unemployed, homemaker, etc.	0.029	0.872	−0.029	0.865	0.000	0.999
Constant	7.470	0.000	6.182	0.000	4.332	0.000
Observations	1702		1703		1701	
R-squared	0.109		0.036		0.098	
F test of model significance (p-value)	0.000		0.000		0.000	

Notes: 1. All the treatment variables are dummy variables which take a value of 1 to indicate the respective regime of the retirement income, retirement age or the wage rate effects, and 0 otherwise. 2. The models also include a constant term.