

Full or partial retirement?

Effects of the pension incentives and increasing retirement age in the United States and the Netherlands

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Abstract

Labor force participation rates of older workers continue to increase in aging societies. However, rules of the pension schemes and restrictions from employers still require large populations of older workers with heterogeneous work preferences to retire fully at the pension eligibility ages. We study the preferences for retirement trajectories characterized by early or delayed full retirement as well as partial retirement at different retirement ages in the United States and the Netherlands. By implementing a randomised field experiment, we analyze how financial incentives and increasing retirement age affect these preferences as means of reducing public expenditure. Two in five prefer partial retirement over early or delayed abrupt full retirement. Individuals want to use partial retirement to work longer if pension accruals are made less generous in the United States, or if deferring pension rights are made actuarially attractive in the Netherlands. Increasing the retirement age induces individuals to retire in the United States, but to reduce hours in the Netherlands. The wage penalty in partial retirement induces later retirement in the United States. We validate that the stated preferences are representative of both the expected and revealed preferences for partial and full retirement.

Keywords: aging, gradual retirement, phased retirement, pensions, stated preferences

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 penalise 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 employees 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 (Kantarci 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 (Kantarci 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

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.

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 ([Kantarci 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 United States and the Netherlands 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 the full retirement decisions, as done in earlier studies, but also on the 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 the 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, which reflect the actual rules of a pension system.

The final aim of this paper is to investigate the potential impact of the institutional 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 United States and the Netherlands, 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 responds to the same pension incentives and same changes in the 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 more or less attractive.

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. We show that these effects are country specific. Besides the pension incentives, increasing retirement age, as a policy measure of reducing public expenditure, induces individuals to work part-time or not at all. Third, a stylised fact is that reducing hours in old age causes a wage penalty in the United States. We show that the wage penalty makes partial retirement unattractive, and causes individuals to prefer to continue to work full-time. 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 conducts sensitivity analyses. Section 7 validates the stated preferences using revealed preferences. Section 8 compares the results obtained in the United States with those in the Netherlands. Section 9 discusses policy implications and concludes.

2 Data and experimental design

The survey is fielded in 2010 in the American Life Panel (ALP) administered by the RAND Cooperation in the United States. The panel is based on a true probability sample of individuals drawn from the population register and hence is representative of the population, but the sample is relatively highly educated due to the high nonresponse rate of the less educated respondents. It consists of 3200 panel members who participate in monthly Internet surveys of about 15 to 30 minutes in total and are paid an incentive of about \$20 per thirty minutes of interviewing. Respondents either use their own computer to log on to the Internet or are provided a small laptop or a Web TV, which allows them to access the Internet and participate in the surveys. 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 2012 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 <https://mmicdata.rand.org/alp/index.php?page=data&p=showsurvey&syid=71>

Figure 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

² 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](#)). 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.

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](#)).

retirement in the Netherlands computed by [Kantarci et al. \(2013\)](#). However, the replacement rates are scaled down to match the actual replacement rates in the United States. We use the same replacement rates in the survey conducted in the Netherlands in 2014 so that respondents in the two countries 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. However, these replacement rates are relatively low for the Netherlands. On the other hand, it accounts 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.

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

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.

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

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, 21.6% choose the early abrupt retirement scenario, 41.2% the partial retirement scenario, and 37.1% the late abrupt retirement retirement scenario. This shows that individual preferences for retirement are heterogeneous in terms of both the age and the type of retirement. The retirement scenarios are respectively rated 5.1, 6.3, and 5.8 on average (with statistically significant differences). To check if respondents consistently rate the

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

retirement scenario they choose in the previous question higher than the other two retirement scenarios, we check the average ratings given to each scenario conditional on scenario choice. The average ratings for early abrupt retirement, partial retirement, and late abrupt retirement are 7.8, 5.0, and 3.8 for those who choose early abrupt retirement; 4.7, 7.8, and 4.9 for those who choose partial retirement; and 3.9, 5.5, and 7.9 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 fraction of respondents who choose a particular retirement scenario and the average of the ratings given to a scenario under the regimes defined for retirement age and retirement 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 fraction of respondents who choose a retirement scenario and the average rating given to that scenario. The differences due to substitution effect regimes show that as the incentives to work beyond age 65 increase, more people choose partial retirement over early abrupt retirement, while about the same number of people choose late abrupt retirement. At the earlier retirement age regimes, more people choose 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. 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 for leisure, 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.

The randomisation of the wage rate in partial retirement reveals the following result (not presented in the table). When partial retirement involves a 20 percent reduction in the wage rate, the fractions of people who choose early abrupt retirement, partial retirement, and late abrupt retirement are 21.9%, 39.0%, and 39.1%, respectively. When partial retirement does not involve a reduction in the wage rate, the corresponding fractions are 21.4%, 43.6%, and 35.0%. This shows that a change to a less demanding job in partial retirement, accompanied by a decrease in the wage rate, deters a large fraction of 11.7 percent 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 in line with the choice percentages. When partial retirement involves a reduction in hourly wage, the average ratings are 5.1, 6.3, and 5.8, respectively. When partial retirement does not involve a reduction, the corresponding average ratings are 5.0, 6.4, and 5.7. 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. The null is not rejected at the 0.10 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).

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:

$$U_{is} = z_i' \gamma_s + x_i' \beta_s + u_{is}. \quad (4.1)$$

z_i' is a vector of seven treatment variables (the scenario characteristics). In particular, it includes dummies for the low and high substitution effect and income effect regimes (the medium one is the base category), and for the retirement age regimes 61 and 65 (with 63 as the base category), and a dummy indicating that 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 socio-economic 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 multivariate normal distributed, this leads to the standard multinomial probit model (Cameron and Trivedi, 2005; Winkelmann and Boes, 2006). Since only one choice (among three vignettes) of each respondent is analysed, in this model the unit of observation is the respondent; there are no multiple observations per respondent. The model is estimated with maximum likelihood.

Note that the z_i in Equation (4.1) are 'individual specific' and 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 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 probit 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, we consider two measures. The count R-squared indicates the proportion of correctly classified observations. We obtain a value of 0.495. As a second 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

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

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 0.009 and 0.680 for early abrupt retirement, between 0.164 and 0.640 for partial retirement, and between 0.091 and 0.789 for late abrupt retirement. This shows that there is substantial variation in the predicted probabilities of all choice alternatives suggesting that the model performs reasonably well in predicting the observed choices. 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 Wald statistic which shows that the regressors are jointly significant at the 0.01 level. The standard F-statistic leads to a similar conclusion in the linear regression model.

5.1 Treatment effects

Table 4 shows the effects of the substitution effect regimes, in particular the effects of low and high rewards for late retirement (and delayed claiming) compared to the reference of actuarially fair rewards. Respondents less often choose late abrupt retirement when delayed retirement is rewarded with less than actuarially fair increases in pension rights compared to when it is rewarded with actuarially fair increases. The effect is plausible but is significant only at the 0.10 level. On the other hand, no significant effect is found when delayed retirement is rewarded with actuarially generous increases. This suggests that people are not responsive to a generous increase but to a less than fair increase in the pension rights for delayed claiming. The table quantifies the effect as follows. The probability of delaying retirement fully at a given early retirement age by five years decreases on average by 4.7 percentage points if the actuarial increase in pension rights due to delaying retirement fully is 10 percentage points lower than if the actuarial increase was fair. We find no significant effect for partial retirement. These results suggest that people are somewhat responsive to increasing rewards to delay retirement until the normal retirement age or beyond but only at the extensive margin. To assess 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 scenario across the substitution effect regimes shown in Table 3. The table shows that, merging retirement age regimes, when going from the middle to the low substitution effect regime, the fraction of respondents choosing late abrupt retirement decreases from 37.5% to 33.6%. This suggests that the found marginal effect represents a notable shift 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). Our results show that individuals are responsive to incentives for retiring later but only at the extensive margin and not at the intensive margin when they are provided with the option to retire partially.

By our experimental design, the increase in the replacement rates for delaying retirement is smaller at the earlier retirement age regimes (see Table 2). Therefore, we allow the substitution effect regimes low and high, which reward delayed retirement respectively with actuarially less than fair and generous increases in pension rights, to interact with the three retirement age regimes 61, 63, and 65. The substitution effect regime middle is considered as the base category in our regression. In this specification we also allow other treatment variables to interact with the three retirement age regimes. We find that (not presented in a table) less than actuarially fair increases in pension rights decreases the probability of late abrupt retirement by a large magnitude of 8.3 percentage points at the retirement age regime 63. The effect is significant at

the 0.10 level. This suggests people are particularly responsive to pension incentives to delay retirement fully at age 63. We do not observe any other significant effect at the other retirement age regimes.

Table 4 shows significant income effects. Respondents less often choose early abrupt retirement and more often choose partial retirement when pension accruals are less than fair, or they more often choose early abrupt retirement and less often choose late abrupt retirement when pension accruals are generous compared to when they are fair. The effects are sizeable in magnitude. The probability of retiring at a given early retirement age decreases by 7 percentage points while the probability of delaying retirement partially from that age by five years increases by 5.7 percentage points when the replacement rates are 10 percentage points lower compared to the reference replacement rates. The probability of retiring at a given early retirement age increases by 5.1 percentage points while the probability of delaying retirement fully from that age by five years decreases by 8.3 percentage points when the replacement rates are 10 percentage points higher compared to the reference replacement rates. These results show that, at a given retirement age, people want to stop working all together, and do not want to continue to work even part-time when the level of the pension income is higher, perhaps because they consider that the provided pension income is sufficient to meet their ends. This expected negative income effect is in line with the previous studies. [Fields and Mitchell \(1984\)](#) showed that an increase in the worker's pension income available for retirement at age 60 induced earlier retirement in the US. [Brown et al. \(2010\)](#) and [Euwals et al. \(2010\)](#) showed that an increase in pension wealth or a positive wealth shock through inheritance receipt increase the odds of retirement. 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 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.

By our experimental design, all the replacement rates are lower at the earlier retirement age regimes (see Table 2). When we allow the income effect regimes to interact with the three retirement age regimes we find age effects for a negative income effect but only at the extensive margin. First, respondents less often choose early abrupt retirement when pension accruals are less than fair at the retirement age regime 63. The marginal effect is -0.078 and is significant at the 0.05 level. Second, respondents less often choose late abrupt retirement when pension accruals are generous compared to when they are fair at the retirement age regimes 61 and 63. The marginal effects are -0.089 and -0.116 , respectively, and both effects are significant at the 0.05 level.

Table 4 shows significant marginal effects for the retirement age regimes with plausible signs. Respondents less often choose early abrupt retirement while they more often choose late abrupt retirement in retirement age regime 61 compared to retirement age regime 63. 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, respondents more often choose early abrupt retirement while they less often choose late abrupt retirement in retirement age regime 65. This is perhaps because they find working onerous at late retirement ages. We find no effect for partial retirement.

Table 4 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 choice probabilities of partial retirement and late abrupt retirement. In particular, when the hourly wage decreases by 20 percent, the probability of choosing partial retirement decreases by 4.6 percentage points while the

probability of choosing late abrupt retirement increases by an equal amount. This shows that a reduced wage rate, accompanied by a job change, in partial retirement deters 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; Aaronson and French, 2004).

The effect of the decrease in hourly wage in partial retirement might depend on the retirement age. When we allow the wage rate regime to interact with the three retirement age regimes, we find that respondents prefer late abrupt retirement to partial retirement at both retirement age regimes 63 and 65. The effect sizes for late abrupt retirement at the two age regimes are 7.9 and 8.5 percent, respectively, and both are significant at 0.05 level. The effect sizes for partial retirement are -8.9 and -7.4 percent, respectively, which are significant at the 0.05 and 0.10 levels, respectively. This result is striking because, as discussed above, the average respondent in fact does not prefer late abrupt retirement in the retirement age regime 65.

The results on the choice probabilities presented above are in line with the average scenario ratings in Table 5. For example, Table 5 shows that when pension accruals are generous compared to when they are fair, respondents give significantly higher ratings to the early abrupt retirement scenario, in line with their significant choice of that scenario in Table 4. The results are also in line with the raw choice probabilities in Table 3.

5.2 Background characteristics

The lower panel of Table 4 shows the effects of a set of socio-economic and other background characteristics. We find significant effects with intuitively plausible signs for most of the variables. First, 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 for the 70-96 category when compared to the reference category 40-49. Respondents of this age category also less often prefer partial retirement.

Second, compared to women, men less often choose partial retirement and more often 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 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.

Fourth, we analyse the effect of home ownership. If home ownership is a proxy for private wealth and leisure is a normal good, we expect that those who own the home they live in want to retire earlier or at least want to work less due to an income effect. We find that home ownership significantly decreases the odds of late abrupt retirement by a large magnitude of 12.9 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 full retirement, and confirm that leisure is a normal good. This result is also in line with that obtained in Section 5.1 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.

Fifth, we obtain plausible effects for labor market status. Compared to those who are

working for an employer at the time of the survey, self-employed workers more often choose late abrupt retirement. It might be that they struggle to meet their financial ends, or that they are less prone to institutional restrictions that require workers with an employer to retire at certain ages, or that this is less of a norm among their peers. Those who are retired are more likely to choose early abrupt retirement. It might be that once individuals leave the labor market, they have no incentive to return to work. Those who are unemployed more often choose early abrupt retirement and less often choose partial retirement perhaps because their work opportunities are limited.

Finally, 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 decrease the odds of early retirement and increase the odds of remaining employed in a part-time or full-time job. This suggests that individuals who are attached to the labor market for non-economic reasons are significantly more likely to remain employed by means of a part-time or full-time job. 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.

The lower panel of Table 5 presents the results on scenario ratings which confirm the significant effects found on the choice probabilities in the lower panel of Table 4. 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 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. This is perhaps because they are more likely to meet their income needs. This income effect corresponds to our previous findings that respondents with more private wealth, or those who are randomised into a higher pension income regime in the retirement scenarios are less likely to delay retirement.

5.3 Job characteristics and satisfaction

In the survey we have also asked questions on job characteristics and several dimensions of job satisfaction.⁸ Job characteristics do not seem to be particularly important. The only significant

⁸ 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 the 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

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 -0.031 and 0.047 .

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 -0.036 and 0.029 .

Second, respondents who are satisfied with their pay less often choose late abrupt retirement. The marginal effect is -0.022 which is significant at the 0.10 level. This is in line with our 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, 0.032 and 0.043 for late abrupt retirement, and -0.038 and 0.003 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.

6 Sensitivity analysis

Baseline pension incentives and retirement age

Section 5.1 analysed the effect of the financial incentives on retirement behaviour. The retirement effects of actuarially less than fair and generous increases in pension rights for delayed claiming are compared to the effects of an actuarially fair increase, to investigate the substitution effect of higher pensions. Furthermore, the retirement effects of accruing pension rights with low and generous accrual rates are compared to the effect of accruing rights with a moderate accrual rate, to study the income effect of higher pensions. Table 2 shows that 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 baseline replacement rates. Based on these changes in the replacement rates, Table 4 has shown significant income effects. Here we check how the substitution effect changes when pension rights increase in an actuarially generous manner compared to when they increase in an actuarially less than fair manner, or how the income effect changes when pension rights grow with a generous accrual rate compared to when they grow with a low accrual rate, where 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 new baseline replacement rates. Section 5.1 also analysed the impact of increasing retirement age on the behaviour of delaying retirement partially or fully. Labour supply effects of delaying retirement at age 61 and 65 are compared to the effect of delaying retirement at age 63. Table 4 has shown significant effects at ages 61 and 65. Here we check how the retirement age effect changes when delaying retirement at age 65 is compared to delaying retirement at age 61.

We find that actuarially generous increases in pension rights, compared to actuarially less than fair increases, decrease the odds of early retirement and increase the odds of late abrupt retirement. The marginal effects are -0.045 and 0.049 , which are significant at the 0.05 and 0.10 levels, respectively.

satisfaction: 1. Very dissatisfied, 2. Dissatisfied, 3. Neutral, 4. Satisfied, and 5. Very satisfied.

As for the income effect, we find that the probability of early abrupt retirement increases by 12.7 percentage points while that of late abrupt retirement decreases by 9.7 percentage points when pension rights grow with an actuarially generous accrual rate compared to when they grow with an actuarially less than fair accrual rate. Both effects are significant at the 0.01 level. Table 4 has shown a similar effect when the reference accrual rate is moderate. Taken together, these results suggest that people are responsive to different degrees of income effect. Furthermore, Section 5.1 showed that, when we interact the income effect regimes with the three retirement age regimes, respondents less often choose the late abrupt retirement scenario when pension accruals are generous compared to when they are fair in the retirement age regimes 61 and 63. We find the same age effects for late abrupt retirement when pension accruals are generous compared to when they are less than fair.

The treatment with respect to the retirement age shows that respondents much less often choose late abrupt retirement while they more often choose the alternative two retirement scenarios when delaying retirement at age 65 is compared to delaying retirement at age 61. The marginal effects for late abrupt retirement, partial retirement, and early abrupt retirement are -16.5, 4.9, and 11.7 percent, respectively. The marginal effects for late and early abrupt are significant at the 0.01 level, and that for partial retirement is significant at the 0.10 level. Section 5.1 provided evidence for retirement age effects at the extensive margin when the reference retirement age regime was considered as 63. The current results show that people are also responsive at the intensive margin. That is, at the normal retirement age, people either prefer to stop working all together or to retire partially if they are offered the option.

Exogeneity of the treatment effects

Section 5.1 presented regression results on the treatment effects based on the field experiment where individuals are randomly assigned to regimes of retirement income and retirement age to analyse the effects of financial incentives and increasing 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 the treatment effects only, and hence are independent of any respondent characteristic. This means that the magnitudes and significance of the treatment effects should remain unaffected when other controls on respondent characteristics are omitted from the regression equation. However, note that the treatments with respect to the retirement income depend on the actual labor income of the respondent by our 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, depend on the actual labor income of that respondent (see Section 2). This means that we should control for the labor income, and other income related variables, in the regression equation to obtain unbiased estimates for the treatment effects. Here we check whether the estimated treatment effects are sensitive to omitting the background characteristics of the respondent, except the labor income and income related correlates. That is, we compare the results from the estimation of the regression model given by Equation (4.1) with the results from an estimation based on the same model but with background characteristics omitted from the model except the labor income and home ownership.

When background characteristics except the income related correlates are omitted from the regression, the coefficient estimates of the treatment effects remain largely unaffected except that the low substitution effect regime becomes insignificant for late abrupt retirement. In the regressions of scenario ratings, the treatment effects show two changes when background characteristics except the income related correlates are omitted from the regression. First, the high

substitution effect regime becomes significant in the early abrupt retirement regression. Second, the high income effect regime becomes insignificant in the late abrupt retirement regression.

These results suggest that in our regression analyses it is important to control for the background characteristics since their potential correlation with labor income has an influence on the treatment effects although to a limited extent.

7 Validation of the stated preferences

We analysed partial retirement behavior using stated preference data but there remains the question of whether stated preferences are predictive of actual behavior. In a survey conducted by The Commonwealth Fund in 1989, [Quinn and Burkhauser \(1994\)](#) find that for many older workers their planned and preferred retirement age are consistent suggesting that people behave in ways to meet their preferences. For partial retirement in particular, [Siegenthaler and Brenner \(2000\)](#) argue that, in longitudinal data, many workers behave as they say they prefer reducing work hours, but this depends on the availability of flexible retirement options. [Louviere et al. \(2000\)](#) survey studies in marketing, transport, resource economics and other social sciences, and compare preference parameter estimates based on stated preference data with estimates based on data on actual behavior. They find that the two are usually quite close, although formal statistical tests sometimes reject exact equality. These results suggest that stated preferences are indicative of actual behavior but they may differ with respect to market restrictions, individual characteristics, or other unanticipated policy interventions or life events.

Here we analyse whether the stated preferences for partial and full retirement based on the vignettes are representative of the expectations and made decisions for partial and full retirement. First, among the respondents of our survey, we check whether their stated preferences for the hypothetical retirement scenarios are in line with their actual intentions and made decisions for retirement. To find out the expected and revealed retirement decisions, in the survey we have asked the respondents to indicate their past and expected future work status at given ages on a time line that intended to outline their employment path from age 55 and onwards. At eight age categories respondents select, from respective drop down menus, among four work status alternatives. The age categories are 55-56, 57-58, 59-60, 61-62, 63-64, 65-66, 67-68, and 69 plus, and the work status alternatives are full-time work, part-time work, retirement, and other. When choosing a future work status, we have asked respondents to take account of what their opportunities will allow them to do. We provided them with the example that if their employer prohibits part-time work, they should avoid choosing part-time work in the drop down menus. Furthermore, we have asked them to indicate at drop down menus beneath the corresponding drop down menus for work status alternatives if their hourly wage has decreased, if their employer, type of work, and the industry they used to work in have changed at the corresponding work status they have chosen.

Table 9 presents the most common retirement sequences that result from the work status choices of the respondents at eight age categories. We find that abrupt retirement, represented by the sequences of the type ‘A’, correspond to 21.2 percent of all different types of retirement sequences, while partial retirement, represented by the sequences of the type ‘P’, correspond to 35.9 percent. Considering the retirement sequences followed by different labor market status groups, we find the following. Among the retirees, 36.8 percent follow the abrupt retirement sequence, while 20.1 percent follow the partial retirement sequence. Among those working for an employer, the corresponding figures are 20.8 and 45.4 percent. Among the self-employed, the corresponding figures are 8.6 and 32.3 percent. These figures show that partial retirement is more prevalent among workers than among retirees. A possible reason is that younger cohorts have greater access to partial retirement schemes, demand such schemes more, or are

more aware of their opportunities for reducing work hours before retirement. Compared to abrupt retirement, partial retirement is more common among the self-employed. This is plausible because self-employed workers are likely to have more discretion over their work schedule compared to those working for an employer (Parker and Rougier, 2007). Furthermore, among those who follow the retirement sequence of type ‘P’, 46.3 percent indicate that their hourly wage has decreased at their part-time job. We also find that 36.8, 29.7, and 21 percent indicate, respectively, that the type of work they do, their employer, and their industry have changed at the part-time job. In general, these figures show that substantial fractions of the workers as well as the retirees expect or have made use of part-time work as they make a transition from full-time work to full retirement, but face a part-time wage penalty when doing so. These figures are in line with the previous studies based on national household surveys which provide evidence that substantial fractions of older workers take a part-time job with their career or a different employer but at a reduced hourly wage before they retire (see e.g. Cahill et al. (2015) or Aaronson and French (2004)). The presented high fractions of respondents expecting to participate or have participated in a partial retirement plan are in line with the high fractions of respondents choosing the partial retirement scenario in our stated preference question (see Table 3).

Given the abrupt and partial retirement sequences outlined by the respondents, we further analyse whether the respondents who outline an abrupt retirement sequence are more likely to choose either the abrupt early retirement scenario or the abrupt late retirement scenario, and less likely to choose the partial retirement scenario, when asked to choose among the three hypothetical retirement scenarios. In particular, we define an indicator variable that takes a value of 1 if the respondent’s retirement sequence is of the abrupt retirement type, and a value of 0 if it is of the partial retirement type (types ‘A’ and ‘P’, respectively, in Table 9). We then check in the baseline multinomial probit regression (Table 4) whether the indicator of abrupt retirement has a positive effect on the odds of choosing the early and late abrupt retirement scenarios, and a negative effect on the odds of choosing the partial retirement scenario. We find that the coefficient of the indicator variable is 0.15 and 0.12 for early and late abrupt retirement, respectively, and -0.27 for partial retirement. All the coefficients are significant at the 0.01 level.⁹ These effects are large in magnitude, e.g. compared to the effects of the other correlates in the baseline regression, and provide clear evidence that the stated preferences are representative of the actual intentions or made decisions for retirement.

As a second check, we analyse the effects of a number of socio-economic characteristics on the revealed preferences for retirement, part-time work, and full-time work. If the effects of the socio-economic correlates in the revealed preferences are in line with the effects of the same correlates in the stated preferences, the stated preferences should be representative of the actual intentions or made decisions. To analyse the revealed preferences, we use the Health and Retirement Study (HRS). The HRS is a nationally representative panel study, and surveys more than 22000 Americans over the age of 50 every two years, along with their spouses or partners. The survey was launched in 1992 and collects information on, among other things, income, work, pension plans, and health. Using the HRS, we estimate a multinomial probit model where choice alternatives are retirement, part-time work, and full-time work.¹⁰ As taste shifters, we consider

⁹ The effect sizes remain largely robust to accounting for incomplete or irregular retirement patterns (of the type ‘O’ in Table 9) in our definition of abrupt retirement. The effects always remain significant at 0.01 level.

¹⁰ We use the complete 11 waves of the survey covering the period from 1992 to 2012, and restrict our sample to individuals between ages 55 and 75 who were either employed or retired at the time of the survey. As is common in US studies, we define part-time work as working less than 35 hours a week, or as working 35 or more hours a week but less than 36 weeks a year. The number of work hours includes the hours in the main job as well as those in a possible second job. Full-time work is working 35 or more hours per week for 36 or more weeks per year.

dummies for reaching eligibility ages for early and normal retirement benefits, as well as the age of 70. We also consider the same three age indicators but then for the married or unmarried partner.¹¹ Furthermore, we include a set of background characteristics that are largely the same as those included in the regressions explaining the stated preferences for retirement scenarios. We do not include the marital status because including the retirement eligibility ages for the partner requires us to restrict the sample to those respondents living with a partner. We also do not include indicators of employment status since the model aims to explain the work and retirement choices.

Table 10 presents the estimation results. A first finding is that reaching the retirement eligibility ages increases the odds of retirement and decreases the odds of working full-time, as we would expect. Notably, however, the retirement ages also increase the odds of working part-time, and the magnitudes of the effects are comparable to those of the effects on the odds of retirement. These results suggest that the average worker is interested in reducing working hours from full-time as part of an informal or formal partial retirement plan. In fact, when we distinguish between part-time work status and part-time retirement status based on the self-reported work status, we find that the effects of one’s own retirement ages are positive and significant for part-time retirement, while they are negative and insignificant for part-time work. A second finding is that, respondents do not prefer to work full-time or part-time if their spouse is eligible for retirement benefits. We also observe that women and those with high education are more likely to be working part-time, and those living in a larger household are more likely to be working full-time. Furthermore, as a measure of private wealth, those who own the house they reside in are less likely to be working full-time but more likely to be working part-time or retired. These results are in line with the results we obtained based on our stated preference data. In particular, as documented in Tables 3, 4, and 5, a substantial fraction of the survey respondents are interested in partial retirement; women are more likely to choose partial retirement; those living in a larger household are more likely to choose late abrupt retirement; home owners are less likely to choose late abrupt retirement but more likely to choose early abrupt retirement or partial retirement; and highly educated respondents give higher ratings to partial retirement.

8 Comparison with the Netherlands

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 common features, cross-national variation helps to obtain or improve identification of the underlying factors that affect retirement decisions. However, cross-national

¹¹ As discussed in Section 1, there is ample 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. The incentives built in the social security system do not only affect work decisions at the extensive margin. Aaronson and French (2004) use retirement eligibility ages as instruments for working part-time in their analysis of the causal effect of working part-time on wages. Furthermore, several studies have shown that whether the partner is eligible for social security benefits affect the retirement behavior of the individual (Blau, 1998; Gustman and Steinmeier, 2000, 2004, 2014). The rationale for the indicator of having reached the age of 70 is two fold. First, before the year 2000, social security benefits were reduced for those who continued to work at the normal retirement age through age 69 (earnings test). This means that some people might have preferred to return to work or increase their work hours at the age of 70, when they no longer faced the earnings test. Second, individuals are allowed to delay receiving their social security benefits at the normal retirement age until the age of 70 and get compensated for this in the form of increased benefits (in an approximately actuarially fair way). This may induce some people to delay their retirement until they reach the age of 70.

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 (Hutchens, 2010). 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.¹¹

Based on the vignette methodology, if cross-country variation in the pension systems or work cultures helps to identify the factors affecting the retirement preferences, then these factors will be better identified if the cross-national variation is larger. The pension system in the United States has long been dominated by defined contribution plans where individuals have discretion over when and how much to contribute to the pension plan, 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 United States and the Netherlands. We expect that these peculiar differences in the institutional settings induce 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 United States is repeated in the Netherlands. The survey is fielded in 2014 in the Longitudinal Internet Studies for the Social Sciences (LISS) panel 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 topics including work, education, income, housing, time use, political views, values and personality. Details on the survey can be found at http://www.lissdata.nl/dataarchive/study_units/view/500. As for the United States, the sample is restricted to the respondents ages 40 and older which generated 4066 responses. Table 1 presents summary statistics on the background characteristics.

8.1 Scenario choices and ratings

The same analyses on scenario choices and ratings carried out in Sections 3 and 5 are reproduced for the Netherlands for comparison. Overall, merging all regimes, 28.2% choose the early abrupt retirement scenario, 42.3% the partial retirement scenario, and 29.4% the late abrupt retirement scenario. The retirement scenarios are respectively rated 5.4, 6.1, and 5.4 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. Compared to the United States, more people prefer early abrupt

¹¹ 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).

retirement over late abrupt retirement, and give, respectively, higher and lower ratings to the two retirement scenarios. This is in line with the empirical fact that workers spend more hours in the labor market or retire later in the United States. The two countries are otherwise similar in their preferences for partial retirement, and that individual preferences for retirement are heterogeneous in terms of both the age and type of retirement.

Table 6 shows the fraction of respondents who choose a particular retirement scenario and the average of the ratings given to a scenario under the regimes defined for retirement age and retirement income. In the left hand panel, the differences due to substitution effect regimes show that as the incentives to delay retirement increases, more people choose partial retirement while fewer people choose late abrupt retirement, with few exceptions. Hence, we observe the expected substitution effect for partial retirement rather than for late abrupt retirement. The differences in the average ratings are in line with this result only under certain regimes of the substitution effect and retirement age. This result compares with that obtained in the United States where the expected substitution effect is observed more often for late abrupt retirement than for partial retirement. In the right hand panel, where differences are due to income effect regimes, we do not observe clear patterns in the choices or average ratings when the general level of pension income increases. This result contrasts with that obtained in the United States where a clear income effect is observed.

The randomisation of the wage rate in partial retirement reveals the following result. When partial retirement involves a 20 percent reduction in the wage rate, the fractions of people who choose early abrupt retirement, partial retirement, and late abrupt retirement are 27.6%, 43.1%, and 29.3%, respectively. When partial retirement does not involve a reduction in the wage rate, the corresponding fractions are 28.9%, 41.6%, and 29.5%. 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 are in line with the choices for partial retirement under the two wage rate regimes. When partial retirement involves a reduction in hourly wage, the average ratings are 5.4, 6.2, and 5.4, respectively. When partial retirement does not involve a reduction, the corresponding average ratings are 5.4, 6.1, and 5.4. However, the null hypothesis of the equality of the average ratings across the two groups is not rejected at the 0.10 significance level for partial retirement. When compared to the United States, the effect of a reduction in hourly wage in partial retirement on the probability of choosing partial retirement is of the opposite sign and twice as large of that in the Netherlands. This shows that when deciding on partial retirement and an accompanying job change, respondents in the two countries prioritise different characteristics of the job in partial retirement: while respondents in the United States are responsive to the financial incentives, respondents in the Netherlands are responsive to how demanding the job is.

8.2 Treatment effects

We use the same regression model presented in Section 4 to perform multivariate analysis in the Netherlands. The model performs slightly worse in terms of the data fit when the Dutch data is applied. In particular, we obtain a smaller magnitude for the count R-squared and in general the predicted choice probabilities lie in smaller ranges compared to when the US data is applied in Section 5. We find that the count R-squared is 0.433. The predicted choice probabilities range between 0.167 and 0.381 for early abrupt retirement, between 0.226 and 0.698 for partial retirement, and between 0.135 and 0.488 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. The Wald statistic of model significance indicates that the regressors are jointly significant at the 0.01 level. The linear regression model that explains the ratings given to each retirement scenario also performs relatively worse 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 Netherlands. We find no significant effects for the substitution effect regimes. However, when we allow the substitution effect regimes low and high to interact with the three retirement age regimes 61, 63, and 65, we find that an actuarially generous increase in pension rights decreases the probability of late abrupt retirement by 5.3 percentage points, but increases the probability of partial retirement by 7.3 percentage points at the retirement age regime 63. The effects are significant at the 0.10 and 0.05 levels, respectively. A similar finding is that an actuarially less than fair increase in pension rights increases the probability of late abrupt retirement by 6.9 percentage points, but decreases the probability of partial retirement by 2.7 percentage points at the retirement age regime 65, although the latter effect is statistically not significant. The effect for late abrupt retirement is significant at the 0.05 level. These results show that individuals are responsive to pension incentives to delay retirement but only partially and not fully at ages 63 or 65. This suggests that financial incentives for delaying retirement could be effective if they are offered as part of a partial retirement scheme at age 63. The age-specific substitution effects on the scenario choices are in line with their counterparts on the scenario ratings: we find significant effects in the scenario ratings for the effects we find significant effects in scenario choices. Similar results are apparent in Table 8.

A comparison of the results with those obtained in the United States in Section 5.1 shows that in both countries people are responsive to financial incentives to delay retirement at age 63, but they respond to these incentives at different margins of labour supply. In the United States, people more often choose late abrupt retirement when pension rights increase in an actuarially fair manner compared to when they increase in a less than fair manner. In the Netherlands, people more often choose partial retirement when pension rights increase in an actuarially generous manner compared to when they increase in a fair manner.

Table 7 shows a significant income effect for early abrupt retirement. The probability of retiring at a given early retirement age decreases by 3 percentage points when pension accruals are generous compared to when the accruals are fair. This means that people want to work more when the level of pension income is higher at all alternative retirement ages. This is in contrast with the expected negative income effect for leisure suggesting that leisure is an inferior good. Table 8 shows a similar positive income effect for late abrupt retirement in the scenario ratings. When we allow the income effect regimes to interact with the three retirement age regimes, we obtain mixed results at different retirement age regimes, at different margins of labour supply. The probability of partial retirement decreases by 7.3 percentage points, and the probability of late abrupt retirement increases by 5.3 percentage points at the retirement age regime 61 when pension accruals are less than fair compared to when they are fair. The effects are significant at the 0.05 and 0.10 levels, respectively. This is the negative income effect we would expect. On the other hand, the probability of early abrupt retirement decreases by 4.8 percentage points at the retirement age regime 63 when pension accruals are generous compared to when the accruals are fair. The effect is significant at the 0.10 level. This suggests a positive income effect.

A comparison of the results with those obtained in the United States in Section 5.1 reveals two main findings. First, in both countries people are responsive to the changes in the generosity of the pension provisions at the extensive but also at the intensive margin, although this depends

on the retirement age. An implication of this result is that in both countries partial retirement programmes could 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. Second, when pension provisions are more generous, we find a negative income effect in the United States, while both a negative and a positive income effect depending on the retirement age in the Netherlands. The income effects are less pronounced in the Netherlands, however.

For the retirement age regimes, Table 7 shows significant effects for partial retirement and late abrupt retirement. Respondents less often choose partial retirement while they more often choose late abrupt retirement at the retirement age regime 61 compared to the retirement age regime 63. Respondents also less often choose partial retirement at the retirement age regime 65 compared to the retirement age regime 63. This shows that partial retirement at age 63 is particularly attractive to the respondents perhaps because it allows them to continue to work and accrue pension rights while at the same it provides leisure time for social activities. This is supported by Table 6 where the raw choices and ratings are particularly pronounced for partial retirement at the retirement age regime 63, or by Table 8 where respondents give significantly higher ratings to partial retirement at the retirement age regime 63 compared to the retirement age regime 65.

Labor supply responses to increasing retirement age seem to differ in the United States and the Netherlands. Respondents react by retiring partially when asked to evaluate retirement at age 63, compared to when asked to evaluate retirement at age 61, in the Netherlands. Respondents react to the same treatment by retiring fully at age 63 in the United States. This shows that labor supply responses to increasing retirement age occur at the intensive margin in the Netherlands, while they occur at the extensive margin in the United States.

Table 7 shows that a decrease in hourly wage, accompanied by a change to a less demanding job, in partial retirement has no significant effect. When we allow the wage rate regime to interact with the three retirement age regimes, we find that respondents in fact prefer partial retirement when it involves a reduction in the hourly wage and job change under the retirement age regime 61. The marginal effect is 0.053 and it is significant at the 0.10 level.

A comparison of the results with those obtained in the United States in Section 3 shows that while people appear particularly responsive to a reduction in the hourly wage in partial retirement in the United States, no such response is observed in the Netherlands. In fact, Section 8.1 showed that the fraction of respondents choosing partial retirement slightly increases when partial retirement involves a reduction in the hourly wage and a job change in the Netherlands. It appears that 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 in the Netherlands.

8.3 Background characteristics

The lower panel of Table 7 shows the effects of socioeconomic and other background variables. Several variables which were found to have significant effects in the lower panel of Table 4 in the United States appear to have similar effects in the Netherlands. 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 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. These results differ from those obtained in the United States where the age effect is evident

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, a continuous linear function of age is significant in both countries.

Second, compared to women, men less often choose partial retirement whereas they more often choose late abrupt retirement. Table 4 showed a similar effect for the United States.

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. This finding is in line with the significant effect on the partial retirement rating in the United States.

Fourth, for those who value work for itself more than for money, the odds of remaining employed in a part-time job is significantly higher. This result differs from that obtained in the United States where the odds of remaining employed increases in a part-time job as well as in a full-time job.

Fifth, home ownership increases the odds of partial retirement but the effect is significant only at the 0.10 level. It also decreases the odds of late abrupt retirement but the effect is not significant. These scenario choices are in line with the scenario ratings in Table 8. These results seem to be in line with the expected negative income effect for leisure. However, note that Section 8.2 showed that individuals increase their labour supply when they are randomised into a higher pension income regime. This suggests that pension wealth and private wealth have opposite effects on the work decision.

A number of variables that have no significant effects on the choice probabilities in Table 7 have significant effects on the scenario ratings in Table 8. 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, compared to those who are working for an employer, those who are retired, homemakers, or disabled 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.

8.4 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 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, -0.009 and 0.009 which are both significant at the 0.05 level. 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: those working in larger companies significantly give lower ratings to partial retirement, with a marginal effect of -0.063 which is significant at the 0.01 level.

The second finding is that 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 is -0.027 which is significant at the 0.01 level.

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. The marginal effects are, respectively, 0.028 and -0.026 which are both significant at the 0.05 level. This suggests that satisfaction with the work itself increases the odds of remaining employed by means of a part-time job.

Second, respondents who have more freedom in deciding how they do their work less often choose partial retirement and more often choose the alternative retirement scenarios. The marginal effect for partial retirement is -0.028 and it is significant at the 0.05 level. The marginal effects of the alternative retirement scenarios are not significant. 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.

Third, respondents who have better promotion prospects less often choose partial retirement while they more often choose the alternative retirement scenarios. The marginal effect for partial retirement is -0.021 which is significant at the 0.10 level. The effects of the alternative retirement scenarios are not significant. 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.

Finally, respondents who report higher levels of job security more often choose partial retirement while they less often choose early or late abrupt retirement. The marginal effect for partial retirement is 0.02 which is significant at the 0.05 level, while the other two effects are not significant most likely due to offsetting effects. It might be that individuals who have more job security have greater power in bargaining for a flexible retirement programme.

A comparison of the results between the United States and the Netherlands reveals two main findings. First job characteristics and job satisfaction mostly affect labor market decisions at the intensive margin in the Netherlands while this is not true for the United States. Second, workers in the two countries largely differ in the types of job characteristics and job satisfaction that affect their motivations to remain employed in a part-time or full-time job. For example, satisfaction with total pay and satisfaction with the relationship with supervisor and coworkers have significant effects in the United States while they have no significant effect in the Netherlands.

8.5 Sensitivity analysis

Baseline pension incentives and retirement age

In Section 8.2, we found no substitution effect when pension rights increase in an actuarially generous manner compared to when they increase in an actuarially fair manner. However, when we allowed the substitution effect regimes to interact with the retirement ages regimes, we found a significant substitution effect between partial and late abrupt retirement. Here we find a significant substitution effect between partial and late abrupt retirement when pension rights increase in an actuarially generous manner compared to when they increase in a less than fair manner. In particular, the probability of partial retirement increases by 4.3 percentage points while that of late abrupt retirement decreases by 4.4 percentage points. Both effects are significant at the 0.05 level. Furthermore, the interaction of the substitution effect regimes with the retirement age regimes shows that these two effects are significant at the 0.01 level at the retirement age regime 63. This result compares to that in Section 8.2 where we found the substitution effect between the same two retirement scenarios at the same retirement age regime when actuarially generous increases in pension rights are compared to fair increases.

This suggests that the found substitution effect at the intensive margin is robust to different degrees of change in the price of leisure.

We find no significant effect for the income effect regime when pension rights grow with an actuarially generous accrual rate compared to when they grow with a less than fair rate. However, the interaction of the income effect regime with the three retirement age regimes shows a positive significant effect for late abrupt retirement at the retirement age regime 65. The marginal effect is 0.056 which is significant at the 0.10 level. Respondents also give higher ratings to the late abrupt retirement and partial retirement scenarios when pension rights grow with a generous accrual rate compared to reference accrual rate. Both effects are significant at the 0.05 level.

The treatment with respect to the retirement age shows no significant effect when delaying retirement at age 65 is compared to delaying retirement at age 61.

Exogeneity of the treatment effects

When we omit the background characteristics, except the income related correlates, from the regression equation to check whether the treatment effects are exogenous to the respondent characteristics, we observe two changes. First, the high substitution effect regime becomes significant at the 0.10 level for partial retirement. Second, the retirement age regime 61 becomes significant at the 0.10 level for early abrupt retirement. In the regressions of scenario ratings, the changes are the following. First, the low income effect regime becomes significant at the 0.10 and 0.05 levels respectively in the early abrupt retirement and partial retirement regressions. Second, the retirement age regime 61 becomes significant at the 0.10 level in the early retirement regression, while it becomes insignificant in the partial retirement regression. We conclude that it is important to control for the background characteristics in the regression analyses since their potential correlation with labor income has some influence on the treatment effects.

9 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 used the vignette methodology in the Internet surveys conducted in the United States and the Netherlands 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 would 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 the 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). These effects are country specific, however. We provide additional evidence that financial incentives affect retirement behaviour not only at the extensive margin but also at the intensive margin. Besides, we show that individuals are responsive to increasing retirement age both at the extensive and intensive margins. Finally, we address the stylised fact that partial retirement cases a wage penalty, and show that the wage penalty indeed makes partial retirement less attractive so much that workers instead prefer to continue to work full-time.

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; Kantarci 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.

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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
- Retirement income
- Type of retirement (partial or full retirement)

Please compare the plans presented below.

Lisa plans to retire at age 70. Her retirement income will be \$2700 a month. This plan can be summarized 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		
Retir. income	0								\$2700		

Carol plans to retire at age 65. Her retirement income will be \$1800 a month. This plan can be summarized 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							
Retir. income	0			\$1800							

Nicole 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 retirement income of \$600 a month. While working part-time she will continue to build retirement benefits for full retirement. She will retire fully at age 70. Her retirement income will be \$2250 a month. This plan can be summarized 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		
Retir. income	0			\$600					\$2250		

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

- Lisa's plan
- Carol's plan
- Nicole's plan

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Figure 1: Survey representation of the competing retirement scenarios.

Table 1: Background characteristics in the US and the NL (%)

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

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: Fraction 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	30.3	5.6	L	0.60/0.60/0.60	22.9	5.1**
	PR	65-69		0.75/0.85/0.95	38.9	6.4***		0.75/0.80/0.85	46.3	6.3***
	FR	70		0.90/1.00/1.10	28.9	5.4		0.90/1.00/1.10	29.8	5.3
65	FR	65	M	0.60/0.70/0.80	26.2	5.4	M	0.70/0.70/0.70	27.6	5.5
	PR	65-69		0.80/0.90/1.00	44.3	6.3***		0.85/0.90/0.95	41.8	6.4***
	FR	70		1.00/1.10/1.20	29.0	5.3		1.00/1.10/1.20	29.7	5.5
63	FR	65	H	0.60/0.70/0.80	25.7	5.2*	H	0.80/0.80/0.80	31.7	5.5
	PR	65-69		0.85/0.95/1.05	44.3	6.3***		0.95/1.00/1.05	39.5	6.3***
	FR	70		1.10/1.20/1.30	29.5	5.4		1.10/1.20/1.30	27.8	5.3
63	FR	63	L	0.50/0.60/0.70	23.0	5.6	L	0.50/0.50/0.50	14.9	4.8***
	PR	63-67		0.60/0.70/0.80	44.0	6.4***		0.60/0.65/0.70	40.3	6.4***
	FR	68		0.70/0.80/0.90	31.5	5.5		0.70/0.80/0.90	43.4	5.8*
63	FR	63	M	0.50/0.60/0.70	21.0	5.0***	M	0.60/0.60/0.60	20.4	4.8***
	PR	63-67		0.65/0.75/0.85	38.5	6.4***		0.70/0.75/0.80	40.4	6.2***
	FR	68		0.80/0.90/1.00	38.5	5.8**		0.80/0.90/1.00	38.2	5.8
61	FR	63	H	0.50/0.60/0.70	21.1	4.7***	H	0.70/0.70/0.70	29.9	5.6
	PR	63-67		0.70/0.80/0.90	41.3	6.3***		0.80/0.85/0.90	42.4	6.4***
	FR	68		0.90/1.00/1.10	37.6	5.8		0.90/1.00/1.10	26.3	5.6
61	FR	61	L	0.40/0.50/0.60	19.1	5.3	L	0.40/0.40/0.40	11.2	4.4***
	PR	61-65		0.45/0.55/0.65	41.1	6.4***		0.45/0.50/0.55	39.2	6.3***
	FR	66		0.50/0.60/0.70	39.4	5.9**		0.50/0.60/0.70	49.2	6.4***
61	FR	61	M	0.40/0.50/0.60	17.6	4.6***	M	0.50/0.50/0.50	16.3	4.8***
	PR	61-65		0.50/0.60/0.70	37.6	6.3***		0.55/0.60/0.65	37.7	6.3***
	FR	66		0.60/0.70/0.80	44.0	6.0***		0.60/0.70/0.80	45.2	6.3***
61	FR	61	H	0.40/0.50/0.60	10.5	4.3***	H	0.60/0.60/0.60	20.5	5.1**
	PR	61-65		0.55/0.65/0.75	39.1	6.4***		0.65/0.70/0.75	41.1	6.4***
	FR	66		0.70/0.80/0.90	50.0	6.6***		0.70/0.80/0.90	37.9	5.7

Notes: 1. FR and PR denotes full and partial retirement, respectively. L, M and H respectively refer to low, middle and high regimes. 2. 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. 3. 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. 4. Totals of choices may not add due to rounding error. 5. **, ***, * indicate statistical significance at the 0.01, 0.05, 0.10 levels, respectively, 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 0.01 level in all of the 18 cases associated with the substitution and income effect regimes in the table.

Table 4: Multinomial probit model explaining the probability of choosing a retirement scenario in the US

	Early abrupt retirement		Partial retirement		Late abrupt retirement	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Treatment effects						
Substitution effect low	0.035	0.023	0.012	0.029	-0.047*	0.027
Substitution effect high	-0.012	0.023	0.010	0.029	0.002	0.027
Income effect low	-0.067***	0.022	0.057*	0.029	0.011	0.027
Income effect high	0.052**	0.023	0.031	0.029	-0.083***	0.027
Retirement age 61	-0.068***	0.022	-0.036	0.029	0.104***	0.028
Retirement age 65	0.045*	0.024	0.022	0.029	-0.067**	0.028
Wage rate low	-0.000	0.019	-0.046*	0.024	0.046**	0.023
Background characteristics						
Age	-0.003**	0.001	-0.002	0.002	0.005***	0.002
Male	0.010	0.020	-0.063**	0.025	0.053**	0.024
Married or living with a partner	0.013	0.021	0.008	0.027	-0.021	0.026
Household size	-0.014	0.009	-0.011	0.011	0.025**	0.010
Highly educated	-0.021	0.020	0.023	0.025	-0.003	0.024
High income earner	0.024	0.021	0.009	0.026	-0.033	0.025
Home owner	0.061**	0.026	0.072**	0.034	-0.134***	0.034
Self-employed	-0.025	0.036	-0.051	0.043	0.076*	0.043
Retired	0.125***	0.036	-0.069*	0.039	-0.056	0.037
Unemployed	0.082	0.051	-0.098*	0.055	0.016	0.054
Homemaker, disabled, etc.	0.008	0.034	-0.000	0.040	-0.007	0.039
Value work more than money	-0.041***	0.005	0.011*	0.006	0.030***	0.006
Observations	1702					
Log-likelihood	-1687.318					
Count R-squared	0.495					
Wald test of model significance	220.880***					

Notes: 1. All the treatment variables are dummy variables to indicate respective regimes of the retirement income, retirement age, and wage rate in partial retirement. 2. Coefficients represent average marginal effects. 3. ***, **, * indicate statistical significance at the 0.01, 0.05, 0.10 levels, respectively. 4. Standard errors are robust to heteroskedasticity. 5. Base group for current employment status is respondents working for an employer.

Table 5: Linear regression model explaining the ratings given to a retirement scenario in the US

	Early abrupt retirement		Partial retirement		Late abrupt retirement	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Treatment effects						
Substitution effect low	0.563***	0.135	0.143	0.121	-0.132	0.148
Substitution effect high	-0.188	0.136	0.020	0.125	0.234	0.152
Income effect low	-0.320**	0.136	0.137	0.126	-0.107	0.150
Income effect high	0.387***	0.138	0.130	0.124	-0.316**	0.152
Retirement age 61	-0.377***	0.135	-0.065	0.122	0.586***	0.149
Retirement age 65	0.221	0.140	-0.018	0.130	-0.396**	0.159
Wage rate low	0.109	0.112	-0.192*	0.102	0.069	0.124
Background characteristics						
Age	-0.041***	0.008	-0.004	0.008	0.020**	0.009
Male	-0.006	0.118	-0.331***	0.110	0.135	0.128
Married or living with partner	0.250*	0.129	0.036	0.116	-0.345**	0.142
Household size	-0.143***	0.049	-0.048	0.047	0.108**	0.055
Highly educated	-0.213*	0.122	0.261**	0.108	0.118	0.132
High income earner	0.390***	0.126	0.221*	0.114	0.125	0.136
Home owner	0.345**	0.166	0.115	0.145	-0.693***	0.178
Self-employed	-0.430**	0.202	-0.061	0.180	0.269	0.209
Retired	0.816***	0.192	-0.273	0.181	-0.193	0.214
Unemployed	0.056	0.251	-0.399	0.250	-0.143	0.317
Homemaker, disabled, etc.	-0.102	0.191	0.127	0.170	0.078	0.215
Value work more than money	-0.198***	0.029	0.128***	0.027	0.293***	0.033
Constant	7.486***	0.516	6.008***	0.470	4.069***	0.549
Observations	1701					
R-squared	0.112		0.038		0.099	
F test of model significance	11.655***		3.777***		10.540***	

Notes: 1. All the treatment variables are dummy variables to indicate respective regimes of the retirement income, retirement age, and wage rate in partial retirement. 2. ***, **, * indicate statistical significance at the 0.01, 0.05, 0.10 levels, respectively. 3. Standard errors are robust to heteroskedasticity. 4. Base group for current employment status is respondents working for an employer.

Table 6: Fraction 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
65	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***
65	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	5.4		0.70/0.80/0.90	24.7	5.1***
63	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
63	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
61	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
61	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: 1. FR and PR denotes full and partial retirement, respectively. L, M and H respectively refer to low, middle and high regimes. 2. 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. 3. 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. 4. Totals of choices may not add due to rounding error. 5. ***, **, * indicate statistical significance at the 0.01, 0.05, 0.10 levels, respectively, 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 0.01 level in all of the 18 cases associated with the substitution and income effect regimes in the table.

Table 7: Multinomial probit model explaining the probability of choosing a retirement scenario in the NL

	Early abrupt retirement		Partial retirement		Late abrupt retirement	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Treatment effects						
Substitution effect low	-0.015	0.018	-0.013	0.020	0.028	0.018
Substitution effect high	-0.013	0.018	0.030	0.020	-0.017	0.018
Income effect low	-0.013	0.018	0.004	0.019	0.009	0.018
Income effect high	-0.030*	0.018	0.012	0.020	0.018	0.018
Retirement age 61	0.025	0.018	-0.066***	0.019	0.041**	0.018
Retirement age 65	0.026	0.018	-0.051***	0.019	0.025	0.018
Wage rate low	-0.012	0.015	0.018	0.016	-0.006	0.015
Background characteristics						
Age	0.001	0.001	-0.003***	0.001	0.003**	0.001
Male	0.016	0.016	-0.050***	0.017	0.034**	0.016
Married or living with a partner	0.001	0.021	-0.012	0.023	0.012	0.021
Household size	0.000	0.009	-0.001	0.010	0.001	0.009
Highly educated	-0.022	0.017	0.053***	0.018	-0.031*	0.017
High income earner	0.012	0.032	0.013	0.034	-0.026	0.031
Home owner	-0.009	0.018	0.034*	0.019	-0.025	0.018
Self-employed	0.032	0.034	0.003	0.036	-0.035	0.032
Retired	0.018	0.026	0.021	0.028	-0.039	0.025
Unemployed	-0.035	0.037	0.070*	0.043	-0.035	0.037
Homemaker, disabled, etc.	-0.002	0.023	-0.005	0.025	0.007	0.023
Value work more than money	-0.009*	0.005	0.015***	0.005	-0.006	0.005
Observations	3771					
Log-likelihood	-4026.166					
Count R-squared	0.433					
Wald test of model significance	88.200***					

Notes: 1. All the treatment variables are dummy variables to indicate respective regimes of the retirement income, retirement age, and wage rate in partial retirement. 2. Coefficients represent average marginal effects. 3. ***, **, * indicate statistical significance at the 0.01, 0.05, 0.10 levels, respectively. 4. Standard errors are robust to heteroskedasticity.

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

	Early abrupt retirement		Partial retirement		Late abrupt retirement	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Treatment effects						
Substitution effect low	0.098	0.092	0.074	0.081	0.211**	0.092
Substitution effect high	-0.127	0.093	0.174**	0.081	-0.013	0.093
Income effect low	-0.140	0.093	-0.135*	0.080	-0.010	0.092
Income effect high	-0.063	0.093	0.066	0.082	0.197**	0.095
Retirement age 61	0.118	0.092	-0.131	0.080	0.117	0.092
Retirement age 65	-0.039	0.093	-0.283***	0.083	-0.093	0.094
Wage rate low	-0.017	0.076	0.096	0.066	-0.042	0.076
Background characteristics						
Age	-0.001	0.005	-0.005	0.005	0.010*	0.005
Male	-0.064	0.082	-0.201***	0.071	-0.014	0.082
Married or living with partner	-0.039	0.108	0.033	0.095	0.081	0.109
Household size	0.101**	0.045	0.013	0.039	0.066	0.045
Highly educated	-0.071	0.087	0.281***	0.074	0.039	0.087
High income earner	0.237	0.167	0.127	0.138	0.050	0.169
Home owner	-0.053	0.090	0.203**	0.082	-0.167*	0.092
Self-employed	0.272	0.176	-0.150	0.144	0.026	0.163
Retired	0.446***	0.136	0.005	0.118	-0.112	0.135
Unemployed	0.085	0.187	0.180	0.162	0.094	0.200
Homemaker, disabled, etc.	0.278**	0.118	-0.118	0.108	0.055	0.120
Value work more than money	0.045*	0.025	0.129***	0.023	0.050*	0.026
Constant	5.012***	0.357	5.901***	0.320	4.452***	0.358
Observations	3771					
R-squared	0.011		0.031		0.009	
F test of model significance	2.130***		6.611***		1.807***	

Notes: 1. All the treatment variables are dummy variables to indicate respective regimes of the retirement income, retirement age, and wage rate in partial retirement. 2. ***, **, * indicate statistical significance at the 0.01, 0.05, 0.10 levels, respectively. 3. Standard errors are robust to heteroskedasticity.

Table 9: Most common self-reported retirement sequences in the US (%)

Rank	Sequence	Type	Frequency	Cumulative	Rank	Sequence	Type	Frequency	Cumulative
1	11113333	A	5.43	5.43	26	22233333	O	1.28	76.73
2	11111223	P	5.02	10.46	27	11112222	O	1.18	77.91
3	11112233	P	4.97	15.43	28	11123333	P	1.18	79.09
4	11111122	O	4.72	20.14	29	11122223	P	1.13	80.22
5	11111111	O	4.46	24.60	30	11223333	P	1.13	81.34
6	11111333	A	4.46	29.06	31	11222233	P	0.87	82.21
7	11122333	P	4.41	33.47	32	12233333	P	0.82	83.03
8	11111133	A	4.10	37.57	33	22222223	O	0.77	83.80
9	11111112	O	3.54	41.11	34	22333333	O	0.77	84.57
10	33333333	O	3.43	44.54	35	22222233	O	0.67	85.24
11	11111123	P	3.33	47.87	36	12223333	P	0.56	85.80
12	11111233	P	2.82	50.69	37	11222223	P	0.46	86.26
13	11122233	P	2.72	53.41	38	11233333	P	0.46	86.72
14	11111222	O	2.67	56.07	39	12222333	P	0.46	87.19
15	44444444	O	2.51	58.59	40	23333333	O	0.46	87.65
16	11133333	A	2.41	60.99	41	11122222	O	0.41	88.06
17	11112333	P	2.10	63.10	42	12222233	P	0.36	88.42
18	11111113	A	2.00	65.09	43	44444333	O	0.36	88.77
19	22222222	O	1.85	66.94	44	11111322	O	0.21	88.98
20	11112223	P	1.59	68.53	45	11114444	O	0.21	89.19
21	13333333	A	1.49	70.02	46	11444444	O	0.21	89.39
22	22223333	O	1.44	71.45	47	12222222	O	0.21	89.60
23	11222333	P	1.33	72.78	48	12222223	P	0.21	89.80
24	11333333	A	1.33	74.12	49	14443333	O	0.21	90.01
25	22222333	O	1.33	75.45					

Notes: 1. 1: Full-time work, 2: Part-time work, 3: Retired; 4: Other. 2. A: Retirement sequences where full-time work is followed immediately by abrupt full retirement. P: Retirement sequences where full-time work is followed by part-time work, and subsequently by full retirement. O: Retirement sequences of other types than of type A or P. 3. Retirement sequences are ranked according to the percentage of respondents who reported the sequence. 4. Observations are based on 1951 self-reports. 5. The eight elements of a given sequence refer to the self-reported work status at eight age categories given by 55-56, 57-58, 59-60, 61-62, 63-64, 65-66, 67-68, and 69 plus.

Table 10: Multinomial probit model explaining the probability of being retired, part-time worker, or full-time worker in the US baed on the HRS

	Retirement		Part-time work		Full-time work	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Retirement eligibility						
Bet. early and normal ret. age	0.041***	0.007	0.036***	0.007	-0.077***	0.007
Bet. normal ret. age and age 70	0.053***	0.011	0.063***	0.012	-0.116***	0.012
Over age 70	0.045**	0.019	0.051**	0.021	-0.096***	0.022
Bet. early and nor. ret. age (P)	0.033***	0.005	-0.013**	0.005	-0.021***	0.005
Bet. nor. ret. age and age 70 (P)	0.045***	0.006	-0.022***	0.005	-0.024***	0.006
Over age 70 (P)	0.087***	0.007	-0.048***	0.006	-0.039***	0.007
Background characteristics						
Age	0.106***	0.010	-0.071***	0.009	-0.035***	0.011
Age squared	-0.001***	0.000	0.001***	0.000	0.000	0.000
Male	0.015***	0.004	-0.088***	0.004	0.073***	0.004
Household size	-0.014***	0.002	-0.000	0.002	0.014***	0.002
Highly educated	-0.037***	0.004	0.046***	0.003	-0.008**	0.004
High income earner	-0.271***	0.006	-0.067***	0.005	0.338***	0.006
Home owner	0.019***	0.006	0.013**	0.006	-0.031***	0.006
Observations	49912					
Log-likelihood	-38310.947					
Count R-squared	0.692					
Wald test of model significance	16083.780***					

Notes: 1. The retirement eligibility ages are dummy variables that indicate if the respondent has reached the age for early or normal retirement benefits. 2. P: Married or unmarried partner. 3. Coefficients represent average marginal effects. 4. ***, **, * indicate statistical significance at the 0.01, 0.05, 0.10 levels, respectively. 5. Standard errors are robust to heteroskedasticity.