USC Dornsife Center for Economic and Social Research

USC Schaeffer Leonard D. Schaeffer Center for Health Policy & Economics

Stated Preference Analysis of Full and Partial Retirement in the United States

Tunga Kantarci, Arthur van Soest

Paper No: 2013-011

CESR-SCHAEFFER WORKING PAPER SERIES

cesr.usc.edu **healthpolicy.usc.edu**

Stated Preference Analysis of Full and Partial Retirement in the United States[☆]

Tunga Kantarcı

Netspar & Tilburg University, Dept. of Econometrics, PO Box 90153, 5000 LE Tilburg, Netherlands

Arthur van Soest

Netspar & Tilburg University, Dept. of Econometrics, PO Box 90153, 5000 LE Tilburg, Netherlands

Abstract

In the traditional retirement scenario, individuals work full-time until a given age and then stop working abruptly. In the alternative partial retirement scenario, individuals work part-time for several years before they stop working. For the individual, partial retirement provides a smooth transition to full-retirement where they gradually adjust to a possibly lower income and more leisure time in full-retirement, and for the economy, it is a potential policy tool to keep people employed longer. The models developed to explain the retirement decisions of older workers are typically estimated using data on actual retirement behavior, from which it is difficult to identify the retirement options available to employees. In particular, employers often do not provide partial retirement opportunities. In this paper, we use stated preference data to identify the preferences of individuals for full and partial retirement plans. We consider a choice set of hypothetical full and partial retirement plans and ask the respondents of a survey representative for the US population of ages 40 and over to choose their favorite plan. We analyze how the choices vary with financial incentives and other factors.

Keywords: Older workers, gradual retirement, field experiment
JEL classification: C35, C93, D04, D91, J14, J22, J26

1. Introduction

In the traditional retirement scenario, individuals work full-time until a given age and then stop working abruptly, also referred to as "cliff-edge" retirement. Several studies suggest that for many employees this retirement pattern is a result of labor market rigidities that limit the opportunities of employees to reduce their hours in a gradual manner before they leave the labor market (Quinn, 1981; Hurd, 1996; Mayer and Müller, 1986). For example, quasi-fixed employment costs discourage employers to permit part-time work (Hurd, 1996). In jobs where members of a team need to interact in the same place at the same time, part-time employment will be difficult (Latulippe and Turner, 2000; Hutchens, 2010). Employers may favor younger workers over older workers, due to age discrimination or for some other reason, and not offer partial retirement. In the United States, the social security regulation requires that the retirement benefits are reduced for people who are below the retirement age and have earnings above an exempt amount, discouraging employees to work reduced hours and draw pension benefits at the same time.

In a partial retirement scenario, as an alternative to an 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 programs may be expected to become more common in the future, perhaps also after age 65, 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 first three waves (1992-1996) of the Health and Retirement Study (HRS), Graig and Paganelli (2000) find that three out of four older workers prefer to reduce their work hours gradually rather than retire abruptly. Siegenthaler and Brenner (2000) report similar figures from other US surveys. 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. Third, working part-time during the otherwise full retirement years may help to limit the

[☆]This study is supported by the National Institute on Aging (NIA) under Grant Number R01AG030824 and by the Netherlands Organization for Scientific Research (NWO) under Grant Number 400-04-088. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of NIA and NWO.

Email addresses: kantarci@uvt.nl (Tunga Kantarcı), avas@uvt.nl (Arthur van Soest)

[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.

loss of cognitive skills (Rohwedder and Willis, 2010; Bonsang et al., 2012). For the employer, partial retirement provides an opportunity to retain people with precious skills that are difficult to replace (Laczko, 1988; Olmsted and Smith, 1994; Latulippe and Turner, 2000; Ghent et al., 2001; Munzenmaier and Paciero, 2002). For the macro-economy, 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-time retirement.

The economic literature explains the labor supply behavior 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 maximizing expected utility over the life cycle (Lazear, 1987; Hurd, 1990; Lumsdaine and Mitchell, 1999). The models developed to explain the retirement decisions of older workers are typically estimated using data on actual retirement decisions (Stock and Wise, 1990; Rust and Phelan, 1997). From such data, however, it is difficult to identify the retirement options available to employees because features of the options that are not chosen are typically not completely observed, or because it is not even clear which options could have been chosen. 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. For example, Hutchens (2010) indicates that partial retirement arrangements are often informal agreements negotiated between an employee and employer. A comparison of the stated and revealed preferences for partial retirement plans suggests that many workers are interested but have limited or no access to partial retirement. US surveys find that 38% to 60% of the respondents have an interest to participate in partial retirement (Brown, 2005; Roper Starch Worldwide, 2004; Watson Wyatt Worldwide, 2004). On the other hand, studies based on the HRS find that only 15% to 25% participate in partial retirement or some form of it (Gustman and Steinmeier, 2000; Scott, 2004; Cahill et al., 2006).

To avoid these problems, our analysis is based upon stated preference data. As stated by Louviere et al. (2000), stated preference data can capture a wider and broader array of preference-driven behaviors than data on actual behavior, 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 analyze 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 an Internet panel survey representative for the adult US population 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 analyzed in this study. Each retirement plan has its own earnings and pension income trajectory. Respondents make leisure versus income trade-offs to choose their favorite plan and also indicate how attractive they find each plan.

These data are ultimately intended to be used in a structural life-cycle model, in which life time utility is a discounted sum of within period utilities driven by consumption expenditures and leisure. On the basis of such a model, it will also be possible to forecast choices among scenarios that are not asked in the stated preference questions, with, for example, different part-time factors or longer or shorter periods of part-time work. The current paper, however, is a more modest first step: it aims at describing part of the stated preferences experiment and the data, and uses some standard models to analyze how the choices between scenarios vary with scenario characteristics. We analyze the plan choices in a multinomial logit model where choices depend on economic variables, such as replacement rates, job characteristics, and job satisfaction, but also on personal characteristics like health and household size.

This paper proceeds as follows. Section 2 describes the experimental design. Section 3 presents descriptive statistics on the stated preferences for full and partial retirement plans. Section 4 describes the econometric model. Section 5 presents the results. Section 6 discusses some policy implications.

2. Data and experimental design

We fielded our survey in 2010 in the American Life Panel, an Internet panel of respondents 18 and over maintained by the RAND Cooperation. Selected respondents are representative of the total population, but the sample is relatively highly educated due to the high nonresponse rate of the less educated respondents. Respondents either use their own computer to log on to the Internet or they were provided a small laptop or a Web TV, which allows them to access the Internet and participate in the surveys. Respondents are interviewed twice a month and are paid an incentive of about $20 per thirty minutes of interviewing. We restricted our sample to the respondents ages 40 and older which generated 2028 responses. 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. We also asked questions on the factors that could limit respondents to participate in partial retirement. These questions are out of the scope of this paper and are analyzed in a separate paper. Details on the survey questions can be found at

https://sites.google.com/site/tungakantarci/home/research.

Figures 1 through 4 in the Appendix show the questions on preferences for retirement scenarios as they appeared on the screens of the respondents. The questions aim to elicit preferences on several aspects of partial retirement, including duration and starting age of partial retirement, and whether partial retirement involved changing jobs or not. In this paper we analyze only the question presented in Figure 1. 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 favorite 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 we present is characterized by four attributes: age of retirement, number of hours worked, work income, and retirement 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 retirement 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,footnoteThis 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). which is asked in an earlier categorical question on their last monthly income from work. The retirement 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, retirement 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 the Netherlands computed by Kantarcı et al. (2011), since, due to the defined contribution nature of most US occupational pensions, such calculations cannot be done for the US. To account for the fact that net replacement rates in the Netherlands are higher than in the US (OECD, 2009), we scaled down the net replacement rates calculated in the Netherlands so that the average US level is obtained.[3]. In our 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.

We randomized the following three attributes of the vignette scenarios: the retirement age, the retirement income, and the wage rate during partial retirement.[4]

For the retirement age, we randomly assign one of three regimes, denoted as 65, 63, and 61. Each regime defines particular ages of partial and full 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 (abrupt) scenario the full retirement age is 70, and in the third (gradual retirement) scenario the partial retirement age is 65 and the full retirement age is 70. Randomization in the retirement age aims to create variation in the scenario choices with respect to the timing of retirement.[5]

For the second attribute, retirement income (or replacement rate), we randomly assign one of nine regimes, where each regime is characterized 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, we expect that higher replacement rates lead to less labor supply and therefore to earlier full retirement, or partial retirement instead of late abrupt retirement. We refer to this randomized regime allocation as the "income effect" regime. 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

[2]Chen et al. (2006) showed that the average full-time worker in the US in 2002 worked on average about 45 hours a week and the average partial retiree worked about 27 hours a week.

[3]For example, in the case of abrupt retirement at age 65, we reduce the net replacement rate 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)

[4]Moreover, we randomized the order in which the scenarios were presented.

[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 our questions, but, exploiting the variation in retirement ages, such a comparison could be made with a structural model estimated using these data.

net present value of total retirement 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 (negative accruals).

Table 2 presents the replacement rates for the nine regimes, the combinations of the three income and the three substitution effect regimes. The first, second and third row always indicates a low, middle or high substitution, and the first, second and third column correspond to the low, middle, or high income. For example, the group low (accruals)/low (income) with retirement age regime 65 has replacement rates 60% for early retirement, 90% for late retirement, and (as of age 70) 75% for partial retirement. For the group high (accruals)/low (income), the replacement rates are 60%, 110% and 85%, 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). We therefore expect that this group substitutes expensive leisure for relatively cheap consumption and in analogy to the labor supply literature, we refer to the difference between choices in the first row and the third row as the (uncompensated) substitution effect.[6] On the other hand, if we compare the replacement rates for the group low/low with those of the group low/high (first row, last column: 80%, 110%, 95%), 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, we refer to the difference between the choices of low/high and low/low group as an income effect.[7]

The levels of the replacement rates associated with a particular retirement 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).

For the third attribute, wage rate in partial retirement, we define two regimes. 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; Ruhm, 1990; Latulippe and Turner, 2000). We aim to investigate how respondents evaluate partial retirement when it is associated with a reduced wage rate or not. 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 job with a wage rate that is 10 percent lower than the wage rate at the old job (*partial retirement*, in the narrow definition; see Section 1).

[6] The substitution effect can be compared to the *price effect* of pension benefits in, e.g., Euwals et al. (2010).

[7] The income effect can be compared to the *wealth effect* of pension benefits in, e.g., Euwals et al. (2010).

3. Descriptive results

Respondents were first asked to choose among three scenarios of early abrupt retirement, late abrupt retirement and partial retirement, and were then asked to rate each scenario on a 10 point scale. Overall, merging all regimes, 21.7% chose the early abrupt retirement scenario, 37.1% the late abrupt retirement scenario, and 41.3% the partial retirement scenario. The figure for partial retirement compares to results in other US surveys, indicating that between 38% and 60% have an interest to participate in partial retirement (Brown, 2005; Roper Starch Worldwide, 2004; Watson Wyatt Worldwide, 2004). The retirement scenarios are respectively rated 5.1, 5.8 and 6.3 on average (with statistically significant differences). To check if respondents consistently tend to rate the retirement scenario they chose in the first question higher than the other two retirement scenarios, we calculate the average ratings given to each scenario conditional on choice. We find average ratings for early abrupt retirement, late abrupt retirement, and partial retirement of 7.7, 3.8, and 5.0 for those who choose early abrupt retirement; 3.9, 7.9, 5.5 for those who choose late abrupt retirement; and 4.7, 4.9, and 7.8 for those who choose partial 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 15 shows the percentage of respondents who choose a particular retirement scenario and the average of the ratings for the regimes defined by retirement age and retirement income (see Table 2). In the left hand panel, we merge across the columns with the three income levels (low/middle/high) so that the differences reflect substitution effects. The columns "choice" and "rating" show the percentage of respondents who choose the particular retirement scenario and the average rating given to each scenario. As the incentives to work beyond age 65 increases, more people prefer partial retirement to early retirement, while about the same number of people choose the late retirement scenario. At earlier retirement ages, more people prefer late retirement to early retirement, while fewer people choose the partial retirement scenario. 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, we merge across substitution levels low/middle/high so that differences reflect income effects. The last two columns show the choice percentages and average ratings. As the general level of retirement income increases, more people favor the early retirement scenario and fewer people choose late retirement. This is in line with the expected negative income effect (confirming that leisure is a normal good). The effect on the fraction choosing partial retirement is ambiguous. The average ratings are in line with these results.

The randomization of the wage rate in partial retirement reveals the following result (not presented in the table). The percentages of the people who choose early abrupt retirement,

late abrupt retirement and partial retirement are, respectively, 21.5%, 34.9%, and 43.6% when partial retirement does not involve a 10 percent reduction in the wage rate; they are 21.9%, 39.1%, and 39.0% when partial retirement involves a reduction in the wage rate. This shows that a job change in partial retirement, accompanied by a decrease in the wage rate, deters 12% of the respondents who otherwise would have participated in partial retirement so that they instead prefer to continue to work full time without changing jobs. The average ratings for the three retirement scenarios are, respectively, 5.0, 5.7, and 6.4, when partial retirement does not involve a reduction in the wage rate, and 5.1, 5.8, and 6.3 when partial retirement involves a reduction in hourly wage. The null hypothesis of equality of the average ratings across the two groups is not rejected at a 0.10 significance level in the cases of early or late abrupt retirement, as expected since these scenarios are the same in the two cases (the wage reduction only applies during partial retirement). On the other hand, the null is rejected at a 0.10 significance level for the partial retirement rating.

4. Empirical approach

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

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

$z_i^{'}$ is a vector of seven treatment variables (the scenario characteristics). In particular, it has dummies for the low and high substitution effect and income effect regimes (the middle 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 respondent's individual characteristics and variables related to the work and social life of the respondent. u_{is} is a random utility term.

We assume that the respondent chooses the scenario with the highest utility U_{is}. Under the assumption that the random terms u_{is} are independently and identically type-I extreme value distributed, this leads to the standard multinomial logit model (Cameron and Trivedi, 2005; Winkelman and Boes, 2006). Since we only analyze one choice (among three vignettes) of each respondent, the unit of observation in this model is the respondent; we do not have multiple observations per respondent. The model is estimated with maximum likelihood.

Note that the z_i in equation (1) are *individual specific* but not alternative specific; γ_s measures the effect of a change in one of the randomized 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. We normalize γ_s (and β_s) to zero for one of the scenarios s (the benchmark). Our modeling approach therefore has the advantage that the other γ_s immediately give the effect of a treatment variable upon the utility of scenario s relative to the benchmark scenario. 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 randomized into this regime pay a higher price for retiring earlier. We therefore expect them to choose late abrupt retirement more often, but also to choose partial retirement (starting at the early retirement age) over early retirement more often than in the benchmark case with actuarially fair rewards. If early retirement is chosen as the base regime (γ_{ER}=0), 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, and that the parameter in γ_{LR} is larger than that in γ_{PR}. 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). We analyze the ratings given to each scenario using a standard linear regression model estimated by ordinary least squares. We then analyze how the effects of the covariates on the ratings given to a retirement scenario compare to effects of those covariates on the probability of choosing that retirement scenario.

5. Estimation results

Table 17 presents the estimation results of the multinomial logit model, explaining the probability of choosing a particular scenario compared to the benchmark scenario. We present the estimations using two different benchmarks: early (abrupt) retirement and late (abrupt) retirement. For the latter benchmark, we only present the coefficient estimates for the alternative of partial retirement, because early retirement is already compared to late retirement using the first benchmark (left hand side of the table).

Model fit. There is no universally accepted goodness of fit measure for discrete choice models (Kennedy, 2009). We consider the McFadden R-squared as an indicator of model fit, comparing the log likelihood value of an unrestricted model with that of an intercept only model. Values of 0.2 to 0.4 indicate an excellent fit (McFadden, 1979). Our model leads to a R-squared value of only 0.039. As an informal indicator of goodness of fit, we compare the fraction of choices in Table 15 with the fraction of choices predicted by the multinomial logit model presented in Table 4. The comparison shows that the observed raw choices are reasonably close to the predicted choices. The comparison of observed scenario ratings with the ratings predicted by the linear regression model leads to a similar conclusion.

Model significance. The likelihood ratio statistic shows that the regressors are jointly significant at the 0.01 level.

The independence of irrelevant alternatives (IIA) property. The multinomial logit model is based on the IIA assumption

which implies that the odds of comparing two alternatives is independent of the third alternative. If the assumption is violated, the multinomial logit model is misspecified. We employ the Hausman-McFadden test of the IIA assumption (Hausman and McFadden, 1984), comparing the estimates of a model where all alternatives are considered with those of a model where the third alternative (considered as irrelevant) is excluded. If the excluded alternative is indeed irrelevant to the comparison of the other two alternatives, the coefficient estimates from the two models should not be statistically different from each other. According to the p-values in Table 17, we do not reject this null hypothesis, suggesting that the IIA assumption is not violated.[8]

Since it is difficult to give a direct interpretation to the coefficient estimates in a multinomial logit model, Table 6 presents the average marginal effects of the regressors on the probability of choosing a particular retirement scenario, based on the estimates in Table 17. Note that the marginal effects for the three scenarios add up to zero by construction.

5.1. Results on treatment variables

Substitution effect. Table 17 shows the effects of low and high rewards for late retirement (and delayed claiming) compared to the reference of actuarially fair rewards. The signs of the effects are plausible: Respondents are less likely to choose late retirement in the case of a low reward for later retirement. The negative effect of a less than fair reward on the probability to choose late retirement is the largest one and the only significant one, suggesting that individuals are more responsive to a less than fair increase than to a more than fair increase. Table 6 quantifies the effect as follows. The probability of delaying full retirement by five years decreases on average by 5.3 percentage points when the actuarial increase in pension benefits due to delaying retirement is 10 percentage points lower than if it was actuarially fair. This finding is in line with the existing literature which shows that individuals are responsive to incentives for retiring later (Burbidge and Robb, 1980; Fields and Mitchell, 1984; Euwals et al., 2010). Table 17 shows there is no significant effect of higher or lower rewards on partial retirement.

The substitution effect may depend on the retirement age, since the increase in the replacement rate for delaying retirement is smaller for earlier retirement ages (see Table 2). We therefore also allowed the two dummy variables that indicate the low and high rewards to interact with three dummy variables indicating the three regimes of the retirement age (65, 63, 61). The results are presented in Table 7, presenting a specification in which the retirement age treatment is interacted with all three other treatments. This specification marginally outperforms the specification without interactions in Table 17 according to a likelihood ratio test (the LR test statistic is 22.36; the p-value is 0.0134).We find a statistically significant effect for the high regime of the substitution effect in the earliest retirement age regime, even though the actuarial increase for delaying retirement is lowest in this case. This result suggests that at the early retirement age individuals are more responsive to pension incentives to retire later. It implies that financial incentives for later retirement could be effective if they target those individuals who would tend to retire early (before the statutory retirement age of 65).

Income effect. The signs of the income effects are plausible. Respondents are more likely to choose late or partial retirement over early retirement when replacement rates are lower. Table 6 shows significant marginal effects for early retirement and late retirement. For example, the probability of delaying full retirement by five years decreases by 6.7 percentage points when the replacement rates are 10 percentage points higher compared to the reference replacement rates. We do not find a significant marginal change for partial retirement. Overall, the results show that when pension income is higher at any retirement age individuals tend to retire earlier or reduce their number of hours worked. This suggests that when individuals achieve a level of pension income that they consider sufficient, they do not want to work longer. The finding is in line with Fields and Mitchell (1984) who showed that an increase in the worker's pension income available for retirement at age 60 induced earlier retirement in the US. This study, however, analyzed the income effect on the binary decision of working versus full retirement. Our results show that the income effect not only exists at the extensive margin, but also influences the number of hours worked at the intensive margin: some respondents prefer partial retirement over early abrupt retirement when pension accruals are less generous, or they prefer partial retirement over late abrupt retirement when pension accruals are more generous. This result suggests that some individuals would use partial retirement to adjust their pension income in a flexible manner when there is a change in the generosity of pension levels.

The income effect might depend on the retirement age. We therefore allow the two dummy variables that indicate the low and high regimes of the income effect to interact with three dummy variables for the three regimes of the retirement age in Table 7. We find a significant income effect between late and early retirement at the earlier retirement ages, suggesting that the income effect is larger at earlier ages, in line with the results in Table 15.

Retirement age effect. We find significant retirement age effects for all pairs of retirement scenarios. Table 17 shows that respondents are more likely to choose late retirement over partial retirement or early retirement, or partial retirement over early retirement in the retirement age regime 61 compared to age regime 63. Table 6 shows significant marginal changes for the probabilities of early and late retirement but not for partial retirement (due to offsetting effects). An explanation for these results is that respondents consider the level of pension income at the younger retirement ages insufficient and prefer to remain employed part-time or full-time to accrue additional pension rights. Another reason might be that respondents want to work at least until the traditional retirement ages because of a social norm or because at younger ages the disutility of working is

[8] We take this result as indicative rather than conclusive because it is shown that the Hausman-McFadden test shows substantial size distortion in Monte Carlo simulations (Cheng and Long, 2007).

small, for example because of (expected) health. Some respondents choose partial retirement when they do not want to retire full-time at the earlier retirement age and do not want to work full-time until the later retirement age. They might also have chosen abrupt retirement at age 62 or 63 if that option would have been available. With our current reduced form analysis we cannot say whether they would prefer this to partial retirement or not; this would require a model imposing more structure.

Wage rate effect. Table 17 shows the effect of a reduced wage rate accompanied by a job change in partial retirement. We find that respondents are less likely to choose partial retirement if the wage rate is reduced and the employee is required to change jobs. Table 6 shows that a 10 percent decrease in the wage rate reduces the probability of choosing partial retirement by 4.3 percentage points. The probability of late retirement increases by 3.8 percentage points. This shows that a reduced wage rate and a job change in partial retirement discourage many individuals to participate in partial retirement so much that they prefer to remain employed full-time. This result is important because a stylized 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 (Honig and Hanoch, 1985; Gustman and Steinmeier, 1983, 1984b, 1986; Ruhm, 1990; Quinn and Burkhauser, 1993; Johnson and Neumark, 1996; Siegenthaler and Brenner, 2000; Hutchens, 2010).

The effect of a reduction in hourly wage in partial retirement might depend on the retirement age. The model with interactions in Table 7 shows that respondents favor late abrupt retirement to partial retirement particularly at the older retirement ages when partial retirement involves a reduced wage rate and job change. This result is striking given the fact that the average respondent prefers to retire early when given the later retirement age scenarios.

5.2. Results on background characteristics

The lower panel of Table 17 shows the effects of socioeconomic and other background variables. We find significant effects with intuitively plausible signs for all variables:

Age: Older respondents more often prefer late abrupt retirement over partial retirement or early abrupt retirement. A reason might be that older respondents want to remain employed to keep their work-related social network or remain physically and mentally active.

Gender: Male respondents are more likely to choose early or late abrupt retirement over partial 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.

Marital status: Married individuals are more likely to choose early or partial retirement over late retirement. It might be that the work or pension income of the spouse is sufficient for the household so that the respondent has less of an incentive to work full-time. The preference for partial retirement over late retirement might also reflect that partial retirement gives married individuals the opportunity to combine work and family responsibilities.

Household size: Respondents living in households with more members favor late retirement over early or partial retirement, perhaps due to the simple economic reason that a larger household requires a higher income to maintain a given standard of living.

Education: Respondents with more education more often prefer partial retirement over early retirement. It might be that those with more education are more ambitious or more attached to their work and therefore more likely to remain employed; they might prefer to remain employed part-time because the type of work they do is suitable for part-time work.

Income: Respondents with higher (former) earnings are less likely to choose late abrupt retirement perhaps because their income is satisfactory. This income effect corresponds to our previous finding that respondents who are randomized into a higher retirement income in the retirement scenarios are less likely to choose late retirement.

Health: Those with a health impairment – defined as a health problem that is experienced in the last six months and limits the activities that people usually do – more often prefer early retirement or partial retirement to late retirement, suggesting that partial retirement provides those with a health impairment the opportunity to remain employed.

Current work status: Among the survey respondents, those who are currently working for an employer or self-employed are more likely to choose the scenarios with longer years of employment. This might suggest that once individuals leave the labor market, they seem to have no incentive to return to work.

Time allocation: We obtain the plausible result that respondents who spend more hours on household and leisure activities favor early retirement. Various reasons could explain this. Some individuals might allocate their time towards household activities where they are more productive. Others may value retirement more if their spouse is retired (Gustman and Steinmeier, 2000).

5.3. Results on other covariates

Table 8 presents a model with additional control variables on job characteristics, job satisfaction, and several aspects of life. Wordings of the questions that define these variables are given in the Appendix.

Job characteristics: Job characteristics do not seem to be particularly important. The only significant result is that respondents whose job requires intense concentration prefer late or early abrupt retirement over partial retirement, perhaps because the nature of their job requires full-time presence. A similar lower preference for partial retirement is found for jobs that require frequent communication with coworkers, but this is only marginally significant.

Job satisfaction: (Former) workers who are satisfied with their relationships with their supervisor and colleagues favor late over early abrupt retirement. This suggests that job satisfaction in terms of the relations with coworkers encourages individuals to remain employed. Respondents who are satisfied with their pay are more likely to choose early retirement

or partial retirement over late retirement. This is in line with our previous finding that high income earners are less likely to remain employed. In fact, the income variable itself becomes insignificant if satisfaction with pay is added to the model. We asked the 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 this statement significantly increase the odds of remaining employed in a full-time or part-time job. This suggests that individuals who are attached to labor market for non-economic reasons are significantly more likely to remain in the labor market. While our findings on 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. Other variables on job satisfaction are insignificant.

Life satisfaction: Respondents who are satisfied with their social life – activities other than the household and paid work activities in the past ten years – choose partial retirement over early or late abrupt retirement. It might be the case that those who already work part-time and divide their time between work and non-work activities often have an active and satisfactory social life. The result might otherwise suggest that those individuals who were satisfied with their social activities in the past favor partial retirement perhaps because it provides them the opportunity to combine work and non-work activities. The result suggests that by allowing individuals to combine work and non-work activities, partial retirement improves the satisfaction people derive from social activities.

5.4. Ratings

Our stated preference question on competing retirement scenarios first asked the survey respondents to choose among three alternative retirement scenarios and then to rate each scenario on a 10 point scale. In Section 3, we have shown that respondents consistently tend to rate the retirement scenario they choose higher than the other two scenarios they do not choose. We interpreted this result as an indication that survey respondents carefully evaluated the retirement scenarios presented to them. Here we check if the survey respondents are also consistent across their choices and ratings with respect to their treatments and background characteristics. That is, we check if the effects of the control variables on the choice probabilities are in line with the effects of those variables on the ratings of the retirement scenarios in a multivariate analysis. We estimate a linear regression model with ordinary least squares, explaining the ratings given to each of the three retirement scenarios. The results are presented in Table 9. When we compare the effects on the choice probabilities in Table 17 with the effects on the ratings in Table 9, we find that they are largely in line with each other. For example, when the wage rate in partial retirement is reduced, respondents become less likely to choose partial retirement over late retirement (Table 17), and also give significantly lower ratings to the partial retirement scenario (Table 9).

6. Conclusion

We have taken a stated preference approach to study preferences for (hypothetical) abrupt and partial retirement scenarios, circumventing the problem that actual retirement choices may be based upon restricted choice. We carried out a randomized experiment where we gave survey respondents retirement scenarios with randomized pension incomes, retirement ages, and wage rates during partial retirement. We asked them to choose between several scenarios and to rate each individual scenario on a ten point scale. We find that 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), affect retirement behavior. The income effect is larger than the substitution effect. The income effect is shown to affect not only the retirement age but also the number of hours worked. Our findings suggest scope for policy interventions to place particular emphasis on partial retirement plans which provide flexible solutions to employees optimizing their retirement paths.

We find plausible signs for a rich set of control variables affecting retirement scenario choice. From a methodological point of view, this suggests that with carefully designed stated preference questions it is possible to measure the true preferences of individuals for different kinds of retirement plans.

We analyzed partial retirement behavior in stated preference data but, of course, 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 intend to do what they would like to do. For partial retirement in particular, Siegenthaler and Brenner (2000) argue that analysis of longitudinal data suggests that 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.

Acknowledgments

We thank Hank Becker, Johannes Binswanger, Katherine Carman, Tim Colvin, Maria Conlon, Tania Gutsche, Kene Henkens, Adriaan Kalwij, Pierre-Carl Michaud, Arie Kapteyn, Martin Salm, Doug Smith, Thad Smith and Frederic Vermeulen for their useful comments and assistance.

References

Bonsang, E., Adam, S., Perelman, S., 2012. Does retirement affect cognitive functioning? Journal of Health Economics, Forthcoming.

Brown, S. K., 2005. Attitudes of individuals 50 and older toward phased retirement Washington, D.C.: AARP Knowledge Management, Retrieved April 3, 2012, from http://assets.aarp.org/rgcenter/post-import/phased_ret.pdf.
Burbidge, J. B., Robb, A. L., 1980. Pensions and retirement behaviour. The Canadian Journal of Economics 13 (3), 421–437.
Cahill, K. E., Giandrea, M. D., Quinn, J. F., 2006. Retirement patterns from career employment. The Gerontologist 46 (4), 514–523.
Cameron, A. C., Trivedi, P. K., 2005. Microeconometrics: Methods and Applications. Cambridge University Press, New York.
Chen, J., Chen, Y.-P., Scott, J. C., 2006. Does phased retirement extend work life? Findings from event history and growth curve analyses. Working paper.
Cheng, S., Long, J. S., 2007. Testing for iia in the multinomial logit model. Sociological Methods & Research 35 (4), 583–600.
Euwals, R., van Vuuren, D., Wolthoff, R., 2010. Early retirement behaviour in the Netherlands: Evidence from a policy reform. De Economist 158 (3), 209–236.
Fields, G. S., Mitchell, O. S., 1984. The effects of social security reforms on retirement ages and retirement incomes. Journal of Public Economics 25 (1-2), 143–159.
Ghent, L., Allen, S., Clark, R., 2001. The impact of a new phased retirement option on faculty retirement decisions. Research on Aging 23 (6), 671–693.
Gordon, R. H., Blinder, A. S., 1980. Market wages, reservation wages and retirement. Journal of Public Economics 14 (2), 277–308.
Graig, L. A., Paganelli, V., 2000. Phased retirement: Reshaping the end of work. Compensation and Benefits Management 16 (2), 1–9.
Gustman, A. L., Steinmeier, T. L., 1983. Minimum hours constraints and retirement behavior. Contemporary Economic Policy 1 (3), 77–91.
Gustman, A. L., Steinmeier, T. L., 1984a. Modeling the retirement process for policy evaluation and research. Monthly Labor Review 107 (7), 26–33.
Gustman, A. L., Steinmeier, T. L., 1984b. Partial retirement and the analysis of retirement behavior. Industrial and Labor Relations Review 37 (3), 403–415.
Gustman, A. L., Steinmeier, T. L., 1985. The effect of partial retirement on wage profiles of older workers. Industrial Relations 24 (2), 257–265.
Gustman, A. L., Steinmeier, T. L., 1986. A structural retirement model. Econometrica 54 (3), 555–584.
Gustman, A. L., Steinmeier, T. L., 2000. Retirement in dual-career families: A structural model. Journal of Labor Economics 18 (3), 503–545.
Hanemann, M. W., 1994. Valuing the environment through contingent valuation. Journal of Economic Perspectives 8(4), 19–43.
Hausman, J., McFadden, D., 1984. Specification tests for the multinomial logit model. Econometrica 52 (5), 1219–1240.
Honig, M., Hanoch, G., 1985. Partial retirement as a separate mode of retirement behavior. The Journal of Human Resources 20 (1), 21–46.
Hurd, M. D., 1990. Research on the elderly: Economic status, retirement, and consumption and saving. Journal of Economic Literature 28 (2), 565–637.
Hurd, M. D., 1996. The effect of labor market rigidities on the labor force rigidities on the labor force. In: Wise, D. A. (Ed.), Advances in the Economics of Aging. The University of Chicago Press, Chicago, pp. 11–60.
Hutchens, R., 2010. Worker characteristics, job characteristics, and opportunities for phased retirement. Labour Economics 17 (6), 1010–1021.
Johnson, R. W., Neumark, D., 1996. Wage declines among older men. The Review of Economics and Statistics 78 (4), 740–748.
Kantarcı, T., Smeets, I., van Soest, A., 2011. Implications of full and partial retirement for replacement rates in a defined benefit system. Netspar Discussion Paper No. 05/2011-045.
Kennedy, P., 2009. A Guide to Econometrics, 6th Edition. Blackwell Publishing Ltd.
Laczko, F., 1988. Partial retirement: An alternative to early retirement? A comparison of phased retirement schemes in the United Kingdom, France and Scandinavia. International Social Security Review 41 (2), 146–169.
Latulippe, D., Turner, J., 2000. Partial retirement and pension policy in industrialized countries. International Labour Review 139 (2), 179–195.
Lazear, E. P., 1987. Retirement from the labor force. Vol. 1 of Handbook of Labor Economics. Elsevier.
Louviere, J. J., Hensher, D. A., Swait, J. D., 2000. Stated Choice Methods: Analysis and Applications. Cambridge University Press.
Lumsdaine, R. L., Mitchell, O. S., 1999. New developments in the economic analysis of retirement. In: Ashenfelter, O. C., Card, D. (Eds.), Handbook of Labor Economics. Vol. 3C. Elsevier, pp. 3261–3307.
Mayer, K. U., Müller, W., 1986. The state and the structure of the life course. In: Sorensen, A. B., Weinert, F. E., Sherrod, L. R. (Eds.), Human Development and the Life Course: Multidisciplinary Perspectives. Hillsdale, NJ: Lawrence Erlbaum Associates Publishers, pp. 217–245.
McFadden, D., 1979. Quantitative methods for analysing travel behaviour of individuals: Some recent developments. In: Hensher, D., Stopher, P. (Eds.), Behavioural Travel Modelling. Croom Heml, London, pp. 279–318.
Munzenmaier, F., Paciero, J., 2002. Replacement ratios and phased retirement - A new tune on an old fiddle. Benefits Quarterly 18 (1), 7–14.
OECD, 2009. Pensions at a glance 2009: Retirement-income systems in OECD countries. OECD Publishing.
Olmsted, B., Smith, S., 1994. Phased and partial retirement. In: Olmsted, B., Smith, S. (Eds.), Creating a flexible workplace: How to select and manage alternative work options, 2nd Edition. Amacom, Ch. 6, pp. 198–234.
Quinn, J. F., 1981. The extent and correlates of partial retirement. Gerontologist 21 (6), 634–643.
Quinn, J. F., Burkhauser, R. V., 1993. Labor market obstacles to aging productively. In: Bass, S. A., Caro, F. G., Chen, Y.-P. (Eds.), Achieving A Productive Aging Society. Auburn House, London, pp. 43–59.
Quinn, J. F., Burkhauser, R. V., 1994. Public policy and the plans and preferences of older Americans. Journal of Aging & Social Policy 6 (3), 5–20.
Rohwedder, S., Willis, R. J., 2010. Mental retirement. Journal of Economic Perspectives 24 (1), 119–138.
Roper Starch Worldwide, 2004. Baby boomers envision retirement II. Washington, DC: AARP Knowledge Management, Retrieved December 29, 2010, from http://assets.aarp.org/rgcenter/econ/boomers_envision.pdf.
Ruhm, C., 1990. Bridge jobs and partial retirement. Journal of Labor Economics 8 (4), 482–501.
Rust, J., Phelan, C., 1997. How social security and medicare affect retirement behavior in a world of incomplete markets. Econometrica 65 (4), 781–832.
Scott, J. C., 2004. Is phased retirement a state of mind? The role of individual preferences in retirement outcomes. Paper presented at Population Association of America Annual Meeting, Boston.
Shultz, K. S., Henkens, K., 2010. Introduction to the changing nature of retirement: an international perspective. International Journal of Manpower 31 (3), 265–270.
Siegenthaler, J. K., Brenner, A. M., 2000. Flexible work schedules, older workers, and retirement. Journal of Aging & Social Policy 12 (1), 19–34.
Stock, J. H., Wise, D. A., 1990. Pensions, the option value of work and retirement. Econometrica 58 (5), 1151–1180.
van Beek, K. W. H., Koopmans, C. C., van Praag, B. M. S., 1997. Shopping at the labour market: A real tale of fiction. European Economic Review 41 (2), 295–317.
Wadensjö, E., 2006. Part-time pensions and part-time work in Sweden. European Papers on the New Welfare Paper No. 6, 29–45.
Watson Wyatt Worldwide, 2004. Phased retirement: Aligning employer programs with worker preferences Washington, D.C.
Whittington, D., 2002. Improving the performance of contingent valuation studies in developing countries. Environmental and Resource Economics 22 (1), 323–367.
Winkelman, R., Boes, S., 2006. Analysis of Microdata. Springer-Verlag, Berlin.

Appendix. Description of survey questions

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 abrupt retirement)

Please compare the plans presented below.

Lisa plans to retire at age 65 . Her retirement income will be $2100 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							
Ret. income	0			$2100							

Carol plans to retire at age 70. Her retirement income will be $3300 a month. This plan cab 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		
Ret. income	0								$3300		

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 $1050 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 $2700 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		
Ret. income	0			$1050					$2700		

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

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

Figure 1. Survey representation of competing retirement scenarios

An employee can choose to work part-time after leaving full time work. The duration of part-time work will have consequences for the retirement income.

Below we describe the retirement plans of five employees. All employees are currently working 40 hours a week and earning $3000 a month. They will stop working full-time at age 65, but some of them plan to continue working 20 hours a week for several years in partial retirement. During that time they will earn $1500 a month and receive a partial retirement income of $1050 a month. They will continue to build retirement benefits for full retirement.

The retirement plans of the five employees differ in the following respects:

- Duration of partial retirement
- Retirement income in full retirement

Please compare the plans presented below.

Linda will fully retire directly from full-time work after turning 65. Her retirement income when fully retired will be $2100 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							
Ret. income	0			$2100							

Mary will spend 1 year in partial retirement after turning 65. Her retirement income when fully retired will be $2220 a month. This plan can be summarized as follows:

Age	62	63	64	65	66	67	68	69	70	71	72
	Work			Par	Retirement						
Hours worked	40 hours			20 h	0						
Work income	$3000			150.	0						
Ret. income	0			105.	$2220						

Elizabeth will spend 2 years in partial retirement after turning 65. Her retirement income when fully retired will be $2370 a month. This plan can be summarized as follows:

Age	62	63	64	65	66	67	68	69	70	71	72
	Work			Partial		Retirement					
Hours worked	40 hours			20 hours		0					
Work income	$3000			$1500		0					
Ret. income	0			$1050		$2370					

Donna will spend 3 years in partial retirement after turning 65. Her retirement income when fully retired will be $2550 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				
Ret. income	0			$1050			$2550				

Barbara will spend 4 years in partial retirement after turning 65. Her retirement income when fully retired will be $2760 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			
Ret. income	0			$1050				$2760			

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

- ☐ Linda's plan
- ☐ Mary's plan
- ☐ Elizabeth's plan
- ☐ Donna's plan
- ☐ Barbara's plan

Figure 2. Survey representation of duration of partial retirement

An employee can often choose the age to enter partial retirement. This choice will have consequences for the retirement income.

Below we describe the retirement plans of four employees. All employees are currently working 40 hours a week and earning $3000 a month. They plan to work 20 hours a week for a period of five years in partial retirement. During that time they will earn work income and partial retirement income. They will continue to build retirement benefits for full retirement. The retirement plans of the four employees differ in the following respects:

- Age of partial retirement
- Retirement income during partial retirement
- Retirement income during full retirement

Please compare the plans presented below.

Mary will enter partial retirement at age 57. Her retirement income when partially retired will be $600 and when fully retired $1500 a month. This plan can be summarized as follows:

Age	55	56	57	58	59	60	61	62	63	64	65	70
	Work		Partial retirement					Retirement				
Hours worked	40 hours		20 hours					0				
Work income	$3000		$1500					0				
Ret. income	0		$600					$1500				

Barbara will enter partial retirement at age 60. Her retirement income when partially retired will be $750 and when fully retired $1800 a month. This plan can be summarized as follows:

Age	57	58	59	60	61	62	63	64	65	66	67	68
	Work			Partial retirement					Retirement			
Hours worked	40 hours			20 hours					0			
Work income	$3000			$1500					0			
Ret. income	0			$750					$1800			

Michelle will enter partial retirement at age 63. Her retirement income when partially retired will be $840 and when fully retired $2250 a month. This plan can be summarized as follows:

Age	59	60	61	62	63	64	65	66	67	68	69	70
	Work				Partial retirement					Retirement		
Hours worked	40 hours				20 hours					0		
Work income	$3000				$1500					0		
Ret. income	0				$840					$2250		

Sarah will enter partial retirement at age 66. Her retirement income when partially retired will be $1050 and when fully retired $3000 a month. This plan can be summarized as follows:

Age	61	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	
Ret. income	0					$1050					$3000	

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

- ☐ Mary's plan
- ☐ Barbara's plan
- ☐ Michelle's plan
- ☐ Sarah's plan

Figure 3. Survey representation of age of partial retirement

An employee can work part-time for several years in partial retirement, before she retires fully. During that time she may prefer to do the same type of work she did before with her former employer. On the other hand, she may prefer to do a different type of work with a different employer. The latter choice will have consequences for the work income and retirement income.

Below we describe two retirement options. The options differ in the following respects:

- Type of work and employer in partial retirement
- Work income in partial retirement
- Retirement income in full retirement

Sarah works 40 hours a week and earns $3000 a month. From age 65 to 68 she plans to work 20 hours a week in partial retirement. She will continue to build retirement benefits for full retirement.

Sarah can choose between two retirement options:

Option 1

She can partially retire with her **former** employer and continue to do the **same** type of work she did before. This plan can be summarized as follows:

Age	62	63	64	65	66	67	68	69	70	71
	Work			Partial retirement				Retirement		
				Former Employer Same Type of Work						
Hours worked	40 hours			20 hours				0		
Work income	$3000			$1500				0		
Ret. income	0			$1050				$2550		

Option 2

She can partially retire with a **different** employer than her former employer and do a **different** type of work than she did before. She will then have the opportunity to work on new and less demanding tasks. However, her work income, and retirement income when fully retired, will be lower than in Option 1. This plan can be summarized as follows:

Age	62	63	64	65	66	67	68	69	70	71
	Work			Partial retirement				Retirement		
				Different Employer Different Type of Work						
Hours worked	40 hours			20 hours				0		
Work income	$3000			$1200				0		
Ret. income	0			$1050				$2400		

Based on your own preferences, which of the two options do you find more attractive?

☐ Option 1
☐ Option 2

Figure 4. Survey representation of job change in partial retirement

Job characteristics

Please indicate how often the following characteristics about your [current/last] job are true. My [current/last] job requires...

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
6. Learning new things

For each item the respondent is allowed to choose among the following frequency alternatives:

1. (Almost) none of time
2. Some of the time
3. Most of the time
4. (Almost) all of the time

Depending on the labor market status of the survey respondent, the wording of the question changed with respect to the selection in the brackets above. If the respondent never had a job, he or she is allowed to skip the question.

Job satisfaction

Please indicate how satisfied you [are/were] with the following aspects of your [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
8. Job security (for example, risk of lay off)

For each item the respondent is allowed to choose among the following scales of satisfaction:

1. Very dissatisfied
2. Dissatisfied
3. Neutral
4. Satisfied
5. Very satisfied

Depending on the labor market status of the respondent, the wording of the question changed with respect to the selection in the brackets below. If the respondent never had a job, he or she is allowed to skip the question.

Life satisfaction

To what extent do you agree or disagree with the following statement? I would [keep, have kept] working even if the money were not needed.

1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

In the past 10 years [/before your retirement] how many times have you been promoted to a higher position at your workplace?

1. Never
2. One time
3. Two times
4. Three times
5. Four times
6. Five times
7. More than five times

In the past 10 years how sufficient has your [work/(work)] income been to cover your living expenses?

1. Never been sufficient
2. Rarely been sufficient
3. Sometimes been sufficient
4. Often been sufficient
5. Always been sufficient

Thinking of the past 10 years, how satisfied are you with your social activities (in terms of the opportunities for them, time spent on them, their quality)? Social activities include activities other than the household and paid work activities.

1. Totally dissatisfied
2. Dissatisfied
3. Slightly dissatisfied
4. Neutral
5. Slightly satisfied
6. Satisfied
7. Totally satisfied

In the past 10 years how often did you experience a problem in your family? Family problems include relationship problems, social problems, and health problems in one or more than one family member affecting others in the household.

1. Never
2. Rarely
3. Sometimes
4. Often
5. Always

If you had to go back to school or get new training, would you change the subject you studied or the field you trained in? If I had the opportunity to study or train again I would study....

1. A completely different subject
2. A somewhat different subject
3. A similar subject
4. A quite similar subject
5. Exactly the same subject

To what extent [does/did] the work you do match the subject you studied?

1. It does not match at all
2. It does not really match
3. It somewhat matches
4. It quite matches
5. It exactly matches

Table 1
Background characteristics

Characteristic	Attribute	Percentage
Age	40-49	26.9
	50-59	36.7
	60-69	24.2
	70+	12.2
Gender	Female	57.7
	Male	42.3
Marital status	Living with a partner	66.4
	Single (divorced, widowed, etc.)	33.6
Health status	Not limited	71.8
	Limited but not severely	21.9
	Severely limited	6.3
Education level	Lower than high school degree	2.5
	High school degree	16.7
	Some college but no degree	24.8
	Associate degree in college	13.1
	Bachelors degree	23.5
	Higher than bachelors degree	19.5
Work status	Working for an employer	50.7
	Working self-employed	9.4
	Retired	22.1
	Other	17.8
Income level	$0-999	16.9
	$1000-1999	20.6
	$2000-2999	20.2
	$3000-3999	13.5
	$4000-4999	9.5
	$5000+	19.3

Notes: Number of observations is about 2000. Income levels represent self-reported last monthly income from work, after taxes and other deductions. Totals may not add due to rounding error.

Table 2
Competing retirement scenarios and associated replacement rates

Retirement scenario	Retirement age regime	Ret. age	Rep. rate during PR	Rep. rate during FR
FR	65	65		0.60/0.70/0.80 0.60/0.70/0.80 0.60/0.70/0.80
FR		70		0.90/1.00/1.10 1.00/1.10/1.20 1.10/1.20/1.30
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	63	63		0.50/0.60/0.70 0.50/0.60/0.70 0.50/0.60/0.70
FR		68		0.70/0.80/0.90 0.80/0.90/1.00 0.90/1.00/1.10
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	61	61		0.40/0.50/0.60 0.40/0.50/0.60 0.40/0.50/0.60
FR		66		0.50/0.60/0.70 0.60/0.70/0.80 0.70/0.80/0.90
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

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

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

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

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

Table 4
Predicted percentage of choices and average ratings under the substitution and income effect regimes

Retirement scenario	Retirement age regime		Retirement income, substitution effect regime		Choice (%)	Rating (avg.)	Retirement income, income effect regime		Choice (%)	Rating (avg.)
	Regime	Ret. age	Regime	Rep. rates			Regime	Rep. rates		
FR	65	65	L	0.60/0.70/0.80	30.7	5.8***	L	0.60/0.60/0.60	21.6	5.1***
FR		70		0.90/1.00/1.10	26.1	5.2***		0.90/1.00/1.10	33.5	5.4*
PR		65-69		0.75/0.85/0.95	43.2	6.4***		0.75/0.80/0.85	44.9	6.3***
FR		65	M	0.60/0.70/0.80	28.1	5.3***	M	0.70/0.70/0.70	28.0	5.4***
FR		70		1.00/1.10/1.20	30.0	5.3***		1.00/1.10/1.20	29.8	5.4**
PR		65-69		0.80/0.90/1.00	41.9	6.3***		0.85/0.90/0.95	42.2	6.3***
FR		65	H	0.60/0.70/0.80	25.0	5.1***	H	0.80/0.80/0.80	34.1	5.7***
FR		70		1.10/1.20/1.30	31.3	5.5		1.10/1.20/1.30	24.2	5.2**
PR		65-69		0.85/0.95/1.05	43.7	6.3***		0.95/1.00/1.05	41.7	6.4***
FR	63	63	L	0.50/0.60/0.70	25.2	5.6*	L	0.50/0.50/0.50	16.7	4.8***
FR		68		0.70/0.80/0.90	32.6	5.6**		0.70/0.80/0.90	41.0	5.8***
PR		63-67		0.60/0.70/0.80	42.2	6.4***		0.60/0.65/0.70	42.3	6.3***
FR		63	M	0.50/0.60/0.70	22.0	5.0***	M	0.60/0.60/0.60	20.9	5.0***
FR		68		0.80/0.90/1.00	37.2	5.7***		0.80/0.90/1.00	38.1	5.8***
PR		63-67		0.65/0.75/0.85	40.8	6.4***		0.70/0.75/0.80	41.0	6.4***
FR		63	H	0.50/0.60/0.70	18.7	4.7***	H	0.70/0.70/0.70	28.3	5.5
FR		68		0.90/1.00/1.10	39.1	6.0***		0.90/1.00/1.10	30.1	5.5
PR		63-67		0.70/0.80/0.90	42.1	6.4***		0.80/0.85/0.90	41.6	6.4***
FR	61	61	L	0.40/0.50/0.60	18.4	5.2***	L	0.40/0.40/0.40	11.8	4.5***
FR		66		0.50/0.60/0.70	41.2	6.0***		0.50/0.60/0.70	48.5	6.2***
PR		61-65		0.45/0.55/0.65	40.4	6.4***		0.45/0.50/0.55	39.7	6.3***
FR		61	M	0.40/0.50/0.60	15.9	4.7***	M	0.50/0.50/0.50	15.8	4.8***
FR		66		0.60/0.70/0.80	45.3	6.2***		0.60/0.70/0.80	46.2	6.3***
PR		61-65		0.50/0.60/0.70	38.8	6.4***		0.55/0.60/0.65	38.0	6.3***
FR		61	H	0.40/0.50/0.60	13.5	4.4***	H	0.60/0.60/0.60	20.8	5.1***
FR		66		0.70/0.80/0.90	47.5	6.4***		0.70/0.80/0.90	38.5	6.0***
PR		61-65		0.55/0.65/0.75	39.0	6.3***		0.65/0.70/0.75	40.7	6.4***

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

Table 5
Multinomial logit model explaining the choice of a retirement scenario when the base category is early full retirement or late full retirement

	Late retirement		Partial retirement		Partial retirement	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
Treatment variables						
Substitution effect low	−0.304	0.044	−0.116	0.422	0.187	0.138
Substitution effect high	0.123	0.428	0.138	0.360	0.015	0.902
Income effect low	0.368	0.019	0.334	0.030	−0.033	0.787
Income effect high	−0.460	0.002	−0.234	0.104	0.226	0.083
Retirement age 61	0.523	0.001	0.271	0.078	−0.252	0.041
Retirement age 65	−0.505	0.001	−0.220	0.130	0.285	0.031
Wage rate low	0.084	0.506	−0.129	0.290	−0.213	0.040
Background characteristics						
Age	0.019	0.015	−0.000	0.962	−0.019	0.005
Male	0.080	0.554	−0.249	0.062	−0.330	0.003
Married	−0.390	0.005	−0.074	0.582	0.316	0.005
Household size	0.156	0.011	0.059	0.320	−0.097	0.041
Highly educated	0.136	0.323	0.144	0.279	0.008	0.943
High income earner	−0.335	0.017	−0.126	0.359	0.210	0.063
Health impairment	−0.238	0.034	−0.036	0.728	0.202	0.039
Currently working	0.600	0.000	0.571	0.000	−0.029	0.822
Hours on non-work activities	−0.033	0.041	−0.021	0.174	0.012	0.379
Base category	Early retirement				Late retirement	
Observations	1984				1984	
Log-likelihood	−2029.688				−2029.688	
McFadden R-squared	0.039				0.039	
LR test of model significance (p-value)	0.000				0.000	
Hausman-McFadden test of IIA (p-value)	0.752		0.866		0.813	

Notes: 1. All the treatment variables are dummy variables which take a value of 1 to indicate the respective regime of the retirement income, retirement age or the wage rate effects, and 0 otherwise. 2. The models include also a constant term. 3. The p-value for the Hausman-McFadden test of IIA that is presented, for example, for late full retirement indicates whether the odds of comparing late full retirement to early full retirement is not affected when partial retirement is excluded from the set of three retirement scenarios in accordance with the IIA assumption of the multinomial logit model.

Table 6
Average marginal effects of variables on the probability of choosing a retirement scenario

	Early retirement		Late retirement		Partial retirement	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
Treatment variables						
Substitution effect low	0.032	0.134	−0.050	0.053	0.018	0.507
Substitution effect high	−0.021	0.346	0.007	0.798	0.015	0.587
Income effect low	−0.056	0.014	0.031	0.211	0.025	0.353
Income effect high	0.054	0.011	−0.067	0.011	0.013	0.633
Retirement age 61	−0.062	0.007	0.075	0.003	−0.013	0.614
Retirement age 65	0.056	0.009	−0.079	0.003	0.023	0.401
Wage rate low	0.005	0.764	0.038	0.073	−0.043	0.049
Background characteristics						
Age	−0.001	0.204	0.004	0.002	−0.003	0.036
Male	0.016	0.408	0.055	0.013	−0.071	0.002
Married	0.035	0.081	−0.075	0.001	0.041	0.090
Household size	−0.017	0.064	0.026	0.008	−0.009	0.369
Highly educated	−0.023	0.256	0.009	0.702	0.014	0.552
High income earner	0.035	0.082	−0.055	0.016	0.020	0.405
Health impairment	0.020	0.186	−0.047	0.018	0.027	0.177
Currently working	−0.094	0.000	0.048	0.068	0.046	0.080
Hours on non-work activities	0.004	0.065	−0.004	0.128	−0.000	0.962

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

Table 7
Multinomial logit model with interaction effects

	Late retirement		Partial retirement		Partial retirement	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
Substitution effect low × Retirement age 65	−0.265	0.300	−0.352	0.135	−0.087	0.708
Substitution effect high × Retirement age 65	−0.038	0.884	−0.039	0.872	−0.001	0.998
Substitution effect low × Retirement age 63	−0.299	0.232	0.057	0.807	0.356	0.088
Substitution effect high × Retirement age 63	−0.060	0.805	0.051	0.830	0.110	0.577
Substitution effect low × Retirement age 61	−0.240	0.348	−0.020	0.938	0.220	0.273
Substitution effect high × Retirement age 61	0.612	0.039	0.555	0.065	−0.057	0.778
Income effect low × Retirement age 65	0.134	0.610	0.294	0.225	0.160	0.485
Income effect high × Retirement age 65	−0.233	0.355	−0.226	0.331	0.007	0.976
Income effect low × Retirement age 63	0.485	0.057	0.399	0.114	−0.086	0.659
Income effect high × Retirement age 63	−0.672	0.005	−0.285	0.197	0.387	0.067
Income effect low × Retirement age 61	0.442	0.118	0.357	0.213	−0.085	0.666
Income effect high × Retirement age 61	−0.441	0.091	−0.183	0.482	0.258	0.209
Wage rate low × Retirement age 65	0.268	0.206	−0.145	0.457	−0.414	0.030
Wage rate low × Retirement age 63	0.252	0.220	−0.205	0.304	−0.457	0.008
Wage rate low × Retirement age 61	−0.236	0.294	−0.089	0.695	0.147	0.376
Retirement age	0.534	0.004	0.089	0.615	−0.445	0.003
Base category	Early retirement				Late retirement	
Observations	1984				1984	
Log-likelihood	−2019.509				−2019.509	
McFadden R-squared	0.044				0.044	
LR test of model significance (p-value)	0.000				0.000	
Hausman-McFadden test of IIA (p-value)	0.460		0.888		0.814	

Notes: 1. All the treatment variables are dummy variables which take a value of 1 to indicate the respective regime of the retirement income, retirement age or the wage rate effects, and 0 otherwise. 2. The model also includes the control variables from Table 17. The p-value of the Hausman-McFadden test of IIA that is presented, for example, for late full retirement indicates whether the odds of comparing late full retirement to early full retirement is not affected when partial retirement is excluded from the set of three retirement scenarios in accordance with the IIA assumption of the multinomial logit model.

Table 8
Alternative multinomial logit models explaining the choice of a retirement scenario when the base category is early full retirement or late full retirement

	Late retirement		Partial retirement		Partial retirement		Late retirement		Partial retirement		Partial retirement	
	Coeff.	p	Coeff.	p	Coeff.	p	Coeff.	p	Coeff.	p	Coeff.	p
Treatment variables												
Substitution effect low	−0.246	0.099	−0.084	0.557	0.162	0.197	−0.361	0.028	−0.142	0.368	0.218	0.098
Substitution effect high	0.168	0.267	0.165	0.267	−0.003	0.978	0.043	0.799	0.065	0.696	0.022	0.871
Income effect low	0.360	0.019	0.328	0.031	−0.032	0.790	0.389	0.026	0.375	0.028	−0.014	0.915
Income effect high	−0.466	0.002	−0.231	0.102	0.235	0.068	−0.614	0.000	−0.359	0.022	0.255	0.062
Retirement age 61	0.530	0.001	0.273	0.074	−0.257	0.034	0.714	0.000	0.442	0.009	−0.272	0.037
Retirement age 65	−0.447	0.003	−0.201	0.157	0.246	0.058	−0.440	0.009	−0.176	0.265	0.264	0.057
Wage rate low	0.062	0.615	−0.152	0.204	−0.214	0.036	0.067	0.632	−0.202	0.129	−0.268	0.015
Background characteristics												
Age							0.031	0.001	0.006	0.453	−0.024	0.002
Male							0.131	0.407	−0.254	0.099	−0.386	0.002
Married							−0.397	0.010	−0.099	0.509	0.298	0.012
Household size							0.121	0.076	0.022	0.735	−0.099	0.057
Highly educated							0.156	0.340	0.208	0.183	0.051	0.689
High income earner							−0.099	0.546	0.062	0.698	0.161	0.219
Health impairment							−0.186	0.157	0.020	0.869	0.206	0.057
Currently working							0.559	0.002	0.585	0.001	0.025	0.866
Hours on non-work activities							−0.034	0.065	−0.019	0.291	0.015	0.293
Job characteristics												
Blue collar worker							0.174	0.430	0.349	0.091	0.175	0.309
Company size							−0.015	0.730	0.027	0.526	0.042	0.240
Lots of physical effort							0.022	0.806	0.040	0.618	0.019	0.786
Intense concentration							−0.005	0.962	−0.162	0.078	−0.157	0.029
Frequent communication							0.084	0.370	−0.047	0.602	−0.131	0.076
Keeping up with pace of others							0.029	0.718	0.080	0.307	0.051	0.432
Repetitive job							0.063	0.443	0.043	0.592	−0.021	0.757
Learning new things							−0.019	0.838	0.029	0.745	0.048	0.500
Job satisfaction												
Relationship with coworkers							0.269	0.004	0.240	0.011	−0.029	0.714
Total pay							−0.198	0.012	−0.097	0.211	0.100	0.109
Work is attractive							−0.044	0.659	−0.032	0.745	0.012	0.880
Freedom in decisions							0.110	0.220	0.079	0.376	−0.031	0.659
Work schedule							0.001	0.990	−0.005	0.949	−0.006	0.927
Promotion prospects							−0.099	0.257	−0.093	0.276	0.006	0.933
Supervision							−0.120	0.172	−0.120	0.166	0.001	0.992
Job security							−0.006	0.931	−0.026	0.705	−0.020	0.717
Value work more than money							0.338	0.000	0.282	0.000	−0.056	0.060
Life satisfaction												
Social activities							0.012	0.814	0.103	0.038	0.091	0.022
Promotions at work							−0.009	0.866	−0.030	0.554	−0.021	0.621
Sufficient work income							−0.066	0.341	−0.101	0.138	−0.036	0.525
Problems in family							0.010	0.902	0.076	0.336	0.066	0.326
Education							−0.092	0.087	−0.063	0.219	0.029	0.510
Education matches work							−0.003	0.952	0.004	0.940	0.007	0.872
Base category	Early retirement				Late retirement		Early retirement				Late retirement	
Observations	2000				2000		1825				1825	
Log-likelihood	−2086.124				−2086.124		−1784.044				−1784.044	
McFadden R-squared	0.020				0.020		0.080				0.080	
LR model significance test (p)	0.000				0.000		0.000				0.000	
Hausman-McFadden IIA test (p)	0.892		0.723		0.933		0.923		0.946		0.989	

Notes: 1. All the treatment variables are dummy variables which take a value of 1 to indicate the respective regime of the retirement income, retirement age or the wage rate effects, and 0 otherwise. 2. The models include also a constant term. 3. The p-value of the Hausman-McFadden test of IIA that is presented, for example, for late full retirement indicates whether the odds of comparing late full retirement to early full retirement is not affected when partial retirement is excluded from the set of three retirement scenarios in accordance with the IIA assumption of the multinomial logit model.

Table 9
Linear regression model explaining the ratings given to a retirement scenario

	Early retirement		Late retirement		Partial retirement	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
Treatment variables						
Substitution effect low	0.547	0.000	−0.167	0.241	0.049	0.670
Substitution effect high	−0.218	0.094	0.178	0.222	−0.023	0.844
Income effect low	−0.310	0.016	0.004	0.976	0.010	0.934
Income effect high	0.369	0.005	−0.267	0.067	0.067	0.567
Retirement age 61	−0.331	0.010	0.431	0.002	−0.032	0.782
Retirement age 65	0.299	0.027	−0.402	0.008	−0.030	0.810
Wage rate low	0.071	0.505	0.043	0.718	−0.189	0.051
Control variables						
Age	−0.026	0.000	0.022	0.002	−0.008	0.172
Male	0.098	0.388	0.101	0.415	−0.290	0.005
Married	0.333	0.005	−0.537	0.000	0.020	0.852
Household size	−0.137	0.005	0.160	0.002	−0.024	0.580
Highly educated	−0.283	0.014	0.151	0.238	0.214	0.035
High income earner	0.439	0.000	−0.042	0.750	0.201	0.055
Health impairment	−0.025	0.804	−0.094	0.392	0.089	0.327
Currently working	−0.550	0.000	0.339	0.021	0.172	0.154
Hours on non-work activities	0.024	0.097	−0.028	0.069	−0.011	0.394
Observations	1984		1984		1984	
R-squared	0.069		0.042		0.014	
F test of model significance (p-value)	0.000		0.000		0.018	

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

Table 10
Duration of partial retirement and associated replacement rates

Retirement scenario	Retirement age regime	Ret. age	Rep. rate during PR	Rep. rate during FR
FR	65	65		0.60/0.70/0.80
				0.60/0.70/0.80
				0.60/0.70/0.80
PR		65-65	0.25/0.35/0.45	0.62/0.72/0.82
			0.25/0.35/0.45	0.64/0.74/0.84
			0.25/0.35/0.45	0.66/0.76/0.86
PR		65-66	0.25/0.35/0.45	0.65/0.75/0.85
			0.25/0.35/0.45	0.69/0.79/0.89
			0.25/0.35/0.45	0.73/0.83/0.93
PR		65-67	0.25/0.35/0.45	0.69/0.79/0.89
			0.25/0.35/0.45	0.75/0.85/0.95
			0.25/0.35/0.45	0.81/0.91/1.01
PR		65-68	0.25/0.35/0.45	0.74 0.84 0.94
			0.25/0.35/0.45	0.82 0.92 1.02
			0.25/0.35/0.45	0.90 1.00 1.10
FR	63	63		0.50/0.60/0.70
				0.50/0.60/0.70
				0.50/0.60/0.70
PR		63-63	0.20/0.30/0.40	0.51/0.61/0.71
			0.20/0.30/0.40	0.53/0.63/0.73
			0.20/0.30/0.40	0.55/0.65/0.75
PR		63-64	0.20/0.30/0.40	0.53/0.63/0.73
			0.20/0.30/0.40	0.57/0.67/0.77
			0.20/0.30/0.40	0.61/0.71/0.81
PR		63-65	0.20/0.30/0.40	0.56/0.66/0.76
			0.20/0.30/0.40	0.62/0.72/0.82
			0.20/0.30/0.40	0.68/0.78/0.88
PR		63-66	0.20/0.30/0.40	0.60/0.70/0.80
			0.20/0.30/0.40	0.68/0.78/0.88
			0.20/0.30/0.40	0.76/0.86/0.96
FR	61	61		0.40 0.50 0.60
				0.40 0.50 0.60
				0.40 0.50 0.60
PR		61-61	0.15/0.25/0.35	0.40 0.50 0.60
			0.15/0.25/0.35	0.42 0.52 0.62
			0.15/0.25/0.35	0.44 0.54 0.64
PR		61-62	0.15/0.25/0.35	0.41 0.51 0.61
			0.15/0.25/0.35	0.45 0.55 0.65
			0.15/0.25/0.35	0.49 0.59 0.69
PR		61-63	0.15/0.25/0.35	0.43 0.53 0.63
			0.15/0.25/0.35	0.49 0.59 0.69
			0.15/0.25/0.35	0.55 0.65 0.75
PR		61-64	0.15/0.25/0.35	0.46 0.56 0.66
			0.15/0.25/0.35	0.54 0.64 0.74
			0.15/0.25/0.35	0.62 0.72 0.82

Notes: 1. FR and PR denotes full and partial 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 11
Duration of partial retirement and the percentage of choices under the substitution and income effect regimes

Retirement scenario	Retirement age regime		Retirement income, substitution effect regime		Choice (%)	Retirement income, income effect regime		Choice (%)
	Regime	Ret. age	Regime	Rep. rates		Regime	Rep. rates	
FR	65	65	L	0.60/0.70/0.80	17.9	L	0.60/0.60/0.60	14.0
PR		65-65		0.62/0.72/0.82	6.4		0.62/0.64/0.66	5.0
PR		65-66		0.65/0.75/0.85	14.2		0.65/0.69/0.73	18.0
PR		65-67		0.69/0.79/0.89	13.8		0.69/0.75/0.81	18.0
PR		65-68		0.74 0.84 0.94	47.7		0.74/0.82/0.90	45.1
FR		65	M	0.60/0.70/0.80	17.1	M	0.70/0.70/0.70	16.2
PR		65-65		0.64/0.74/0.84	7.7		0.72/0.74/0.76	11.4
PR		65-66		0.69/0.79/0.89	18.0		0.75/0.79/0.83	18.3
PR		65-67		0.75/0.85/0.95	18.0		0.79/0.85/0.91	11.8
PR		65-68		0.82 0.92 1.02	39.3		0.84/0.92/1.00	42.4
FR		65	H	0.60/0.70/0.80	14.6	H	0.80/0.80/0.80	19.4
PR		65-65		0.66/0.76/0.86	9.7		0.82/0.84/0.86	7.5
PR		65-66		0.73/0.83/0.93	18.1		0.85/0.89/0.93	14.1
PR		65-67		0.81/0.91/1.01	16.4		0.89/0.95/1.01	18.5
PR		65-68		0.90 1.00 1.10	41.2		0.94/1.02/1.10	40.5
FR	63	63	L	0.50/0.60/0.70	20.1	L	0.50/0.50/0.50	14.4
PR		63-63		0.51/0.61/0.71	5.4		0.51/0.53/0.55	5.2
PR		63-64		0.53/0.63/0.73	11.2		0.53/0.57/0.61	11.8
PR		63-65		0.56/0.66/0.76	13.8		0.56/0.62/0.68	17.0
PR		63-66		0.60/0.70/0.80	49.6		0.60/0.68/0.76	51.5
FR		63	M	0.50/0.60/0.70	9.4	M	0.60/0.60/0.60	14.6
PR		63-63		0.53/0.63/0.73	5.6		0.61/0.63/0.65	5.2
PR		63-64		0.57/0.67/0.77	14.5		0.63/0.67/0.71	12.7
PR		63-65		0.62/0.72/0.82	15.0		0.66/0.72/0.78	12.7
PR		63-66		0.68/0.78/0.88	55.6		0.70/0.78/0.86	54.7
FR		63	H	0.50/0.60/0.70	10.1	H	0.70/0.70/0.70	10.7
PR		63-63		0.55/0.65/0.75	5.3		0.71/0.73/0.75	5.8
PR		63-64		0.61/0.71/0.81	14.5		0.73/0.77/0.81	15.6
PR		63-65		0.68/0.78/0.88	15.0		0.76/0.82/0.88	13.8
PR		63-66		0.76/0.86/0.96	55.1		0.80/0.88/0.96	54.0
FR	61	61	L	0.40 0.50 0.60	13.9	L	0.40 0.40 0.40	10.0
PR		61-61		0.40 0.50 0.60	4.0		0.40 0.42 0.44	2.5
PR		61-62		0.41 0.51 0.61	7.2		0.41 0.45 0.49	11.9
PR		61-63		0.43 0.53 0.63	4.9		0.43 0.49 0.55	10.0
PR		61-64		0.46 0.56 0.66	79.0		0.46 0.54 0.62	65.7
FR		61	M	0.40 0.50 0.60	11.4	M	0.50/0.50/0.50	11.4
PR		61-61		0.42 0.52 0.62	3.4		0.50/0.52/0.54	3.3
PR		61-62		0.45 0.55 0.65	5.9		0.51/0.55/0.59	6.2
PR		61-63		0.49 0.59 0.69	9.8		0.53/0.59/0.65	7.1
PR		61-64		0.54 0.64 0.74	69.5		0.56/0.64/0.72	71.9
FR		61	H	0.40 0.50 0.60	8.2	H	0.60/0.60/0.60	12.4
PR		61-61		0.44 0.54 0.64	2.6		0.60/0.62/0.64	4.1
PR		61-62		0.49 0.59 0.69	9.2		0.61/0.65/0.69	4.5
PR		61-63		0.55 0.65 0.75	11.8		0.63/0.69/0.75	9.1
PR		61-64		0.62 0.72 0.82	68.2		0.66/0.74/0.82	70.0

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

Table 12
Multinomial logit model explaining the choice of a number of years in partial retirement when the base category is full retirement

	Partial retirement one year		Partial retirement two years		Partial retirement three years		Partial retirement four years	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
Treatment variables								
Substitution effect low	−0.389	0.159	−0.535	0.014	−0.600	0.005	−0.334	0.044
Substitution effect high	0.196	0.484	0.204	0.361	0.137	0.531	0.158	0.382
Income effect low	−0.376	0.189	0.143	0.513	0.406	0.067	0.011	0.951
Income effect high	−0.183	0.495	−0.169	0.441	0.207	0.349	−0.095	0.577
Retirement age 61	−0.315	0.316	−0.486	0.046	−0.369	0.113	0.440	0.012
Retirement age 65	0.142	0.585	−0.053	0.796	−0.147	0.470	−0.510	0.002
Background characteristics								
Age	0.002	0.844	0.014	0.162	−0.007	0.494	0.024	0.003
Male	−0.057	0.816	−0.487	0.013	−0.187	0.332	−0.255	0.091
Married	−0.425	0.100	−0.201	0.323	−0.246	0.222	−0.513	0.001
Household size	0.080	0.510	0.206	0.024	0.149	0.088	0.160	0.034
Highly educated	0.001	0.998	0.418	0.030	0.385	0.044	0.328	0.032
High income earner	−0.166	0.508	−0.238	0.233	−0.073	0.711	−0.299	0.052
Health impairment	−0.146	0.489	0.100	0.522	0.038	0.804	0.193	0.121
Currently working	0.189	0.443	0.074	0.717	0.160	0.441	0.758	0.000
Hours on non-work activities	−0.023	0.390	−0.074	0.002	−0.044	0.056	−0.023	0.203
Base category	Full retirement							
Observations	1984							
Log-likelihood								
McFadden R-squared								
LR test of model significance (p-value)								
Hausman-McFadden test of IIA (p-value)								

Notes: 1. All the treatment variables are dummy variables which take a value of 1 to indicate the respective regime of the retirement income, retirement age or the wage rate effects, and 0 otherwise. 2. The models include also a constant term. 3. The p-value for the Hausman-McFadden test of IIA that is presented, for example, for late full retirement indicates whether the odds of comparing late full retirement to early full retirement is not affected when partial retirement is excluded from the set of three retirement scenarios in accordance with the IIA assumption of the multinomial logit model.

Table 13
Average marginal effects on the probability of choosing a number of years in partial retirement

	Full retirement		Partial retirement one year		Partial retirement two years		Partial retirement three years		Partial retirement four years	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
Treatment variables										
Substitution effect low	0.047	0.009	−0.002	0.870	−0.022	0.230	−0.032	0.092	0.009	0.744
Substitution effect high	−0.019	0.343	0.003	0.798	0.008	0.660	−0.000	0.979	0.008	0.753
Income effect low	−0.008	0.690	−0.024	0.065	0.010	0.571	0.045	0.019	−0.023	0.390
Income effect high	0.007	0.694	−0.007	0.549	−0.014	0.429	0.034	0.078	−0.019	0.460
Retirement age 61	−0.013	0.505	−0.022	0.120	−0.071	0.001	−0.059	0.003	0.165	0.000
Retirement age 65	0.038	0.035	0.023	0.046	0.028	0.085	0.017	0.307	−0.107	0.000
Background characteristics										
Age	−0.002	0.036	−0.001	0.294	0.000	0.905	−0.003	0.005	0.005	0.000
Male	0.030	0.069	0.009	0.396	−0.032	0.050	0.006	0.734	−0.013	0.564
Married	0.048	0.007	−0.004	0.712	0.019	0.248	0.014	0.402	−0.076	0.001
Household size	−0.018	0.029	−0.003	0.570	0.009	0.196	0.002	0.814	0.011	0.263
Highly educated	−0.037	0.026	−0.016	0.173	0.017	0.282	0.013	0.404	0.023	0.326
High income earner	0.028	0.099	0.002	0.849	−0.004	0.814	0.017	0.299	−0.044	0.065
Health impairment	−0.015	0.273	−0.014	0.150	−0.001	0.929	−0.009	0.490	0.039	0.046
Currently working	−0.059	0.001	−0.013	0.222	−0.045	0.008	−0.035	0.050	0.153	0.000
Hours on non-work activities	0.004	0.045	0.000	0.780	−0.006	0.005	−0.002	0.357	0.003	0.277

Notes:

Table 14
Age of partial retirement and associated replacement rates

Retirement scenario	Partial ret. years regime	Ret. age	Rep. rate during PR	Rep. rate during FR
FR	5	57-61	0.10/0.20/0.30	0.40/0.50/0.60
			0.10/0.20/0.30	0.40/0.50/0.60
			0.10/0.20/0.30	0.40/0.50/0.60
PR		60-64	0.12/0.22/0.32	0.45/0.55/0.65
			0.13/0.23/0.33	0.50/0.60/0.70
			0.14/0.24/0.34	0.55/0.65/0.75
PR		63-67	0.16/0.26/0.36	0.55/0.65/0.75
			0.18/0.28/0.38	0.65/0.75/0.85
			0.20/0.30/0.40	0.75/0.85/0.95
PR		66-70	0.22/0.32/0.42	0.75/0.85/0.95
			0.25/0.35/0.45	0.90/1.00/1.10
			0.28/0.38/0.48	1.05/1.15/1.25
FR	4	57-60	0.10/0.20/0.30	0.35/0.45/0.55
			0.10/0.20/0.30	0.35/0.45/0.55
			0.10/0.20/0.30	0.35/0.45/0.55
PR		60-63	0.12/0.22/0.32	0.40/0.50/0.60
			0.13/0.23/0.33	0.45/0.55/0.65
			0.14/0.24/0.34	0.50/0.60/0.70
PR		63-66	0.16/0.26/0.36	0.50/0.60/0.70
			0.18/0.28/0.38	0.60/0.70/0.80
			0.20/0.30/0.40	0.70/0.80/0.90
PR		66-69	0.22/0.32/0.42	0.70/0.80/0.90
			0.25/0.35/0.45	0.85/0.95/1.05
			0.28/0.38/0.48	1.00/1.10/1.20
FR	3	57-59	0.10/0.20/0.30	0.30/0.40/0.50
			0.10/0.20/0.30	0.30/0.40/0.50
			0.10/0.20/0.30	0.30/0.40/0.50
PR		60-62	0.12/0.22/0.32	0.35/0.45/0.55
			0.13/0.23/0.33	0.40/0.50/0.60
			0.14/0.24/0.34	0.45/0.55/0.65
PR		63-65	0.16/0.26/0.36	0.45/0.55/0.65
			0.18/0.28/0.38	0.55/0.65/0.75
			0.20/0.30/0.40	0.65/0.75/0.85
PR		66-68	0.22/0.32/0.42	0.65/0.75/0.85
			0.25/0.35/0.45	0.80/0.90/1.00
			0.28/0.38/0.48	0.95/1.05/1.15

Notes: 1. FR and PR denotes full and partial 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 15
Age of partial retirement and the percentage of choices under the substitution and income effect regimes

Retirement scenario	Partial retirement years regime		Retirement income, substitution effect regime		Choice (%)	Retirement income, income effect regime		Choice (%)
	Regime	Ret. age	Regime	Rep. rates		Regime	Rep. rates	
PR	5	57-61	L	0.40/0.50/0.60	11.3	L	0.40/0.40/0.40	10.7
PR		60-64		0.45/0.55/0.65	16.0		0.45/0.50/0.55	14.3
PR		63-67		0.55/0.65/0.75	32.9		0.55/0.65/0.75	30.2
PR		66-70		0.75/0.85/0.95	39.8		0.75/0.90/1.05	44.8
FR		57-61	M	0.40/0.50/0.60	8.4	M	0.50/0.50/0.50	6.6
PR		60-64		0.50/0.60/0.70	17.2		0.55/0.60/0.65	19.3
PR		63-67		0.65/0.75/0.85	33.6		0.65/0.75/0.85	34.2
PR		66-70		0.90/1.00/1.10	40.8		0.85/1.00/1.15	39.9
PR		57-61	H	0.40/0.50/0.60	10.4	H	0.60/0.60/0.60	12.5
PR		60-64		0.55/0.65/0.75	18.7		0.65/0.70/0.75	18.8
PR		63-67		0.75/0.85/0.95	30.3		0.75/0.85/0.95	32.5
PR		66-70		1.05/1.15/1.25	40.6		0.95/1.10/1.25	36.3
PR	4	57-60	L	0.35/0.45/0.55	16.5	L	0.35/0.35/0.35	7.7
PR		60-63		0.40/0.50/0.60	16.9		0.40/0.45/0.50	10.9
PR		63-66		0.50/0.60/0.70	24.9		0.50/0.60/0.70	27.4
PR		66-69		0.70/0.80/0.90	41.8		0.70/0.85/1.00	54.1
FR		57-60	M	0.35/0.45/0.55	8.2	M	0.45/0.45/0.45	11.1
PR		60-63		0.45/0.55/0.65	14.6		0.50/0.55/0.60	14.2
PR		63-66		0.60/0.70/0.80	31.1		0.60/0.70/0.80	34.1
PR		66-69		0.85/0.95/1.05	46.1		0.80/0.95/1.10	40.7
PR		57-60	H	0.35/0.45/0.55	5.6	H	0.55/0.55/0.55	11.5
PR		60-63		0.50/0.60/0.70	13.7		0.60/0.65/0.70	19.7
PR		63-66		0.70/0.80/0.90	36.3		0.70/0.80/0.90	30.7
PR		66-69		1.00/1.10/1.20	44.4		0.90/1.05/1.20	38.1
PR	3	57-59	L	0.30/0.40/0.50	7.4	L	0.30/0.30/0.30	5.4
PR		60-62		0.35/0.45/0.55	11.3		0.35/0.40/0.45	8.2
PR		63-65		0.45/0.55/0.65	31.9		0.45/0.55/0.65	35.9
PR		66-68		0.65/0.75/0.85	49.5		0.65/0.80/0.95	50.5
FR		57-59	M	0.30/0.40/0.50	10.3	M	0.40/0.40/0.40	7.4
PR		60-62		0.40/0.50/0.60	11.4		0.45/0.50/0.55	7.0
PR		63-65		0.55/0.65/0.75	26.0		0.55/0.65/0.75	27.9
PR		66-68		0.80/0.90/1.00	52.4		0.75/0.90/1.05	57.7
PR		57-59	H	0.30/0.40/0.50	4.0	H	0.50/0.50/0.50	8.4
PR		60-62		0.45/0.55/0.65	9.0		0.55/0.60/0.65	16.8
PR		63-65		0.65/0.75/0.85	35.0		0.65/0.75/0.85	30.0
PR		66-68		0.95/1.05/1.15	52.0		0.85/1.00/1.15	44.7

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

Table 16
Multinomial logit model explaining the choice of partial retirement age when the base category is partial retirement at age 57

	Partial retirement at age 60		Partial retirement at age 63		Partial retirement at age 66	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
Treatment variables						
Substitution effect low	−0.266	0.244	−0.321	0.118	−0.384	0.054
Substitution effect high	0.233	0.346	0.341	0.126	0.194	0.372
Income effect low	−0.185	0.455	−0.027	0.900	0.110	0.599
Income effect high	0.004	0.986	−0.315	0.122	−0.490	0.014
Partial retirement three years	−0.019	0.940	0.374	0.096	0.501	0.022
Partial retirement five years	0.148	0.489	0.049	0.800	−0.105	0.580
Background characteristics						
Age	0.019	0.085	0.025	0.012	0.048	0.000
Male	−0.032	0.876	−0.254	0.169	0.001	0.997
Married	−0.218	0.329	−0.350	0.080	−0.596	0.002
Household size	0.146	0.123	0.138	0.101	0.186	0.025
Highly educated	0.034	0.871	0.079	0.673	−0.020	0.914
High income earner	0.058	0.788	−0.062	0.748	−0.248	0.186
Health impairment	−0.280	0.080	−0.320	0.022	−0.211	0.120
Currently working	0.124	0.577	0.392	0.051	0.732	0.000
Hours on non-work activities	−0.009	0.694	−0.019	0.348	−0.028	0.178
Base category	Partial retirement at age 57					
Observations						
Log-likelihood						
McFadden R-squared						
LR test of model significance (p-value)						
Hausman-McFadden test of IIA (p-value)						

Notes: 1. All the treatment variables are dummy variables which take a value of 1 to indicate the respective regime of the retirement income, retirement age or the wage rate effects, and 0 otherwise. 2. The models include also a constant term. 3. The p-value for the Hausman-McFadden test of IIA that is presented, for example, for late full retirement indicates whether the odds of comparing late full retirement to early full retirement is not affected when partial retirement is excluded from the set of three retirement scenarios in accordance with the IIA assumption of the multinomial logit model.

Table 17
Average marginal effects on the probability of choosing a partial retirement age

	Partial retirement at age 57		Partial retirement at age 60		Partial retirement at age 63		Partial retirement at age 66	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
Treatment variables								
Substitution effect low	0.028	0.071	0.006	0.768	−0.003	0.908	−0.030	0.263
Substitution effect high	−0.021	0.226	0.001	0.965	0.035	0.167	−0.015	0.566
Income effect low	−0.001	0.970	−0.028	0.174	−0.013	0.624	0.041	0.124
Income effect high	0.028	0.073	0.045	0.016	0.000	0.988	−0.072	0.006
Partial retirement three years	−0.029	0.084	−0.050	0.018	0.011	0.664	0.068	0.013
Partial retirement five years	0.000	0.982	0.022	0.213	0.018	0.461	−0.041	0.120
Background characteristics								
Age	−0.003	0.000	−0.002	0.054	−0.002	0.092	0.007	0.000
Male	0.008	0.576	0.008	0.647	−0.053	0.017	0.037	0.107
Married	0.036	0.019	0.026	0.149	0.018	0.427	−0.079	0.001
Household size	−0.013	0.042	0.000	0.984	−0.003	0.743	0.016	0.116
Highly educated	−0.002	0.886	0.002	0.920	0.018	0.410	−0.018	0.449
High income earner	0.010	0.479	0.025	0.155	0.019	0.411	−0.054	0.025
Health impairment	0.021	0.039	−0.007	0.650	−0.026	0.166	0.011	0.574
Currently working	−0.041	0.007	−0.047	0.009	−0.023	0.346	0.111	0.000
Hours on non-work activities	0.002	0.265	0.001	0.499	0.000	0.943	−0.003	0.244

Notes: 1. All the treatment variables are dummy variables which take a value of 1 to indicate the respective regime of the retirement income, retirement age or the wage rate effects, and 0 otherwise. 2. The models include also a constant term. 3. The p-value for the Hausman-McFadden test of IIA that is presented, for example, for late full retirement indicates whether the odds of comparing late full retirement to early full retirement is not affected when partial retirement is excluded from the set of three retirement scenarios in accordance with the IIA assumption of the multinomial logit model.