Netspar

Network for Studies on Pensions, Aging and Retirement

NETSPAR ACADEMIC SERIES

Increasing labor market participation of older workers in the Netherlands

The effects of pension incentives, increasing retirement age, and partial retirement

Yvonne Theeuwes

MSc 09/2018-009

A thesis submitted in partial fulfilment of the requirements for the degree of
Master of Science in Econometrics and Mathematical Economics

Tilburg School of Economics and Management
Tilburg University

Increasing labor market participation of older workers in the Netherlands: the effects of pension incentives, increasing retirement age, and partial retirement

---

By:
Yvonne Theeuwes (132201)

Supervised by:
Dr. T. Kantarcı

September 12, 2018

Abstract

The Dutch government faces the challenge of financing the pension benefits of an aging society. In order to finance the pension benefits, the government aims to keep older workers longer in the labor market.

Using a stated preference analysis, we analyse how financial incentives and increasing retirement age affect the preferences for early full retirement, late full retirement, or partial retirement. Furthermore, we analyse if provision of a partial retirement scheme would increase total labor supply among older workers. We find that partial retirement is preferred to early abrupt retirement and late abrupt retirement. Partial retirement is particularly attractive when it starts at age 63. More respondents prefer partial retirement and fewer respondents prefer early retirement when the rewards for retiring later increase.

Provision of a partial retirement scheme could increase total labor supply, but it depends on the financial incentives. When rewards for retiring later are actuarially fair and pension accruals are actuarially fair, provision of a partial retirement scheme increases total labor supply.

1 Introduction

As life expectancy increases, the Dutch government faces the challenge of financing pension benefits. If the government does not react to this demographic change, the pension system will not be able to finance the pension benefits of an increasing population of older workers. Therefore, from the perspective of public finances, the government has to increase the labor supply of older workers.

There are different ways work could be promoted among older workers: the first way is pension incentives. In the Netherlands, starting in the mid-1970s, early retirement at age 55 was promoted by giving tax benefits to early retirees. Starting in the 1990s, the government tries to increase total labor supply among older workers by abolishing tax benefits for early retirees (Capretta, 2007). Phasing out pension benefits for early retirees leads to an increase in the labor force participation rate (van Soest and Vonkova, 2014). This suggests that agents in the Netherlands are responsive to pension incentives.

The second way is to increase the pension eligibility age. In January 2018 the government increased the eligibility age for the first pillar pension (AOW) to 66. Furthermore, the eligibility age will be further increased to 67. Atalay and Barrett (2012) studied the effects of increasing the pension eligibility age for women in Australia in 1993. They found that increasing the pension eligibility age induces an increase in the labor force participation rate. This suggests that agents are responsive to increasing the retirement eligibility age.

The third way is to provide a partial retirement scheme. For older agents it is appealing to decrease working hours towards retirement (Hutchens, 2010; Honig and Hanoch, 1985). Elsayed et al. (2015) show that in the Netherlands, agents retire later when they have greater flexibility in terms of number of working hours. However, employers can put restrictions on the number of working hours so that it is not always possible to decrease working hours towards retirement (Gielen, 2007; Gustman and Steinmeier, 1983). Kantarcı and van Soest (2008) show that in the Netherlands men aged 51-65 often work full-time whereas they prefer to work part-time, which is an indication that the employer puts restrictions on the number of working hours of the elderly.

In this paper, we first derive the neoclassical model of labor-leisure choice, and in particular we consider a life-cycle model for older workers to study how financial incentives and increasing retirement age affect the retirement decision (Borjas, 1996; Gustman and Steinmeier, 1984). For this, we take account of partial retirement. We then test the predictions of this model using a stated preference experiment. A stated preference approach overcomes the problem that, when

analysing actual retirement behavior, it is not known what retirement options are available for the agent, and therefore what trade-off the agent makes in order to choose a particular retirement trajectory.

The first aim of this study is to analyse preferences of older people for abrupt retirement and partial retirement scenarios. In addition, we analyse the effect of financial incentives on the preferred retirement scenario. In particular, we are interested in how the preferred retirement scenario changes when the incentives for retiring later change (substitution effect of pensions), or when the pension income level changes irrespective of the retirement age (income effect of pensions). Furthermore, we analyse the effect of increasing the retirement age on the preferred retirement decision. Moreover, we analyse the effect of a wage penalty during partial retirement on the preferred retirement choice.

We conduct an Internet panel survey where we present respondents with hypothetical retirement scenarios of hypothetical people. The retirement scenarios differ from each other with respect to the (full or partial) retirement ages and pension income amounts. Respondents are presented with the retirement scenarios and choose their most preferred plan by making a trade-off between income and leisure.

The second aim of this study is to analyse whether provision of a partial retirement scheme would increase or decrease the total labor supply of older workers, and whether this is affected by financial incentives and the retirement age. Previous studies using revealed preference data were not able to observe what those respondents who follow a partial retirement trajectory would have done if partial retirement was not an option (Tolan, 2017). Furthermore, in studies using stated preference analysis, it is not asked which retirement trajectory those respondents who prefer partial retirement would have chosen in the absence of partial retirement, see for example (Kantarcı and van Soest, 2015). By asking those respondents who prefer partial retirement what they would have chosen in the absence of partial retirement, we analyse if partial retirement increases or decreases total labor supply of older workers.

The final aim of this study is to analyse what makes partial retirement attractive in terms of number of hours worked and number of steps partial retirement consists of, and whether this is affected by financial incentives and the retirement age.

We have several findings. First, 40% of the respondents prefer partial retirement to abrupt retirement. We find that partial retirement is the most preferred choice irrespective of whether partial retirement starts at an early or later retirement age. Partial retirement is particularly attractive when it starts at age 63. Preferences for retirement plans depend on financial incentives and the retirement age. Moreover, preferences for retirement plans depend on the agents background characteristics.

Second, partial retirement can increase the total labor supply of older workers, but it depends on the financial incentives and the retirement age. An interesting finding is that for actuarially fair rewards for retiring later and an actuarially fair pension income irrespective of retirement age, the option to partially retire increases total labor supply for all retirement ages considered in this paper. When partial retirement starts at age 63, partial retirement increases total labor supply, irrespective of the financial incentives.

Third, we find that when partial retirement starts at age 63, a part-time wage penalty has no effect on the preferences for partial retirement. When partial retirement starts at an earlier or later retirement age, a part-time wage penalty has a negative effect on the preferences for partial retirement. This implies that between ages 63 and 68, agents want to work part-time, even if this has negative financial consequences. In general, when partial retirement induces a decrease in wage and change in employer, agents are less likely to prefer this option, and rather continue to work.

Finally, we document what makes partial retirement attractive in terms of number of hours

worked and the number of steps partial retirement consists of. We find that most agents prefer to work 20 hours during partial retirement. The level of pension income and the retirement age have no significant effect on the number of hours a respondent wants to work. In terms of the number of steps partial retirement consists of, we find that most agents prefer to reduce their working effort in two steps during partial retirement, and thus want to reduce hours towards retirement not just once, but further reduce hours with increasing age. The level of pension income has no significant effect on whether a respondent wants to reduce working effort in one or two steps.

This paper is organized as follows. Section 2 describes the theoretical model of the labor-leisure choice. Section 3 describes the data and the experimental design. Section 4 presents descriptive results of the preferences for different retirement scenarios. Section 5 describes the econometric models. Section 6 presents the results. Section 7 presents sensitivity checks. Section 8 validates the stated preferences using the expected or realized retirement decisions of the respondents. Section 9 concludes.

2 Theoretical models and predictions

Agents make a trade-off between work (consumption) and leisure in order to make a decision on how many hours to work. In this section we use the neoclassical model of labor-leisure choice and consider in particular a life-cycle model for older workers to study how financial incentives and increasing retirement age affect the retirement decision (Borjas, 1996; Gustman and Steinmeier, 1984). Gustman and Steinmeier (1984) show that agents maximize expected lifetime utility by choosing an optimal amount of consumption and leisure in each period. The total expected lifetime utility that the agent achieves from his decisions is given by:

$$U = \int_0^T f(C(t), L(t), t; \beta)dt$$

where $C(t)$ is the consumption at time t, $L(t)$ is leisure at time, T is the expected maximization horizon and β is a vector of parameters which determines the shape of the agent's utility function. The number of hours an agent works at time t not only affects his consumption now in the form of wage, but also the amount of consumption in the future, in the form of pension income. Therefore, an agent takes account of the future when making a choice on how many hours to work. Different levels of consumption (income) and leisure will generate the same level of utility. All different combinations of consumption and leisure amounts with the same level of utility lead to the indifference curve of the agent.

An agent maximizes his expected utility at a feasible level of consumption and leisure. This feasible level of consumption and leisure is determined by the agent's lifetime budget line, given by:

$$\int_0^T d(t)(W_F[H_F(t), t] + W_P[H_P(t), t])dt + A_0$$

Where $d(t)$ is the discount factor to time t. $H_F(t)$ is the number of hours the agent works in his full-time job, and $H_P(t)$ is the number of hours the agent works in his part-time job. $W_F[H_F(t), t]$ is the total income now and in the future generated from working $H_F(t)$ hours at the full-time job, including wage and pension income. $W_P[H_P(t), t]$ is the total income now and in the future generated from working $H_P(t)$ hours at the part-time job, including part-time wage, partial pension income and full pension income. A_0 is the discounted value of the agent's non-labor income, such as capital gains and gifts.

The optimal level of consumption and leisure is reached at the point where the lifetime budget line is tangent to the indifference curve. Figure 1 illustrates a potential maximization problem. In the figure we normalize the leisure time so that 0 indicates that the agent works full-time (and thus has 0 leisure time while working), and 1 means that the agent does not work at all and therefore is retired. The slope of the budget line is negative, as income level and thus consumption level is a positive function of working hours.

For the maximization problem in Figure 1, the wage rate does not change for part-time work. However, partial retirement often induces a wage penalty. This will result in a change in the budget line. In our stated preference experiment, a decrease in wage rate during partial retirement does not have an effect on the pension income during partial or full-retirement. Gustman and Steinmeier (1984) show that when partial retirement induces a wage penalty, the budget line shifts down during partial retirement. Figure 2 illustrates a potential maximization problem when partial retirement induces a wage penalty.

The presented theoretical model can be used to study how the labor-leisure choice is affected by pension incentives and the retirement age. First, we will study the implications of changing the rewards for retiring later (substitution effect). We then analyse the implications of changing the pension income level irrespective of the retirement age (income effect). Finally, we study the

implications of increasing retirement age (retirement age effect). In these analyses we assume that the wage rate stays the same during partial retirement.

Figure 1: A maximization problem for the labor-leisure choice

Figure 2: A maximization problem for the labor-leisure choice when partial retirement induces a wage penalty

Substitution effect

At a certain age, an older worker decides to continue to work full-time, part-time, or retire. When an agent decides to work longer, he can be rewarded with increases in pension income in an actuarially fair manner, in an actuarially less than fair manner, or in a more than fair manner.

Figure 3 shows the agent's maximization problem, and in particular the shift in lifetime budget line and indifference curve, when the rewards for retiring later increase. An agent can choose to spend his full available time on leisure (early retirement: point 1 on the x-axes), on continuing to work full-time (late retirement: point 0 on the x-axes) or anything in between (partial retirement). When the increases in pension income for retiring later are actuarially more than fair, the total income (and thus consumption) for partial retirement and late abrupt retirement is higher compared to when the increases in pension income for retiring later are actuarially fair. The rewards for retiring later do not have an effect on the budget line at the point of early retirement, as the total income for early retirement is the same irrespective of the rewards for retiring later. Therefore, the budget line rotates clockwise around point E. When the rewards for retiring later increase, the cost of leisure increases and we therefore expect that agents choose to work longer (Borjas, 1996). This results in a shift of the indifference curve to the left.

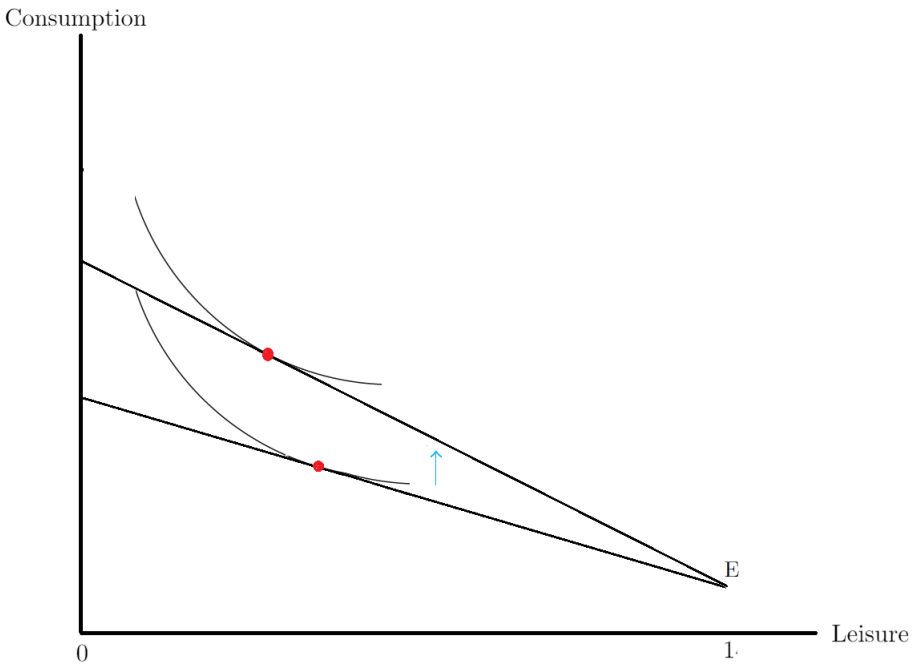


Figure 3: The effect of the rewards for retiring later on the labor-leisure choice

Income effect

Depending on the pension schemes, pension rights accrue at an actually fair rate, at an actuarially less than far rate, or at a more than fair rate. The pension accrual rate affects the pension income irrespective of the retirement age. We analyse the change in the labor-leisure choice when the pension income irrespective of the retirement age changes.

Figure 4 shows the agent's maximization problem, and in particular the shift in lifetime budget line and indifference curve, when the pension income irrespective of the retirement age

increases. An agent can choose to spend his full available time on leisure (early retirement: point 1 on the x-axes), on continuing to work full-time (late retirement: point 0 on the x-axes) or anything in between (partial retirement). When the pension income irrespective of the retirement age increases, the total income increases irrespective of the retirement decision. This results in an upward shift of the budget line. If leisure is a normal good, an increase in income results in an increase in demand for leisure. Therefore, the amount of leisure time at which an agent maximizes his utility, subject to his lifetime budget constraint, increases when there is an increase in the pension income level. This results in a shift of the indifference curve to the right.

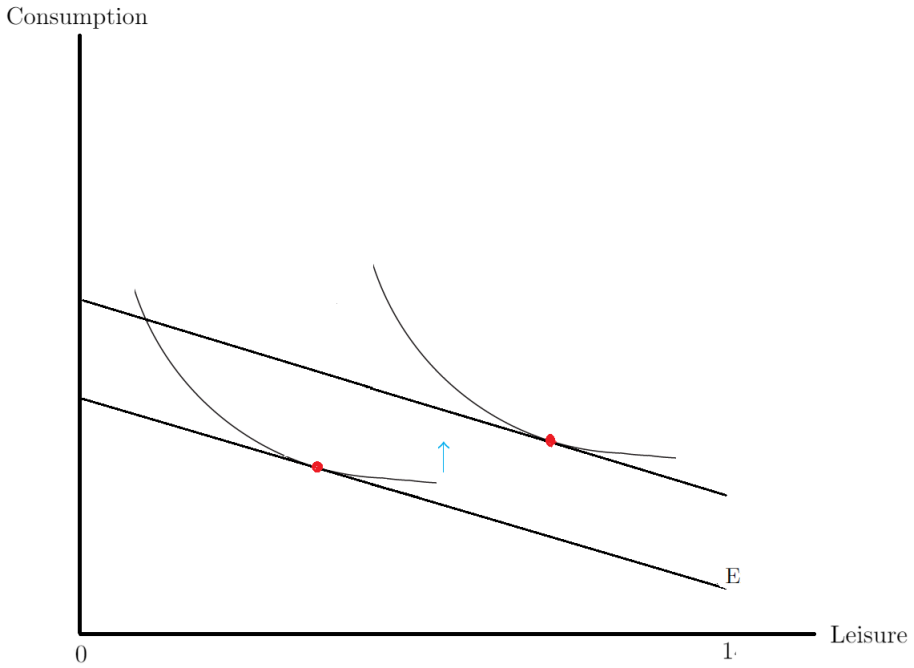


Figure 4: The effect of the pension income irrespective of the retirement age on the labor-leisure choice

Retirement age effect

Whereas the substitution and income effect induce a change in both the lifetime budget line and the indifference curve, aging only induces a change in the indifference curve. At increasing age, an agent prefers more leisure and therefore the compensation in income an individual wants for giving up one hour of leisure increases. This results in the indifference curve rotating clockwise, and thus the indifference curve becomes steeper. Moreover, at increasing age, full-retirement becomes unavoidable because of health limitations. Therefore, the indifference curve shifts to the right. A potential shift in the indifference curve over age is presented in Figure 5.

Figure 5: The effect of age on the labor-leisure choice

3 Data and experimental design

3.1 Data

The survey is fielded in June 2017 in the Longitudinal Internet Studies for the Social Sciences (LISS) panel administered by CentERdata at Tilburg University. The sample is restricted to respondents ages 40 and older since younger respondents might not have a clear view on their retirement plans yet. This results in a sample of 3263 respondents. The sample is representative of the Dutch population. Summary statistics on the background characteristics are shown in Table 1. In our sample, 37.9% works for an employer. 7% has no income from work, and most respondents have a net income between 1001 and 2000 euro per month. 33.5% of our sample is retired.

Table 1: Background characteristics

Characteristic	Attribute	Frequency(%)
Age	40-49	20.35
	50-59	25.25
	60-69	31.14
	70+	23.26
Gender	Female	51.06
	Male	48.94
Marital status	Married or living with partner	71.71
	Single (divorced, widowed, etc.)	28.29
Education level	Primary school	6.26
	Secondary and prep. uni./high school	35.03
	Vocational education/college	49.74
	University	8.97
Work status	Working for an employer	37.85
	Working self-employed	6.22
	(Partially) disabled	5.12
	Retired	33.53
	Other	17.22
Income level	0	7.00
	1-1000	20.18
	1001-2000	39.68
	2001-3000	25.23
	3001-4000	5.93
	4001-5000	1.20
	5000+	0.78
House owner	Owns a house	74.38
	Doesn't own a house	25.62

Notes: 1. Number of observations is 3263. 2. Income levels represent self-reported last monthly net income from work. 3. Totals may not add due to rounding errors.

3.2 Experimental design

The first part of the survey contains questions about background characteristics and work. In the second part, questions are asked to measure the preference for different retirement scenarios.

The retirement scenarios are presented to the respondents as vignettes. A vignette is a description of a hypothetical situation. We use vignettes to reveal respondents' intended behaviors with respect to the presented vignettes (Steiner et al., 2016). The hypothetical situations in our survey are retirement scenarios of hypothetical persons. First, respondents choose among full and partial retirement scenarios. In a next question, respondents are asked to choose among variations of partial retirement scenarios.

Comparing retirement scenarios

We analyse the preferences for abrupt and partial retirement scenarios. Figure 6 in the Appendix shows the question where respondents choose among three different retirement scenarios. The question starts with a text explaining the situation. Then, respondents are asked to choose among early abrupt retirement, partial retirement and late abrupt retirement scenarios. The partial retirement scenario is always presented second in order, but the order how the abrupt early retirement scenario and the late abrupt retirement scenarios are presented is randomized. In the next screen, respondents are asked to rate each scenario on a 10-point scale.

We analyse whether partial retirement increases total labor supply among older workers. In order to do this, we give respondents who choose partial retirement among the three retirement scenarios an extra question where they are asked to choose among the early abrupt retirement and the late abrupt retirement scenarios, where the partial retirement scenario is omitted. If the respondent prefers to retire early, partial retirement extends his working life and thus increases his total labor supply. If the respondent prefers to continue to work full-time and retire at a later age, partial retirement induces a decrease in working hours towards retirement, and therefore decreases total labor supply. The respondent is also asked to rate the two scenarios on a 10-point scale.

The retirement scenarios have six attributes: age of retirement, number of working hours, work income during full-time work, work income during partial retirement, duration of partial retirement, and pension income. For the retirement age, we consider three different retirement age regimes: 65, 63 and 61. Respondents are asked to choose among retirement scenarios for all three retirement age regimes in the following way: first, respondents choose among and rate the three scenarios of early abrupt retirement, partial retirement, and late abrupt retirement for the retirement age regime which is closest to their expected or realized retirement age. Then, this is repeated for the other two age regimes, so that the respondents have chosen among the three scenarios for retirement age regime 65, 63 and 61. Table 2 displays the corresponding retirement ages for early abrupt retirement, partial retirement, and late abrupt retirement corresponding to each retirement age regime. For example, in retirement age regime 65, the retirement age for the early abrupt retirement scenario is 65 and for the late abrupt retirement scenario is 70. In the partial retirement scenario, the partial retirement age is 65 and the full retirement age is 70.

In the scenarios, the number of working hours during full-time work is 40 hours a week and the number of working hours during partial retirement is 20 hours a week.

The work income in the hypothetical scenarios depend on the respondent's actual work income asked earlier in the survey. This is in order to avoid alienation bias, which occurs if a respondent has problems evaluating scenarios that are too different from their own situation (Hanemann, 1994; Whittington, 2002). Respondents are randomly assigned a wage regime during partial retirement. Half of the respondents is assigned a low wage regime, which means that the hypothetical person reduces working hours at a less demanding job with a 20 percent lower wage rate than in the full-time job. This reflects the stylized empirical fact that when an agent moves to a part-time job in old age it is likely that his wage rate is reduced (Gustman

and Steinmeier, 1982, 1983, 1984, 1985; Gordon and Blinder, 1980; Ghent et al., 2001; Russo and Hassink, 2008). The other half of the respondents is assigned a normal wage regime, which means that the hypothetical person reduces working hours at the same job with the same wage rate as in the full-time job.

Respondents are randomly assigned a duration regime. Half of the respondents is assigned a short duration regime and the other half of the respondents is assigned a long duration regime. Partial retirement takes four years in the short duration regime, whereas it takes five years in the long duration regime.

Pension incomes are computed as a percentage of the work income during full-time work, starting from a given replacement rate. Replacement rates are computed by Kantarcı et al. (2013). There are nine different regimes for the replacement rates, and each respondent is randomly assigned a replacement rate regime. In the scenarios, the pension incomes are presented as absolute amounts computed from the replacement rates. In the nine different replacement rate regimes, we distinguish between substitution effects and income effects. For both income and substitution effects, a low, middle and high regime is defined. When the rewards for retiring later changes, we measure the substitution effect. In the middle substitution effect regime, the rewards for retiring later are actuarially fair. The low substitution effect regime gives less than actuarially fair rewards for retiring later, and the high substitution effect regime gives actuarially generous rewards for retiring later. When pension income changes, irrespective of the retirement age, we measure the income effect. The middle income effect regime provides actuarially fair pension incomes irrespective of the retirement age. The low income effect regime provides less than actuarially fair pension incomes, and the high income effect regime provides actuarially generous pension incomes.

Table 2 shows the replacement rates of full and partial retirement for the three retirement age regimes.[1] Looking at the replacement rates row-wise, we distinguish between three substitution effect regimes. The first, second and third row indicates the low, middle, and high substitution effect regime, respectively. For example, in retirement age regime 65, a respondent in the low substitution effect regime is assigned the replacement rates 0.60, 0.75 and 0.90 for early abrupt retirement, partial retirement and late abrupt retirement respectively. A different respondent in the middle substitution effect regime is assigned the replacement rates 0.60, 0.80 and 1.00 for early abrupt retirement, partial retirement and late abrupt retirement respectively. If both respondents have the same work income level, the second respondent is rewarded more for later retirement than the first respondent, while their pension income level for early retirement is the same. Looking at the replacement rates in Table 2 column-wise, we distinguish between three income effect regimes. The first, second and third column indicates the low, middle or high income effect regime, respectively. For example, in retirement age regime 65 a respondent in the low income effect regime is assigned the replacement rates 0.60, 0.75 and 0.90 for early abrupt retirement, partial retirement and late abrupt retirement respectively. A different respondent in the middle income effect regime is assigned the replacement rates 0.70, 0.85 and 1.00 for early abrupt retirement, partial retirement and late abrupt retirement respectively. If both respondents have the same work income level, the second person has a higher pension income level irrespective of the retirement age.

[1] This table corresponds to the long duration regime, the replacement rates for the short duration regime are shown in Table 20 in the Appendix.

Table 2: Competing retirement scenarios with associated replacement rates

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

Notes: 1. PR and FR denotes partial and full retirement, respectively. 2. Looking at the replacement rates row-wise, the first, second and third rows refer, respectively, to the low, middle and high substitution effect regimes. Looking at the replacement rates column-wise, the first, second and third columns refer, respectively, to the low, middle and high income effect regimes. 3. The replacement rates during full retirement correspond to respondents with 5 years of partial retirement, i.e. long duration regime.

What makes partial retirement attractive?

We are interested in how to make partial retirement more attractive. Therefore, respondents are asked to choose among different variations of partial retirement scenarios. The US Bureau of Labor Statistics define partial retirement as working at most 34 hours per week. We have used working 20 hours per week as the definition of partial retirement for choosing among the three and two retirement scenarios. However, we are interested in the preferences with respect to the number of working hours during partial retirement. Furthermore, we are interested in whether a respondent prefers to reduce working effort in one step, or two steps.

Respondents who have chosen partial retirement among the three scenarios at least once get an extra question where they have to choose among three scenarios which differ with respect to the amount of hours they work during partial retirement. The retirement age regime is based on the retirement age regime for which the respondent has chosen partial retirement for the first time during the previous questions. The respondent is asked to choose among three partial retirement scenarios. The respondent chooses among working 12, 20 or 28 hours per week during partial retirement. In the next question, respondents are asked to rate each of the three pension plans on a 10 point scale. For evaluating the number of hours a respondent prefers to work during partial retirement, we only distinguish between different income effect regimes. The replacement rates corresponding to the different income effect regimes are shown in Table 3.

Table 3: Competing numbers of hours worked during partial retirement with associated replacement rates

Ret. age regime	PR age	Hours worked during PR	Pension income during PR	Pension income during FR
65	65-69	12	0.45/0.55/0.65	0.75/0.85/0.95
	65-69	20	0.25/0.35/0.45	0.80/0.90/1.00
	65-69	28	0.05/0.15/0.25	0.85/0.95/1.05
63	63-67	12	0.40/0.50/0.60	0.60/0.70/0.80
	63-67	20	0.20/0.30/0.40	0.65/0.75/0.85
	63-67	28	0.00/0.10/0.20	0.70/0.80/0.90
61	61-65	12	0.35/0.45/0.55	0.45/0.55/0.65
	61-65	20	0.15/0.25/0.35	0.50/0.60/0.70
	61-65	28	0.00/0.05/0.15	0.55/0.65/0.75

Notes: 1. PR and FR denotes partial and full retirement, respectively. 2. Looking at the replacement rates, the first, second and third columns refer, respectively, to the low, middle and high income effect regimes. 3. The replacement rates shown are for the long duration regime, and those for the short duration regime are not shown.

Respondents who have chosen partial retirement among the three scenarios at least once are asked to choose among two step scenarios. The retirement age regime is again based on the retirement age regime for which the respondent has chosen partial retirement for the first time during the previous questions. The duration regime for partial retirement is four years for all respondents who are asked to answer this question, this means that we do not distinguish between short and long duration regimes. One of the two scenarios presents a hypothetical

person who works for 20 hours during partial retirement until full retirement. The other scenario presents a hypothetical person who works 20 hours per week for the first two years of partial retirement and 10 hours per week for the last years of partial retirement. In the next question, respondents are asked to rate the two scenarios. For evaluating the two step scenarios, we only distinguish between different income effect regimes. The replacement rates corresponding to the different income effect regimes are shown in Table 4.

Table 4: Competing numbers of steps partial retirement consists of with associated replacement rates

Ret. age regime	PR age	Number of steps PR consists of	Pen. income during the first step of PR	Pen. income during the second step of PR	Pen. income during FR
65	65-68	1	0.25/0.35/0.45		0.75/0.85/0.95
	65-68	2	0.25/0.35/0.45	0.50/0.60/0.70	0.70/0.80/0.90
63	63-66	1	0.20/0.30/0.40		0.60/0.70/0.80
	63-66	2	0.20/0.30/0.40	0.45/0.55/0.65	0.55/0.65/0.75
61	61-64	1	0.15/0.25/0.35		0.45/0.55/0.65
	61-64	2	0.15/0.25/0.35	0.40/0.50/0.60	0.40/0.50/0.60

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

4 Descriptive results

In this section we provide descriptive results for the choices and ratings of retirement scenarios the respondents are asked to evaluate. First, respondents choose among the three scenarios of early abrupt retirement, partial retirement, and late abrupt retirement for the retirement age regime which is closest to their expected or realized retirement age. In the next question, they are asked to rate the three scenarios. This is repeated for the other two retirement age regimes, so that the respondents have chosen among the three scenarios for retirement age regime 65, 63 and 61. If a respondent has chosen for the partial retirement scenario in a particular retirement age regime, he is asked to choose between early abrupt retirement and late abrupt retirement in the case that partial retirement would not be an option. We use this to analyse the effect of partial retirement on total labor supply. Subsequently, the respondent is asked to rate each of the two scenarios.

Merging all regimes, 29.2% choose the early abrupt retirement scenario, 40.4% choose the partial retirement scenario and 30.4% choose the late abrupt retirement scenario. The three scenarios are respectively rated 5.4, 6.1 and 5.5 on average. Respondents choose among three different scenarios for all three retirement age regimes. Merging all substitution and income effect regimes, in retirement age regime 65, 29.6% choose the early abrupt retirement scenario, 39.8% choose the partial retirement scenario and 30.7% choose the late abrupt retirement scenario. The three scenarios in retirement age regime 65 are respectively rated 5.4, 6.1 and 5.5 on average. Merging all substitution and income effect regimes, in retirement age regime 63, 28.0% choose the early abrupt retirement scenario, 42.9% choose the partial retirement scenario and 29.1% choose the late abrupt retirement scenario. The three scenarios in retirement age regime 63 are respectively rated 5.4, 6.2 and 5.5 on average. Merging all substitution and income effect regimes, in retirement age regime 61, 30.0% choose the early abrupt retirement scenario, 38.6% choose the partial retirement scenario and 31.4% choose the late abrupt retirement scenario. The three scenarios in retirement age regime 61 are respectively rated 5.4, 5.9 and 5.5 on average. The fraction of respondents who choose the partial retirement scenario is higher than the fraction of respondents who choose the early abrupt or late abrupt retirement option in all three retirement age regimes, which means that partial retirement is preferred over early and late abrupt retirement for every retirement age regime.

Merging all regimes, for the respondents who chose partial retirement, 51.8% chose abrupt early retirement and 48.2% chose abrupt late retirement in the absence of the partial retirement scenario. Furthermore, we checked whether respondents who choose a particular scenario are consistent in their choice with respect to the ratings. In Table 5 the average ratings for the three scenarios are displayed, conditioned on the choice of the respondents. We distinguish between the three retirement age regimes, but not between the substitution and income effect regimes. We find that respondents who choose a particular scenario, on average rate this scenario higher than the other two scenarios. Therefore, we conclude that respondents are on average consistent in their choice of a retirement scenario with respect to the ratings they give to each scenario.

Table 5: The rating respondents give to the three scenarios conditioned on their choice

Age regime	Chosen scenario	Rating ER	Rating PR	Rating LR
65	ER	7.4	5.3	4.2
	PR	4.9	7.6	5.0
	LR	4.0	5.0	7.4
63	ER	7.4	5.3	4.2
	PR	5.0	7.5	5.0
	LR	4.2	5.1	7.4
61	ER	7.2	5.2	4.3
	PR	5.0	7.4	5.0
	LR	4.2	5.0	7.3

Notes: 1. ER, PR and LR denotes early abrupt retirement, partial retirement and late abrupt retirement respectively. 2. Respondents choose for all three age regimes ER, PR or LR and give a rating to all scenarios in the age regimes. 3. The number of observations for the ratings depend on the number of respondents who choose early abrupt retirement, partial retirement and late abrupt retirement. The minimum amount of observations is 569 and the maximum amount of observations is 1288.

In Table 6 we show the fraction of respondents who choose a particular retirement scenario. Furthermore, we show the ratings given to all scenarios. The fraction of choices for abrupt early retirement and abrupt late retirement in the absence of partial retirement are shown as well. Respondents answered the questions for three retirement age regimes, and choices and ratings are based on pooling respondents evaluations for three sets of retirement scenarios that differ with respect to retirement age regimes. In the left columns, the income effects are merged so that we distinguish between different substitution effects. In the right columns, the substitution effects are merged so that we distinguish between different income effects.

In a high substitution effect regime, the rewards for working longer are higher compared to a lower substitution effect regime. In retirement age regime 65, more people choose partial retirement in higher substitution effect regimes. The fraction of respondents who choose both early abrupt retirement and late abrupt retirement decreases for higher substitution effect regimes. It might be that people think age 70 is too old to retire. As they prefer to work longer when the rewards for retiring later increase, partial retirement is a good alternative. For the choices among two scenarios, the fraction of respondents who choose late abrupt retirement increases as the incentive to work longer increases, which is in line with our theory. In retirement age regime 63, the fraction of people who choose partial retirement is higher in the middle and high substitution effect regimes compared to the low substitution effect regime. However, for the middle and high substitution effect regimes, the fractions are about the same. For the choices among two scenarios we do not observe a clear pattern with respect to the substitution effect regimes. Regardless of the rewards for retiring later, the fraction of respondents who choose early abrupt retirement is higher than the fraction of respondents who choose late abrupt retirement. This means that partial retirement would extend the working life for older people in this retirement age regime regardless of how agents are rewarded for retiring later. For retirement age regime 61, we do not observe clear patterns for the choices between three scenarios, as the partial retirement scenario is preferred in all three substitution effect regimes. However, the

fractions of choices in the absence of partial retirement are in line with what we would expect, as respondents indicate to prefer to work longer when the rewards for retiring later are high. The average ratings for the retirement scenarios are in line with the choices of respondents.

In a high income effect regime, pension incomes are higher irrespective of the retirement age compared to the middle and low income effect regime. In retirement age regime 65, we see that the fraction of respondents who choose a particular scenario is about the same for different income effect regimes. This holds for both the evaluations of three retirement scenarios and the evaluations of two retirement scenarios. For retirement age regime 63, the fraction of respondents who choose a particular scenario is about the same for different income effect regimes as well. In evaluating two scenarios, the fraction of respondents who choose early abrupt retirement is higher than the fraction of respondents who choose late abrupt retirement for all three income effect regimes. For retirement age regime 61, there is not a clear pattern in the evaluations of three scenarios either. However, in evaluating two scenarios, the fraction of respondents who choose early abrupt retirement increases as the general level of pension income increases. This is in line with our expectation that leisure is a normal good. We do not observe an income effect for the evaluations of three retirement scenarios, but partial retirement is the preferred scenario in all income effect regimes. The average ratings for the scenarios are consistent with respect to the choices of respondents.

From the perspective of public finances, the longer people stay in the labor force, the longer people pay taxes. We analyse if the option to partially retire increases total labor supply, and thus has the desired effect. In order to do so, we calculate the net effect of partial retirement on total labor supply. From Table 6 we can calculate the net effect of partial retirement on total labor supply for the different retirement age, substitution effect, and income effect regimes.

In revealed preference analysis it cannot be observed what partial retirees would have chosen, if partial retirement was not an option (Tolan, 2017). In our stated preference analysis we are able to observe this. For calculating the net effect, we use the fact that we know what respondents who choose the partial retirement scenario would have done, had partial retirement not been an option. If those respondents would have chosen early retirement, partial retirement would extend their working life. But if those respondents would have chosen late retirement, partial retirement would reduce their working hours before full retirement. Therefore, we are interested in the fraction of partial retirees who choose early and late abrupt retirement when evaluating two scenarios. For the effect on total labor supply, it is important to investigate how many respondents prefer the partial retirement scenario. Therefore the second thing we consider, is the fraction of respondents who prefer the partial retirement scenario in evaluating three scenarios. Thus, the net effect of partial retirement is determined by two aspects: 1. the difference in the fraction of partial retirees who choose early and late abrupt retirement when evaluating two scenarios, 2. the fraction of respondents who choose partial retirement when evaluating three scenarios.

We base our calculations of the net effect on two strong assumptions. First, we assume that the respondents who choose early abrupt retirement when evaluating three scenarios, would also choose early abrupt retirement in evaluating two scenarios. Second, we assume that the respondents who choose late abrupt retirement in evaluating three scenarios, would also choose late abrupt retirement in evaluating two scenarios. Therefore, we assume that the partial retirement scenario does not affect the respondents who do not choose this scenario with respect to decreasing or increasing total labor supply. In Table 6 we display the fraction of partial retirees who choose early abrupt retirement and late abrupt retirement when choosing among two scenarios. But if we would subtract those fractions, we get the net effect of partial retirement on labor supply for partial retirees. As explained above, we want the net effect of partial retirement on total labor supply for all respondents. We therefore multiply the difference

Table 6: Fraction of choices and average ratings under the substitution and income effect regimes

Ret. age regime	Type	Ret. age	Subst. effect	Repl. rates	Choice 3 sc.(%)	Rating 3 sc. (avg.)	Choice 2 sc.(%)	Rating 2 sc.(avg.)	Income effect	Repl. rates	Choice 3 sc.(%)	Rating 3 sc. (avg.)	Choice 2 sc.(%)	Rating 2 sc.(avg.)
65	FR	65	L	0.60/0.70/0.80	32.6	5.5	53.2	5.8***	L	0.60/0.60/0.60	29.2	5.3***	50.0	5.5
	PR	65-69		0.75/0.85/0.95	35.5	6.0***				0.75/0.80/0.85	41.6	6.1***		
	FR	70		0.90/1.00/1.10	31.9	5.5	46.8	5.6		0.90/1.00/1.10	29.3	5.3**	50.0	5.5
	FR	65	M	0.60/0.70/0.80	29.5	5.3**	50.5	5.9***	M	0.70/0.70/0.70	30.2	5.4	49.3	5.8***
	PR	65-69		0.80/0.90/1.00	39.8	6.1***				0.85/0.90/0.95	39.5	6.0***		
	FR	70		1.00/1.10/1.20	30.7	5.4	49.5	5.6		1.00/1.10/1.20	30.3	5.5	50.8	5.8***
	FR	65	H	0.60/0.70/0.80	26.6	5.3***	46.5	5.6	H	0.80/0.80/0.80	29.3	5.4	50.1	5.9***
	PR	65-69		0.85/0.95/1.05	44.0	6.2***				0.95/1.00/1.05	38.4	6.2***		
	FR	70		1.10/1.20/1.30	29.4	5.4	53.5	5.8***		1.10/1.20/1.30	32.4	5.5	49.9	5.7**
63	FR	63	L	0.50/0.60/0.70	29.4	5.5	55.3	6.0***	L	0.50/0.50/0.50	28.7	5.4*	54.5	5.9***
	PR	63-67		0.60/0.70/0.80	38.5	6.1***				0.60/0.65/0.70	42.2	6.1***		
	FR	68		0.70/0.80/0.90	32.1	5.6	44.7	5.9***		0.70/0.80/0.90	29.1	5.4*	45.5	5.7**
	FR	63	M	0.50/0.60/0.70	27.3	5.4	51.0	5.8***	M	0.60/0.60/0.60	27.0	5.4*	53.8	5.9***
	PR	63-67		0.65/0.75/0.85	45.4	6.2***				0.70/0.75/0.80	43.1	6.2***		
	FR	68		0.80/0.90/1.00	27.3	5.4*	49.0	5.7**		0.80/0.90/1.00	29.9	5.6	46.2	5.8***
	FR	63	H	0.50/0.60/0.70	27.3	5.4	54.8	5.8***	H	0.70/0.70/0.70	28.3	5.6	52.8	5.9***
	PR	63-67		0.70/0.80/0.90	44.8	6.2***				0.80/0.85/0.90	43.3	6.3***		
	FR	68		0.90/1.00/1.10	27.9	5.5	45.2	5.7*		0.90/1.00/1.10	28.4	5.5	47.2	5.8***
61	FR	61	L	0.40/0.50/0.60	28.9	5.4	53.9	6.0***	L	0.40/0.40/0.40	31.1	5.3**	49.7	5.7**
	PR	61-65		0.45/0.55/0.65	38.5	5.9***				0.45/0.50/0.55	37.2	5.7***		
	FR	66		0.50/0.60/0.70	32.6	5.6	46.1	5.8***		0.50/0.60/0.70	31.8	5.4	50.3	5.8***
	FR	61	M	0.40/0.50/0.60	30.3	5.4*	54.9	5.9***	M	0.50/0.50/0.50	28.8	5.4**	51.4	5.9***
	PR	61-65		0.50/0.60/0.70	38.9	6.0***				0.55/0.60/0.65	38.2	6.0***		
	FR	66		0.60/0.70/0.80	30.7	5.4	45.1	5.7**		0.60/0.70/0.80	33.0	5.6	48.6	5.8***
	FR	61	H	0.40/0.50/0.60	30.9	5.4	47.2	5.8***	H	0.60/0.60/0.60	30.3	5.5	54.5	6.1***
	PR	61-65		0.55/0.65/0.75	38.4	6.0***				0.65/0.70/0.75	40.3	6.1***		
	FR	66		0.70/0.80/0.90	30.8	5.5	52.8	5.9***		0.70/0.80/0.90	29.3	5.5	45.5	5.8***

Notes: 1. FR and PR denotes full and partial retirement, respectively. L, M and H respectively refer to low, middle and high regimes. 2. In the table, for the partial retirement scenario, the replacement rates during the period of partial retirement are not shown but only those during full retirement. 3. About 1000 respondents choose one of the three retirement plans and rate each of them under each regime of the substitution and income effects, under each age regime. 4. Choices and ratings are based on pooling respondents' evaluations for three sets of retirement scenarios that differ with respect to retirement age regimes. 5. The choices and ratings are pooled for the respondents with short and long duration regime. The Retirement ages and replacement rates corresponding to the long duration regime are displayed, for the respondents allocated to the short duration regimes, the retirement age and replacement rates can be found in Table 20. 6. Totals of choices may not add due to rounding error. 7. ***, **, * indicate statistical significance at the 0.01, 0.05, 0.10 levels, respectively, based on the test of the null hypothesis that the mean rating is equal to 5.5. The null hypothesis that the means of the ratings given to the three retirement scenarios are equal to each other is rejected at the 0.01 level in all of the 18 cases associated with the substitution and income effect regimes in the table. The null hypothesis that the means of the ratings given to the two retirement scenarios are equal to each other is not rejected in all 18 cases.

in fractions for early abrupt retirement and late abrupt retirement (when choosing among two scenarios) by the fraction of respondents who choose partial retirement (when choosing among three scenarios). For example, for retirement age regime 65 and substitution effect regime low, 32.6%, 35.5% and 31.9% of the respondents choose early abrupt retirement, partial retirement and late abrupt retirement respectively. Out of the partial retirees, 53.2% choose early abrupt retirement and 46.8% choose late abrupt retirement, had partial retirement not been an option. Since more partial retirees choose early abrupt retirement among two scenarios, we know that the partial retirement option increases total labor supply. Furthermore, the fraction of respondents who choose partial retirement is quite high, so it is important to consider the effect of partial retirement on total labor supply for all respondents. The magnitude is computed by subtracting 53.2% by 46.8% (=6.4%), followed by multiplying this by the fraction of partial retirees (35.5%). This results in a net effect of 2.3%.

When more partial retirees choose early abrupt retirement than late abrupt retirement, we always get a positive net effect. A positive net effect indicates that the option to partially retire increases total labor supply, and a negative net effect indicates that the option to partially retire decreases total labor supply.

In Table 7 we display the net effect of partial retirement for all respondents. In the left hand panel, we observe a clear pattern for retirement age regime 65 and 61 with respect to substitution effect regimes. Increasing the incentives to delay retirement decreases the net effect of partial retirement on total labor supply. In the high substitution effect regime, we even observe a negative net effect, which suggests that rewarding people to retire later causes the option to partially retire to decrease total labor supply. In the right hand panel, we do not observe a clear effect for the income effect on total labor supply for retirement age regime 65 and 63. For retirement age regime 61, we observe that the net effect of partial retirement on total labor supply increases as the general income level increases. Another factor which determines if the option to partially retire increases or decreases total labor supply, is the retirement age. For retirement age regime 63, partial retirement increases total labor supply for all substitution and income effect regimes. It might be that people think 63 is a good age to reduce working hours without having to quit working completely. For retirement age regime 61 and 65, the effect of partial retirement on total labor supply depends on retirement incentives.

In Table 8 we condition on the respondents' expected or realized retirement age, and display the fractions of choices for all three retirement age regimes which are evaluated by the respondent. From this table, we can observe if respondents with different expected or realized retirement age evaluate the retirement scenarios differently. Furthermore, we can observe how respondents with a given expected or realized retirement age, evaluate the different age regimes. The substitution and income effects are merged.

For retirement age regime 63, the fraction of respondents who choose partial retirement is higher for respondents with expected or realized retirement age 63 and 65 compared to expected or realized retirement age 61. Respondents with expected or realized retirement age 61 more often choose the early abrupt retirement scenario than respondents with expected or realized retirement age 63 and 65. This is not surprising, since their expected or realized retirement age of 61 might be because they prefer to retire early. In retirement age regime 65, the fraction of respondents who choose partial retirement is 10 percentage points higher for respondents with an expected or realized retirement age of 65 compared to 63 and 61. We can conclude that it is important to consider which retirement age regime is affected by provision of a partial retirement scheme, since the different retirement scenarios for particular retirement age regimes can be evaluated differently over people with different expected retirement age.

For respondents with expected or realized retirement age 65, we observe that the fraction of respondents who choose partial retirement is higher than the fraction of respondents who

Table 7: Net effect of partial retirement on total labor supply for all respondents (%)

Ret. age regime	Subst. effect	Net effect for all respondents	Income effect	Net effect for all respondents
65	L	2.3	L	0.0
	M	0.4	M	−0.6
	H	−3.1	H	0.1
63	L	4.1	L	3.8
	M	0.9	M	3.3
	H	4.3	H	2.4
61	L	4.3	L	−0.2
	M	3.8	M	1.1
	H	−2.2	H	3.6

Notes: 1. L, M and H respectively refer to low, middle and high regimes. 2. The net effect for different substitution and income effect regimes is based on about 1000 observations. 3. The net effects are derived from Table 6.

choose either early abrupt retirement or late abrupt retirement, in all retirement age regimes. Respondents with expected or realized retirement age 61 or 63, on average prefer partial retirement to early abrupt retirement or late abrupt retirement in retirement age regimes 61 and 63 as well. In retirement age regime 65, the fraction of respondents who choose early abrupt retirement is slightly higher than the fraction of respondents who choose partial retirement or late abrupt retirement. This is in line what we expect, as respondents whose expected or realized retirement age is 61 or 63 probably perceive 70 as too old to retire. Furthermore, we observe that respondents who prefer the partial retirement scenario when evaluating three scenarios, more often choose early abrupt retirement in the absence of the partial retirement scenario. This suggests that the option to partially retire increases total labor supply. In Table 9, the net effects of partial retirement on total labor supply are displayed for different expected or realized retirement ages and retirement age regimes. It shows that the retirement age regime has an effect on the net effect of partial retirement on total labor supply, as we once more observe large positive net effects for retirement age regime 63. Irrespective of the expected or realized retirement age, the option to partially retire increases labor supply for retirement age regime 63. Furthermore, partial retirement decreases total labor supply for retirement age regime 65 when we consider respondents who expect or realized to retire at this particular age.

In Table 10 we condition on the choice of the respondents in a particular retirement age regime, and display the fraction of choices in the other two retirement age regimes. This table shows that respondents are persistent in their choices, irrespective of the retirement age regime. Conditioned on choosing a particular scenario in any retirement age regime, the fraction of respondents who choose the same scenario in the other two retirement age regimes is higher than the fraction of respondents who choose any of the other two scenarios.

This table also provides the results for the evaluations of two scenarios. For the respondents who choose early abrupt retirement in a particular retirement age regime when evaluating three scenarios, about 30% choose partial retirement in the other two retirement age regimes. When those respondents have to choose among early and late abrupt retirement in the absence of partial retirement, they more often prefer early abrupt retirement. Therefore, for respondents who choose the early abrupt retirement scenario among three scenarios at least once, partial

Table 8: Choices in the three retirement age regimes based on the expected or realized retirement age (%)

Exp. or real. ret. age	Number of scenarios	Choice in age regime 61			Choice in age regime 63			Choice in age regime 65		
		ER	PR	LR	ER	PR	LR	ER	PR	LR
61	3	30.9	35.2	33.9	33.0	37.2	29.8	34.0	32.4	33.7
	2	51.8		48.2	53.0		47.0	53.0		47.0
63	3	29.0	39.9	31.2	26.2	43.1	30.7	31.5	33.7	34.8
	2	54.6		45.4	56.7		43.3	52.9		47.1
65	3	30.0	39.4	30.6	26.8	44.7	28.5	27.6	43.7	28.7
	2	51.3		48.7	53.1		46.9	49.1		51.0

Notes: 1. ER, PR and LR denotes early abrupt retirement, partial retirement and late abrupt retirement respectively. 2. The number of observations that answer the question for three scenarios is about 625 for expected or realized age regime 61, about 460 for expected or realized age regime 63 and about 1910 for expected or realized age regime 65. The number of observations that answer the question for two scenarios is about 230 for expected or realized age regime 61, about 170 for expected or realized age regime 63 and about 1200 for expected or realized age regime 65.

Table 9: Net effect in the three retirement age regimes based on the expected or realized retirement age (%)

Exp. or real. ret. age	Net effect all resp. in age regime 61	Net effect all resp. in age regime 63	Net effect all resp. in age regime 65
61	1.3	2.2	1.9
63	3.7	5.8	2.0
65	1.0	2.8	−0.8

Notes: 1. The net effects are derived from Table 8.

retirement increases total labor supply.

This is the other way around for respondents who choose late abrupt retirement in a particular retirement age regime. For those respondents, when choosing among two scenarios, the late abrupt retirement scenario is chosen more often over the early abrupt retirement scenario. This indicates that for respondents who choose the late abrupt retirement scenario among three scenarios at least once, partial retirement decreases total labor supply. However, this effect is not as large as the effect for respondents who choose early abrupt retirement at least once.

Respondents who have chosen partial retirement in a particular retirement age regime, and choose the same scenario again in any other retirement age regime, are more divided over choosing early and late abrupt retirement when the partial retirement scenario is omitted.

From this, we can conclude that for agents who make a trade off between early retirement and partial retirement, partial retirement would increase total labor supply. Whereas for agents who make a trade off between late retirement and partial retirement, partial retirement would decrease total labor supply.

In Table 10, we present the fraction of choices in the other retirement age regimes, conditioned on a particular retirement age regime. In Table 11, we present the exact consecutive retirement scenario choices for respondents in retirement age regime 61, 63 and 65. From this

Table 10: Choices conditioned on the choice in a given age regime (%)

Retirement age regime	Choice	Number of scenarios	Choice in age regime 61			Choice in age regime 63			Choice in age regime 65		
			ER	PR	LR	ER	PR	LR	ER	PR	LR
61	ER	3				62.1	29.3	8.7	46.6	31.9	21.5
		2				74.9		25.1	49.8		50.2
	PR	3				17.4	66.6	16.0	25.6	51.8	22.6
		2				52.2		47.8	48.3		51.7
	LR	3				8.3	26.8	64.9	18.2	32.5	49.3
		2				36.1		63.9	52.5		47.5
63	ER	3	66.7	24.0	9.3				63.0	25.0	12.0
		2	70.7		29.3				61.4		38.6
	PR	3	20.5	59.9	19.6				20.2	59.5	20.3
		2	50.0		50.0				51.6		48.4
	LR	3	8.9	21.2	69.8				11.2	25.1	63.7
		2	39.5		61.5				32.9		67.1
65	ER	3	47.3	33.3	19.3	59.6	29.3	11.1			
		2	54.6		45.4	71.9		28.1			
	PR	3	24.1	50.3	25.6	17.6	64.0	18.4			
		2	51.0		49.0	53.1		46.9			
	LR	3	21.1	28.5	50.5	11.0	28.4	60.6			
		2	51.0		49.0	37.2		62.8			

Notes: 1. ER, PR and LR denotes early abrupt retirement, partial retirement and late abrupt retirement respectively. 2. Respondents choose for all three age regimes either early abrupt retirement, partial retirement or late abrupt retirement, conditioned on this choice, this table displays respondents' choices in the other two are regimes. 3. The number of observations depend on the number of respondents who choose early abrupt retirement, partial retirement or late abrupt retirement in a given age regime. The minimum amount of observations is 837 and the maximum amount of observations is 1285.

table, we can more clearly see that respondents are persistent in their choices. 41.9% of the respondents choose the same retirement scenario in all three retirement age regimes, which means that 41.9% of the respondents prefers a particular retirement scenario irrespective of the retirement age regime. Out of the 41.9% of the respondents who prefer the same scenario in all three retirement age regimes, 16.4% of the respondents choose partial retirement in all three age regimes, 13.6% of the respondents choose late abrupt retirement in all three age regimes, and 11.9% of the respondents choose early abrupt retirement in all three age regimes. The next nine consecutive choices which occur most (rank 4 until rank 13) contain partial retirement at least once, which again suggests that it is a preferred choice.

Furthermore, we can see how partial retirement affects total labor supply for different consecutive choices. If in a retirement age regime partial retirement is chosen, the fractions of choices when partial retirement is omitted are presented. When the consecutive choices contain both the early abrupt retirement scenario and the partial retirement scenario, we once more observe the clear result that early abrupt retirement is chosen more often than late abrupt retirement when choosing among two scenarios. For those respondents, the partial retirement option increases total labor supply, as partial retirement extends their working life.

Table 11: Frequencies of consecutive retirement scenario choices at age regime 61, 63 and 65 (%)

Rank	Consecutive choices	Frequency	age regime 61		age regime 63		age regime 65		Cumulative
			E	L	E	L	E	L	
1	PPP	16.44	49.4	50.6	51.0	49.0	49.0	51.0	16.44
2	LLL	13.57							30.01
3	EEE	11.90							41.91
4	LLP	4.81					34.0	66.0	46.72
5	PPE	4.71	44.0	56.0	75.2	24.8			51.44
6	EPP	4.55			80.2	19.8	41.9	58.1	55.98
7	PPL	4.51	58.8	41.2	32.6	67.4			60.49
8	LPP	4.51			33.3	67.7	70.4	29.6	65.01
9	EEP	4.41					58.3	41.7	69.42
10	PEE	4.41	68.2	31.8					73.83
11	PLL	3.58	38.3	61.7					77.41
12	EPL	2.71			58.0	42.0			80.11
13	LPE	2.41			55.6	44.4			82.52
14	EEL	2.34							84.86
15	LLE	1.97							86.83
16	PLP	1.87	41.1	58.9			25.0	75.0	88.70
17	PEP	1.67	78.0	22.0			68.0	32.0	90.37
18	EPE	1.54			89.1	10.9			91.91
19	LPL	1.50			13.3	86.7			93.42
20	ELL	1.40							94.82
21	LEE	1.34							96.16
22	LEP	0.87					61.5	38.5	97.03
23	PLE	0.74	40.9	59.1					97.76
24	ELP	0.64					47.4	52.6	98.40
25	PEL	0.64	68.4	31.6					99.03
26	ELE	0.57							99.60
27	LEL	0.40							100.00

Notes: 1. E stands for early retirement, P stands for partial retirement, L stands for late retirement 2. The first letter in the consecutive choices indicates the choice of the respondent at age regime 61, the second letter indicates the choice of the respondent at age regime 63 and the third letter indicates the choice of the respondent at age regime 65. 3. Number of observations is 2992. 4. When partial retirement is chosen at least once in the consecutive choices, we check for that age regime the choices among early abrupt and late abrupt retirement in the absence of partial retirement.

We obtained descriptive results on retirement plan evaluations, and found that partial retirement is a preferred choice. As we observed that partial retirement often increases total labor supply, we are interested in how to make partial retirement more attractive. Respondents who choose partial retirement at least once in the plan evaluations, are asked to choose among different partial retirement scenarios.

Partial retirement scenarios

This subsection provides descriptive results on what makes partial retirement attractive. In order to do this, we ask respondents who chose partial retirement at least once in the plan evaluations to answer two extra questions. In the first question they are asked to choose among

three partial retirement plans which differ with respect to the amount of working hours during partial retirement. In the second question they are asked to choose among two partial retirement plans which differ with respect to reducing the work effort in one or two steps. Because the plan evaluations contain only partial retirement scenarios, we do not distinguish between different substitution effect regimes. Table 12 presents the frequencies of choices for respondents who choose among different scenarios which differ with respect to the number of working hours. For every retirement age regime and income effect regime, more respondents prefer working 20 hours than 12 or 28 hours. It might be that respondents think 12 hours is too few and 28 hours is too many. It might also be that they think working 20 hours is normal during partial retirement, as we used this in the previous questions. For retirement age regime 65 and 63, we do not observe a pattern for different income effect regimes. However, for retirement age regime 61, we observe that more respondents prefer working 12 hours when the retirement income increases. This is in line with our theory that the demand for leisure increases as income increases. On average, people are consistent in the ratings with respect to the choices.

Table 13 presents the frequencies of choices for respondents who choose among different step scenarios. With only one exception, for all income effect and retirement age regimes, respondents prefer to reduce work effort in two steps compared to reducing work effort in one step. We do not observe a pattern with respect to the income effects or retirement age regime effects. We find that regardless of the retirement age regime respondents prefer to reduce work effort in steps. Our finding is in contrast with Bonekamp (2015) who obtains an age effect for reducing work hours in steps when analysing retirement plans of men in the Netherlands.

Table 12: Fraction of choices and average ratings under the income effect regimes for different partial retirement hours scenarios

Ret. age regime	Hours	Income effect	Pension income during PR	Pension income during FR	Choice (%)	Rating (avg.)
65	12	L	0.45	0.75	29.5	5.9***
	20		0.25	0.80	42.9	6.3***
	28		0.05	0.85	27.7	5.6
	12	M	0.55	0.85	27.6	5.8***
	20		0.35	0.90	40.5	6.4***
	28		0.15	0.95	31.9	5.9***
	12	H	0.65	0.95	27.7	5.9***
	20		0.45	1.00	44.8	6.5***
	28		0.25	1.05	27.4	5.9***
63	12	L	0.40	0.60	28.1	5.8***
	20		0.20	0.65	40.0	6.4***
	28		0.00	0.70	31.9	6.0***
	12	M	0.50	0.70	31.5	5.9***
	20		0.30	0.75	43.0	6.4***
	28		0.10	0.80	25.5	5.6
	12	H	0.60	0.80	31.4	5.9***
	20		0.40	0.85	42.9	6.5***
	28		0.20	0.90	25.7	5.7
61	12	L	0.35	0.45	29.3	5.6
	20		0.15	0.50	43.3	6.2***
	28		0.00	0.55	27.3	5.5
	12	M	0.45	0.55	30.2	5.6
	20		0.25	0.60	37.2	6.1***
	28		0.05	0.65	32.6	5.6
	12	H	0.55	0.65	34.2	5.9***
	20		0.35	0.70	34.2	6.3***
	28		0.15	0.75	31.6	5.6

Notes: 1. L, M and H respectively refer to low, middle and high regimes. 2. In the table, the work income during the period of partial retirement are not shown but only pension income. Replacement rates for long duration regime are displayed 3. For age regime 65, for each income effect regime, about 315 respondents choose one of the three retirement plans and rate each of them. For age regime 63 and 61, for each income effect regime, about 170 respondents choose one of the three retirement plans and rate each of them. 4. The Retirement ages and pension incomes corresponding to the long duration regime are displayed. 5. Totals of choices may not add due to rounding error. 6. ***, **, * indicate statistical significance at the 0.01, 0.05, 0.10 levels, respectively, based on the test of the null hypothesis that the mean rating is equal to 5.5.

Table 13: Fraction of choices and average ratings under the income effect regimes for different partial retirement steps scenarios

Ret. age regime	NR of steps PR	Income effect	Pension income during first step	Pension income during second step	Pension income during FR	Choice (%)	Rating (avg.)
65	1	L	0.25		0.75	43.8	6.2***
	2		0.25	0.50	0.70	56.2	6.3***
	1	M	0.35		0.85	44.3	6.4***
	2		0.35	0.60	0.80	55.7	6.5***
	1	H	0.45		0.95	46.8	6.4***
	2		0.45	0.70	0.90	53.2	6.5***
63	1	L	0.20		0.60	48.1	6.2***
	2		0.20	0.45	0.55	51.9	6.4***
	1	M	0.30		0.70	45.5	6.3***
	2		0.30	0.55	0.65	54.6	6.5***
	1	H	0.40		0.80	50.3	6.3***
	2		0.40	0.65	0.75	49.7	6.4***
61	1	L	0.15		0.45	40.9	5.9***
	2		0.15	0.40	0.40	59.1	6.2***
	1	M	0.25		0.55	48.5	6.0***
	2		0.25	0.50	0.50	51.5	6.1***
	1	H	0.35		0.65	43.9	6.2***
	2		0.35	0.60	0.60	56.1	6.4***

Notes: 1. L, M and H respectively refer to low, middle and high regimes. 2. In the table, the work income during the period of partial retirement are not shown but only pension income. 3. For age regime 65, for each income effect regime, about 315 respondents choose one of the three retirement plans and rate each of them. For age regime 63 and 61, for each income effect regime, about 170 respondents choose one of the three retirement plans and rate each of them. 4. In scenario 1 the person works 20 hours per week for four years as partial retirement before getting full abrupt retirement. In scenario 2 the person works 20 hours for two years and 10 hours for the other two years as partial retirement before getting full abrupt retirement. 5. Totals of choices may not add due to rounding error. 6. ***, **, * indicate statistical significance at the 0.01, 0.05, 0.10 levels, respectively, based on the test of the null hypothesis that the mean rating is equal to 5.5.

5 Empirical approach

In this section, we present the models we use for evaluating the different retirement scenarios. First, respondents choose among three different retirement scenarios. Respondents are asked to do this at three different occasions which differ with respect to regimes defined for the retirement age. We base our model on pooling the three observations of a given respondent from his evaluation of the three retirement scenarios at three different retirement age regimes. The dependent variable is the choice among three retirement scenarios. Therefore we use a discrete choice model. In the model, the dependent variable takes three values, and therefore we employ the multinomial probit model. The multinomial probit model is based on comparison of utilities the agent derives from participating in one of the three retirement scenarios, conditional on the individual characteristics and on the treatments with respect to pension income and retirement age, among others. For every respondent i, the scenario with the highest utility is chosen. The utility of respondent i for scenario s is given by:

$$U_{is} = z_i^{'}\gamma_s + x_i^{'}\beta_s + u_{is}$$

This utility is not observed. Instead, we observe the made choice, y_i, which depends on the utility in the following way: $y_i = j$ if $U_{ij} \geq U_{ik}$ for $k \neq j$. We assume that errors u_{ij} are jointly normally distributed with mean 0 and flexible covariance matrix Σ. This leads to the standard multinomial probit model (Winkelman and Boes, 2006). In the regression model the explanatory variables include the treatment variables and a number of background characteristics. The treatment variables for observation i are captured by the vector z_i, and the background characteristics for observation i are captured by the vector x_i.

For the treatments, we created three dummies for the three substitution effect regimes, and three other dummies for the three income effect regimes. For both the substitution and income effect treatments, we use the middle regime as the base case. Similarly, we created three dummies for the three retirement age regimes, and we use the middle retirement age regime (63) as the base outcome. Moreover, z_i includes a dummy indicating the low wage rate during partial retirement where the base case is that the wage rate stays the same during partial retirement. Finally, z_i contains a dummy indicating the short duration regime (partial retirement is four years) where the base case is the long duration regime (partial retirement is five years). The vector of background characteristics x_i contains the respondent characteristics, such as the age and gender, and the socio-economic characteristics, such as the type of work and education.

If a respondent chooses the partial retirement scenario when choosing among three scenarios, in the next question the respondent is asked to choose among the early abrupt retirement and late abrupt retirement scenarios. Some respondents answer this question in more than one retirement age regime, and we base our model on pooling the observations for different retirement age regimes. In this case the dependent variable takes only two values since the choice set includes two retirement scenarios. Therefore, we use the standard probit model (Winkelman and Boes, 2006) with normally distributed error terms.

The (multinomial) probit models above are estimated using the maximum likelihood method. Because the interpretation of the coefficients of a (multinomial) probit model is difficult, we will present the marginal effects of the variables. The marginal effect is computed as the change in the probability of choosing a scenario as a function of a change in a particular variable, while keeping all other variables constant. Formally, in binary choice scenarios, the marginal effect of variable x_j on the probability of choosing $y_i = 1$ for observation i is: $m.e.(x_{i,j}) = \frac{\delta P(y_i=1|x_i,z_i)}{\delta x_{i,j}}$. In multiple choice scenarios, the marginal effect of variable x_j on the probability of choosing scenario s for observation i is: $m.e.(x_{i,j}) = \frac{\delta P(y_i=s|x_i,z_i)}{\delta x_{i,j}}$ for all s. In section 6 we display the average marginal effects at the mean values of the explanatory variables.

After each scenario choice question, the respondent is asked to rate each scenario on a ten-point scale from 1 (not interesting at all) to 10 (perfect). We model the ratings using the standard linear regression model given by:

$$y_i = z_i^{'}\gamma + x_i^{'}\beta + e_i$$

where the errors are assumed to have mean 0 and variance σ^2. This model is estimated by ordinary least squares.

6 Estimation results

In this section we present the results from the estimation of the models in Section 5. First, in Section 6.1, we present the marginal effects for the probabilities of choosing one of the three retirement scenarios, and the corresponding linear regression coefficients for the ratings of the scenarios. In Section 6.2, we present the marginal effects for the probability of choosing early or late abrupt retirement, followed by the corresponding linear regression coefficients for the ratings given to these scenarios.

We analysed the effects of the explanatory variables on the number of hours worked during partial retirement and the number of steps partial retirement consists of. We will not present the marginal effects because we did not find significant marginal effects for the income effect regimes and the retirement age regimes.

For the discrete choice models, we assess the goodness of fit using the count R-squared measure. The count R-squared indicates the proportion of correct predictions (Long and Freese, 2006). For the linear regression models, we use the standard R-squared statistic.

For the discrete choice models, we test the model significance using the Wald statistic, which compares a model without predictors to our model. For the linear models, we use the standard F-statistic of joint significance of the explanatory variables.

6.1 Estimation results for choosing among early abrupt retirement, partial retirement and late abrupt retirement.

Table 14 presents the marginal effects of the explanatory variables on the probability of choosing early abrupt retirement, partial retirement and late abrupt retirement. The count R-squared is 0.40, which indicates that the model fit is reasonable. However, there remains substantial variation in the scenario choices that needs to be explained by correlates we did not consider in the model. The Wald statistic indicates that the explanatory variables are jointly significant at the 0.01 level. Table 15 presents the coefficients of the explanatory variables for the ratings of the three retirement scenarios. We obtain low values for the R-squared, which means that our model fits poorly the data. The F-statistic indicates that the explanatory variables are jointly significant at the 0.01 level for early abrupt retirement and partial retirement, and the explanatory variables are jointly significant at the 0.05 significance level for late abrupt retirement.

As mentioned in Section 5, we distinguish between treatment effects and background characteristics.

Treatment effects

For substitution effect regimes, we use the middle substitution effect regime as the base case. The middle substitution effect regime dictates that the rewards for retiring later are actuarially fair. At the significance level of 0.05, we find that the probability of choosing partial retirement decreases by 4.2 percentage points when the rewards for retiring later are less than actuarially fair compared to when the rewards for retiring later are actuarially fair. This result is in line with our findings in Table 6 in Section 4, where we observe that the fraction of people who choose partial retirement is higher in the middle substitution effect regime compared to the low substitution effect regime in all retirement age regimes.

As discussed in Section 4, Table 6 shows that the substitution effect regimes have different effects under the three retirement age regimes. Therefore, we consider interactions terms of

the retirement age regimes and substitution effect regimes.[2] We find that when the rewards for retiring later are less than actuarially fair, the probability of choosing early abrupt retirement increases by 3.6 percentage points and the probability of choosing partial retirement decreases by 6.2 percentage points at retirement age regime 65. When rewards for retiring later are less than actuarially fair, respondents do not find that the increase in pension income due to working longer is enough to give up leisure time in order to work after age 65.

For retirement age regime 63, less than actuarially fair rewards for retiring later decrease the probability of choosing partial retirement by 5.6 percentage points (significant at the 0.01 level) and increase the probability of choosing late abrupt retirement by 4.0 percentage points (significant at the 0.1 level). The result that respondents are more likely to choose late abrupt retirement when the rewards for retiring later are less than actuarially fair is at odds with the predictions of our theoretical model. In their stated preferences analysis in the Netherlands, van Soest and Vonkova (2014) show that retirement decisions are sensitive to the substitution effect of higher pensions. They find that actuarially generous rewards for retiring later have only little effect on the probability of choosing late retirement at retirement age regime 65, whereas they have a large positive effect on the probability of choosing partial retirement at retirement age regime 63. Their findings are partly in line with our results, since none of the substitution effect regimes have a significant effect on the probability of choosing late retirement in retirement age regime 65. However, for retirement age regime 63, we find that rewards for retiring later do have an effect on the probability of choosing partial retirement as well, but only when we compare less than actuarially fair rewards for retiring later with actuarially fair rewards for retiring later.

When the rewards for retiring later change, this affects both the pension income during the partial retirement period, as the full-retirement pension income. Table 2 in Section 3.2 shows the replacement rates for the pension income during partial retirement and those during full-retirement over different substitution effect regimes. We do not investigate whether the decision for partial retirement is sensitive to both pension income during partial retirement and pension income during full-retirement. van Soest and Vonkova (2014) found that increasing or decreasing the pension income during partial retirement is less important than changing the pension income during full-retirement. We would expect that the marginal effects of the substitution effect treatments are almost fully based on the pension income during full-retirement, and thus would not change if we used the same replacement rate for pension income during partial retirement irrespective of the substitution effect regime. It might be that respondents have a clear view on their pension income after full-retirement, but did not give any thought to what is normal to receive as pension income when one still works part-time.

For the income effect regimes, we only find a significant effect for the interaction of high income effect regime and retirement age regime 65. For retirement age regime 65, the probability of choosing late abrupt retirement increases by 3.4 percentage points when pension accrual is generous compared to when the pension accrual is actuarially fair. This is not in line with the expected negative income effect: if leisure is a normal good, we expect that the demand for leisure increases when the retirement income irrespective of the retirement age increases. For the ratings in Table 15 we observe that respondents give a lower rating to the late abrupt retirement scenario under the low income effect regime compared to the middle income effect regime. This result contradicts with what we would expect. Under the low income effect regime, the pension accrual is less than actuarially fair regardless of the retirement age. If leisure is a normal good, we expect that the demand for leisure is lower when the pension accrual is less than actuarially fair compared to when the pension accrual is actuarially fair, leading agents to prefer to work

[2] Table 21 in the Appendix displays the marginal effects of the interactions of the retirement age regimes and the substitution effect regimes.

more. The income effects we find are also at the odds of the findings of van Soest and Vonkova (2014) in the Netherlands. They provide respondents scenarios with retirement ages 60 to 70 and corresponding replacement rates for full-retirement (disregarding partial retirement in this question). Respondents are asked to choose their most preferred retirement age. They find clear evidence that increasing the retirement income regardless of the retirement age increases the probability of retiring at age 63 or earlier, and decreases the probability of retiring at age 67 or later.

For retirement age treatments, we find clear effects that respondents are more likely to choose the early abrupt retirement scenario and less likely to choose the partial retirement scenario at retirement age regimes 61 and 65 compared to retirement age regime 63. For late abrupt retirement, we only find a significant effect under retirement age regime 61: respondents at retirement age regime 61 are more likely to choose late abrupt retirement than respondents at retirement age regime 63. It might be that respondents perceive age 63 or earlier as too early to retire, and age 68 or later as too late to retire, and think that working part-time between age 63 and 68 is an ideal balance between leisure and work. Elsayed et al. (2015) study the preferences for partial and full-retirement scenarios which differ with respect to retirement age and pension income. They find that most respondents choose age 67 as the preferred full-retirement age after partial retirement. This is in line with our finding that respondents perceive partial retirement between age 63 and 68 as an ideal retirement trajectory.

Partial retirement is often associated with switching to a less demanding job with lower earnings (Gustman and Steinmeier, 1982, 1983, 1984, 1985; Gordon and Blinder, 1980; Ghent et al., 2001; Russo and Hassink, 2008). We find that a decrease in wage rate during partial retirement decreases the probability of choosing partial retirement by 4.8 percentage points and increases the probability of choosing late abrupt retirement by 2.8 percentage points. In Section 4 we found that partial retirement increases the total labor supply of older workers. Here, we find that if partial retirement induces a decrease in wage rate, respondents trade off partial retirement for late abrupt retirement. This results suggests that a decrease in wage rate has the consequence that people prefer to work longer. This result is important to consider when implementing any policies regarding partial retirement, as in our study we randomly assigned the low wage rate regime to half of the respondents. In reality, we do not observe how often a reduction in wage rate for partial retirees occurs, so the net effects of partial retirement could be biased.

When we consider interaction terms of the retirement age regimes and wage rate regimes, we observe that we have no significant wage rate effects for retirement age regime 63.[3] In Section 4 we found that for retirement age regime 63, respondents prefer partial retirement irrespective of the financial incentives. It might be that respondents think that working full-time until age 63, working part-time between age 63 and 68, and retiring full-time from age 68 on wards is the ideal retirement trajectory, even though they face a wage penalty for working part-time. For retirement age regime 61 and 65, respondents less often prefer partial retirement when they have to switch to a less demanding job with lower earnings. It might be that respondents take financial incentives into account when making a trade-off between partial retirement and abrupt retirement in these retirement age regimes.

For the duration treatments, we observe a significant effect for the interaction between the duration regime where partial retirement is four years and retirement age regime 61. That is, when partial retirement is four years, the probability of choosing late abrupt retirement is 2.8 percentage points higher than if partial retirement is five years under retirement age regime 61. When partial retirement is four years, abrupt late retirement starts at age 65 which can be

[3] Table 21 in the Appendix displays the marginal effects of the interactions of the retirement age regimes and the wage rate regimes.

perceived as a more natural retirement age to respondents compared to age 66.

Background characteristics

For age, we observe only very small effects. Younger respondents more often prefer partial retirement, and less often prefer late abrupt retirement. We created dummies for age categories 40-45, 46-50, 51-55, 56-60, 61-65, 66-70 and 70+, and take the 40-45 category as the base case. For the probability of choosing partial retirement we obtain significant marginal effects for all age categories except 46-50. All marginal effects are negative, with a larger magnitude for higher age categories. For the probability of choosing late abrupt retirement we obtain significant marginal effects for age categories 51-55, 61-65, 66-70 and 70+. All marginal effects are positive, with a larger magnitude for higher age categories.

At the significance level of 0.01, the probability of choosing partial retirement is 5.6 percentage points lower and the probability of choosing late abrupt retirement is 3.4 percentage points higher for men compared to women. Women have more opportunities in part-time jobs because they work in sectors where part-time work is allowed, or they already work at a part-time job (van Soest et al., 2006). It might also be that the type of job men do is not suitable for part-time work. Men also give significantly lower rating to the partial retirement scenario.

A respondent with high education is 3.0 percentage points more likely to choose partial retirement compared to a respondent with low or middle education. Previous studies show that people with high education level more often reduce hours and change jobs compared to people with lower education levels. This can be explained in two ways. First, people with higher education have a wider range of choices for retirement as they have greater market control compared to people with lower education. This results in more part-time job opportunities for people with higher education level (van Soest et al., 2006). Second, people with higher education are more likely to receive noneconomic rewards, which they want to retain. This makes part-time work a good option for them (Ekerdt et al., 1996). The education dummy also has a very significant positive effect on the rating given to the partial retirement scenario.

We consider dummies for labor market status (self-employed, retired, unemployed, homemaker), where the base case is working for an employer. For a respondent who is retired, the probability of choosing late abrupt retirement decreases by 4.2 percentages points compared to a respondent who works for an employer. The probability of choosing early abrupt retirement increases and the probability of choosing late abrupt retirement decreases when the person is a homemaker (or disabled etc.) compared to when the person is working for an employer. It might be that homemakers do not want to be in the labor market anyway.

Respondents are asked to rate the statement 'I would keep working if money were not needed' on a scale from 1 (strongly disagree) to 7 (strongly agree). Respondents with higher levels of agreement are more likely to choose partial retirement and less likely to choose late abrupt retirement. For respondents with a high level of agreement with the statement, partial retirement provides an opportunity to stay in the labor market, while having enough leisure time. Higher levels of agreement has a positive effect on the ratings for each retirement scenario. This suggests that respondents with a high level of agreement with the statement more positive about their working life compared to respondents with lower levels of agreement with the statement.

How the three retirement scenarios are presented is randomised. The partial retirement option is always presented second, and the order of the early abrupt retirement and late abrupt retirement scenario is randomised. When we include a dummy variable for the order, we obtain a significant marginal effect on the probability of choosing early abrupt retirement. If the first scenario presented to a respondent is the early abrupt retirement scenario, the probability of choosing early abrupt retirement is 8.4 percentage points higher than when he is presented the

late abrupt retirement option first. Therefore, it matters how the scenarios are presented. For the other two retirement scenarios, we do not observe a significant effect.

Table 14: Marginal effects for the probability of choosing one of the three retirement scenarios

	Early abrupt retirement		Partial retirement		Late abrupt retirement	
	M. effect	Std. Err.	M. effect	Std. Err.	M. effect	Std. Err.
Treatment effects						
Substitution effect low	0.015	0.017	−0.042**	0.017	0.028	0.017
Substitution effect high	−0.009	0.016	0.008	0.017	0.000	0.017
Income effect low	0.004	0.016	0.001	0.017	−0.005	0.017
Income effect high	−0.002	0.016	0.004	0.016	−0.001	0.016
Retirement age 61	0.019**	0.009	−0.042***	0.010	0.023***	0.009
Retirement age 65	0.021**	0.009	−0.036***	0.011	0.014	0.009
Wage rate low	0.020	0.013	−0.048***	0.014	0.028**	0.014
Short duration regime	0.001	0.013	−0.008	0.014	0.007	0.014
Background characteristics						
Age	0.002	0.001	−0.004***	0.001	0.002**	0.001
Male	0.021	0.014	−0.056***	0.014	0.034**	0.014
Married or living with partner	−0.018	0.020	0.001	0.020	0.017	0.020
Household size	0.012	0.008	−0.003	0.008	−0.009	0.008
Highly educated	−0.010	0.015	0.030*	0.015	−0.020	0.015
High income earner	0.024	0.026	−0.012	0.026	−0.013	0.026
Home owner	−0.018	0.017	0.017	0.017	0.001	0.017
Self-employed	0.009	0.033	0.022	0.033	−0.031	0.032
Retired	0.006	0.023	0.037	0.024	−0.042*	0.024
Unemployed	0.009	0.036	0.003	0.036	−0.012	0.035
Homemaker, disabled, etc.	0.054**	0.022	−0.018	0.022	−0.037*	0.022
Value work more than money	−0.005	0.004	0.016***	0.004	−0.011***	0.004
Observations	8223					
Log likelihood	−8842.725					
Count R-squared	0.40					
Wald test of model significance	180.51***					

Notes: 1. All the treatment variables are dummy variables to indicate respective regimes of the retirement income, retirement age, wage rate in partial retirement and duration regime of partial retirement. 2. Choices are based on pooling respondents' evaluations for three sets of retirement scenarios that differ with respect to retirement age regimes. 3. Standard errors are robust to heteroskedasticity and clustering on repeated observations of survey respondents. 4. ***, **, * indicate statistical significance at the 0.01, 0.05, 0.10 levels, respectively.

Table 15: Linear regression model explaining the ratings given to a retirement scenario

	Early abrupt retirement		Partial retirement		Late abrupt retirement	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Treatment effects						
Substitution effect low	0.093	0.090	−0.099	0.079	0.163*	0.087
Substitution effect high	0.006	0.089	0.076	0.077	0.116	0.087
Income effect low	−0.112	0.090	−0.143*	0.078	−0.172**	0.086
Income effect high	0.094	0.088	0.065	0.077	−0.052	0.086
Retirement age 61	−0.050	0.034	−0.200***	0.031	0.037	0.034
Retirement age 65	−0.049	0.036	−0.109***	0.033	−0.042	0.037
Wage rate low	−0.021	0.072	−0.179***	0.063	0.067	0.070
Short duration regime	0.089	0.072	0.069	0.063	0.179**	0.070
Background characteristics						
Age	0.002	0.006	−0.005	0.005	0.010*	0.005
Male	−0.077	0.076	−0.249***	0.067	−0.059	0.074
Married or living with a partner	0.031	0.105	0.148	0.093	0.143	0.103
Household size	0.063	0.041	0.022	0.035	−0.002	0.040
Highly educated	−0.045	0.081	0.211***	0.068	−0.077	0.079
High income earner	0.009	0.149	−0.036	0.113	0.006	0.138
Home owner	0.002	0.091	0.124	0.082	−0.054	0.089
Self-employed	0.084	0.173	0.030	0.148	−0.061	0.172
Retired	0.270**	0.131	0.280**	0.116	−0.006	0.125
Unemployed	0.253	0.192	0.062	0.182	−0.044	0.189
Homemaker, disabled, etc.	0.390***	0.118	−0.059	0.106	−0.082	0.115
Value work more than money	0.081***	0.021	0.139***	0.018	0.051***	0.020
Constant	4.660***	0.356	5.894***	0.319	4.609***	0.344
Observations	8223					
R-squared	0.013		0.037		0.009	
F test of model significance	2.507***		8.888***		1.816**	
p	0.000		0.000		0.015	

Notes: 1. All the treatment variables are dummy variables to indicate respective regimes of the retirement income, retirement age, wage rate in partial retirement and duration regime of partial retirement. 2. Ratings are based on pooling respondents' evaluations for three sets of retirement scenarios that differ with respect to retirement age regimes. 3. Standard errors are robust to heteroskedasticity and clustering on repeated observations of survey respondents. 4. ***, **, * indicate statistical significance at the 0.01, 0.05, 0.10 levels, respectively.

6.2 Estimation results for choosing among early abrupt retirement and late abrupt retirement in the absence of partial retirement.

If a respondent prefers the partial retirement scenario when evaluating the three retirement options, he gets an extra question where he has to choose among early abrupt retirement and late abrupt retirement. In this section we want to observe which variables determine whether a respondent who prefers partial retirement would choose early abrupt or late abrupt retirement, in the absence of partial retirement. Table 16 presents the marginal effects of the explanatory variables on the probability of choosing late abrupt retirement. Our count R-squared indicates that the model performs reasonably well. The Wald test of model significance indicates that

the predictors are not jointly significant. For the ratings, we obtain a low R-squared, but the predictors are jointly significant at the 0.01 significance level.

Treatment effects

We obtain a significant marginal effect for retirement age regime 65. With a significance level of 0.1, we find that the probability of choosing late abrupt retirement increases with 8.6 percentage points if the respondent is in retirement age regime 65 compared to retirement age regime 63. It might be that the financial compensation for late retirement in this age regime is experienced as more attractive.

When we allow the substitution effects to interact with the retirement age regimes, we find that for retirement age regime 61, the probability of choosing late abrupt retirement increases with 19 percentage points if the rewards for retiring later are generous compared to when the rewards for retiring later are actuarially fair.[4] It might be that for retirement age regime 61, respondents are sensitive to financial incentives are their need for leisure is not as big as for later retirement ages. The coefficient for high substitution effect on the rating for late abrupt retirement is positive. This is in line with our expectation, as a respondent under the high substitution effect regime receives higher rewards for retiring later than a respondent under the middle substitution effect regime. The coefficient for low income effect on the rating for early abrupt retirement is negative. This is in line with our expectation, as a respondent with a high income is more likely to retire earlier because it might be that the pension income is sufficient to meet their needs.

Overall, very few treatment effects have significant marginal effect on the probability of choosing late abrupt retirement. We only consider respondents who chose partial retirement among three retirement scenarios. Therefore, their first preference among retirement scenarios is partial retirement. If those respondents have to choose among early abrupt retirement and late abrupt retirement in the absence of their first preference, it might be that they do not have a strong preference for either of the two. Therefore it is not surprising that we do not find significant effects. In the descriptive results, we found that more respondents who choose partial retirement among three scenarios prefer early abrupt retirement among two scenarios even though we are not able to classify which treatment variables cause an increase in probability for choosing either of the two.

Background characteristics

The only significant effect for background characteristics in Table 16 is for the variable 'Unemployed'. A respondent who is unemployed is 30 percentage points less likely to choose late abrupt retirement compared to a respondent who works for an employer. It might be that the unemployed do not want to work at all and therefore want to retire early.

Some variables that do not have a significant effect on the probability of choosing a particular scenario, have a significant effect on the ratings given to the scenarios. Older respondents give a higher rating to the early abrupt retirement scenario compared to younger respondents. Males give a lower rating to both scenarios compared to females. A respondent who is married or living with a partner gives a higher rating to the early abrupt retirement scenario compared to a respondent who is single. This might be because that respondents with a partner have a higher household income, and therefore have enough money to satisfy their needs. It might also be that they want to spend time together instead of working. A highly educated respondent gives a lower

[4] Table 22 in the Appendix displays the marginal effects of the interactions of the retirement age regimes and the substitution effect regimes.

rating to the early abrupt retirement scenario than a respondent with lower education. A reason can be that job opportunities are better for someone with a high education. A homemaker or disabled (etc.) person gives a higher rating to the early abrupt retirement scenario than someone who works for an employer. It can be that they do not want to be in the labor market anyway, and therefore want to retire early. A higher agreement with the statement 'I would keep working if money were not needed' results in a higher rating to the late abrupt retirement scenario. This is perhaps because they work because they like working, and therefore like the late abrupt retirement scenario more.

Similarly as for the treatment variables, we do not find a pattern in what kind of people prefer either of the two retirement scenarios in the absence of partial retirement. This once more indicates that people who prefer partial retirement, are indifferent between early abrupt and late abrupt retirement.

Table 16: Marginal effects for the probability of choosing late retirement in the absence of partial retirement

	M. effect	Std. Err.
Treatment effects		
Substitution effect low	−0.059	0.062
Substitution effect high	0.081	0.057
Income effect low	0.000	0.061
Income effect high	−0.034	0.059
Retirement age 61	0.075	0.048
Retirement age 65	0.086*	0.049
Wage rate low	0.060	0.048
Short duration regime	−0.047	0.048
Background characteristics		
Age	−0.005	0.004
Male	−0.014	0.051
Married or living with partner	−0.029	0.068
Household size	−0.010	0.028
Highly educated	0.047	0.052
High income earner	−0.017	0.094
Home owner	−0.027	0.060
Self-employed	−0.123	0.109
Retired	0.060	0.086
Unemployed	−0.301**	0.129
Homemaker, disabled, etc.	−0.089	0.078
Value work more than money	0.004	0.014
Observations	3343.000	
Log likelihood	−2301.119	
Count R-squared	0.54	
Wald test of model significance	26.50	

Notes: 1. All the treatment variables are dummy variables to indicate respective regimes of the retirement income, retirement age, wage rate in partial retirement and duration regime of partial retirement. 2. Choices are based on pooling respondents' evaluations for two sets of retirement scenarios that differ with respect to retirement age regimes. 3. First, respondents are asked to choose between early abrupt retirement, partial retirement or late abrupt retirement. Respondents who prefer partial retirement are asked to choose between early and late abrupt retirement, in the case partial retirement would not be an option. Therefore, these marginal effects are based on respondents who would choose partial retirement if this is possible. 4. Standard errors are robust to heteroskedasticity and clustering on repeated observations of survey respondents. 5. ***, **, * indicate statistical significance at the 0.01, 0.05, 0.10 levels, respectively.

Table 17: Linear regression model explaining the ratings given to a retirement scenario in the absence of partial retirement

	Early abrupt retirement		Late abrupt retirement	
	Coef.	Std. Err.	Coef.	Std. Err.
Treatment effects				
Substitution effect low	0.131	0.103	0.077	0.100
Substitution effect high	−0.082	0.097	0.182**	0.092
Income effect low	−0.168*	0.100	−0.131	0.097
Income effect high	0.050	0.099	−0.044	0.096
Retirement age 61	0.007	0.063	0.058	0.064
Retirement age 65	−0.104	0.065	−0.085	0.067
Wage rate low	−0.014	0.081	0.078	0.079
Short duration regime	0.134*	0.081	0.173**	0.078
Background characteristics				
Age	0.017***	0.006	0.004	0.006
Male	−0.190**	0.085	−0.143*	0.084
Married or living with a partner	0.222*	0.123	0.132	0.123
Household size	−0.031	0.048	0.004	0.047
Highly educated	−0.168*	0.087	−0.100	0.087
High income earner	−0.040	0.152	−0.006	0.148
Home owner	−0.083	0.102	−0.070	0.103
Self-employed	0.112	0.180	−0.054	0.188
Retired	−0.108	0.148	0.170	0.142
Unemployed	0.258	0.207	0.011	0.203
Homemaker, disabled, etc.	0.241*	0.133	0.080	0.129
Value work more than money	0.033	0.024	0.080***	0.022
Constant	4.833***	0.375	5.065***	0.366
Observations	3343			
R-squared	0.026		0.017	
F test of model significance	3.187		1.973	
p	0.000		0.006	

Notes: 1. All the treatment variables are dummy variables to indicate respective regimes of the retirement income, retirement age, wage rate in partial retirement and duration regime of partial retirement. 2. First, respondents who initially preferred partial retirement, are asked to choose between early abrupt retirement or late abrupt retirement in the absence of partial retirement. Then, they are asked to rate the early and late abrupt retirement scenarios. 3. Ratings are based on pooling respondents' evaluations for two sets of retirement scenarios that differ with respect to retirement age regimes. 4. Standard errors are robust to heteroskedasticity and clustering on repeated observations of survey respondents. 5. ***, **, * indicate statistical significance at the 0.01, 0.05, 0.10 levels, respectively.

7 Sensitivity analysis

Baseline pension incentives and retirement age

As explained in Section 5, for the results of the treatment variables in Section 6 we take the middle regimes as the base case. We use the middle substitution effect regime as the base case for substitution effect, the middle income effect regime as the base case for income effect, and retirement age regime 63 as the base case for retirement age effect. In this section, we analyse how the effects of the treatment variables change when we take the low substitution and income effect regime as the base case for analysing substitution and income effect, and retirement age regime 61 as the base case for analysing the retirement age effect.

With a significance level of 0.01 and 0.1, we find that the probability of choosing partial retirement increases by 5.1 percentage points and the probability of choosing late abrupt retirement decreases by 2.7 percentage points if the rewards for retiring later are actuarially generous compared to when the rewards for retiring later are less than actuarially fair. When we allow the substitution effect regimes to interact with the retirement age regimes, we find that for retirement age regime 65 the probability of choosing early abrupt retirement decreases and the probability of choosing partial retirement increases if the rewards for retiring later are actuarially generous compared to when the rewards for retiring later are less than actuarially fair. This means that for retirement age regime 65, the responses on financial incentives are in line with our theoretical framework, since people prefer to work longer when rewards for working longer are higher. For retirement age regime 63 we find that the probability of choosing partial retirement increases and the probability of choosing late abrupt retirement decreases if the rewards for retiring later are actuarially generous. For higher rewards when retiring later, in this retirement age regime respondents make a trade off between partial retirement and late abrupt retirement, and they more often prefer partial retirement. Respondents prefer a mixture of leisure and work between ages 63 and 68, even though the rewards for retiring later are higher. This is in line with our results for retirement age regime 63 in Section 6.1.

For the income effect regimes, we find significant effects when we allow the income effect regimes to interact with the retirement age regimes. When the pension accrual is generous, the probability of choosing partial retirement decreases by 4.5 percentage points and the probability of choosing late abrupt retirement increases by 3.6 percentage points compared to when the pension accrual is less than actuarially fair. For retirement age regime 61, the probability of choosing partial retirement increases by 4.5 percentage points when pension accruals are generous compared to when pension accruals are less than actuarially fair. The results for the income effect regimes are not in line with the expected negative income effect: if leisure is a normal good, we expect that the demand for leisure increases when the retirement income irrespective of the retirement age increases.

For the retirement age effect regimes, we do not find significant effects when the retirement age regime is 65 compared to when the retirement age regime is 61. We already observed that there is an retirement age effect in retirement choices, as partial retirement is particularly attractive in retirement age regime 63 compared to retirement age regimes 61 and 65. This is not in line with our theoretical model, but it is in line with the results in Section 4. There, we present the frequencies of choices merging the substitution and income effect regimes, and we observe only small differences in frequencies of choices among different retirement scenarios for retirement age regime 65 compared to retirement age regime 61.

In Section 6.2, the marginal effects of the treatment variables on the probability of choosing early or late abrupt retirement, for respondents who prefer partial retirement when choosing among three scenarios, are shown. We used the middle regimes as the base case. In this section,

we analyse the marginal effects of the treatment variables on the probability of choosing early or late abrupt retirement, when the low regimes are the base regimes. In 6.2, we did not find a significant marginal effect for the substitution effect regimes. When we compare the high substitution effect regime with the low substitution effect regime, we do find an effect. When the increase in pension income for retiring later is generous, we find that the probability of choosing late retirement is 14 percentages points higher compared to when the increase in pension income for retiring later is less than actuarially fair. When we take interactions between substitution effect regimes and retirement age regimes, we find that the probability of choosing late abrupt retirement increases by 18.4 and 23.6 percentage points for retirement age regime 65 and 61 respectively, when the increase in pension income is generous. This large effect shows that respondents are responsive to rewards for retiring later.For the income effect regimes and retirement age regimes we do not find significant effects when we use the low regimes as the base case.

Exogeneity of the treatment effects

In Section 6 we present the results of the regressions on the probability of choosing particular retirement scenarios. We distinguish between variables for treatment effects and variables for background characteristics. The treatment effect regimes are assigned randomly to respondents, as explained in Section 3.2. Therefore, the treatment effects are uncorrelated with the background characteristics of respondents. In this section we check if the marginal effects of the treatment effects remain the same when we omit the background characteristics. If this is the case, we can conclude that we can omit background characteristics in order to analyse the effects of financial incentives on the choices for particular retirement scenarios. It is important to take income related background characteristics into account, as they are correlated with the treatments by our experimental design. Therefore, we do include the variables for education, income, and home ownership. In order to check whether the treatment effects are sensitive to omitting background characteristics, we will run the regression models from section 5 twice. First, we run the regression models with treatment effects and background characteristics. Then, we run the regression models with the background characteristics except for education, income and home ownership omitted from the model.

When we omit the background characteristics except for education, income and home ownership, the estimation results for choosing among early abrupt retirement, partial retirement and late abrupt retirement remain largely unaffected. The significance levels remain the same, for all significant variables from Section 6.1. We observe very small changes for the marginal effects of significant variables.

When we omit the background characteristics except for education, income and home ownership, the estimation results for choosing among early abrupt retirement and late abrupt retirement, in Section 6.2, remain largely unaffected as well. The marginal effect for retirement age regime 65 becomes significant at the 0.05 level, and the magnitude changes from 0.086 to 0.094.

We observe only very small changes, and thus conclude that we can omit background characteristics in order to analyse the effects of financial incentives on the choices for particular retirement scenarios.

8 Validation of the stated preferences

Our analysis on retirement behavior relies on stated preference data. A main critic is whether the stated preferences on retirement scenarios are predictive of actual behavior. In order to analyse the predictive validity of our stated preference analysis, we will compare respondents' preferences for retirement scenarios with their realized or expected retirement trajectories.

To investigate respondents' realized or expected retirement trajectories, we present a time line in the first part of the questionnaire, where respondents fill in their expected or realized employment trajectories from age 55 and on wards. For each age, they fill in their expected or realized work status and whether they expect a change in type of work, employer, industry and income. Figure 7 shows the question for expected work status trajectories as it is presented to respondents. For eight age categories they choose between four work status options. The age categories are 55-56, 57-58, 59-60, 61-62, 63-64, 65-66, 67-68, and 69+. The work status options are full-time work, part-time work, retirement, and other. Respondents are asked to fill in their actual intentions and made decisions, which means that it should be feasible for their situation. Then, we are able to analyse whether respondents who prefer a retirement trajectory, are more likely to follow or have followed this retirement trajectory.

In Table 18 we present the work status over the eight age categories, ranked according to the percentage of respondents who reported the sequence. We present the 49 sequences with highest frequency, as the work status of 87.1% of the respondents is represented by these 49 different sequences. Furthermore we present the type of the sequence with the letters A (abrupt retirement: full-time work followed by full retirement), and P (partial retirement: full-time work followed by part-time work, and subsequently full retirement), and O (other sequences). Out of all respondents, 18.3% follows an abrupt retirement trajectory, and 23.2% follows a partial retirement trajectory.

We may use a flexible definition for the partial retirement trajectory. For the flexible definition, we also include respondents with full-time work followed by part-time work, as we know that they will retire eventually. We find that 26.1% of all respondents follows a partial retirement trajectory when we use the flexible definition. Out of all respondents who work for an employer, 18.1% follows an abrupt retirement trajectory, 37.8% follows a partial retirement trajectory, and 41.4% follows a partial retirement trajectory when we use the flexible definition. Out of all respondents who are retired, 35.0% followed an abrupt retirement trajectory, 15.0% followed a partial retirement trajectory, and 16.0% followed a partial retirement trajectory when we use the flexible definition. Respondents who work for an employer more often follow a partial retirement trajectory compared to respondents who are retired. It might be that younger respondents have more partial retirement opportunities, as the economy is moving in directions that make partial retirement more prevalent for two reasons. First, the number of people who are covered by defined contribution plans has grown on the expense of the number of people who are covered by defined benefit plans (Hutchens, 2010). This makes partial retirement more likely to occur, as it is allowed to draw pension benefits besides getting part-time income with defined contribution plans. Second, it is currently more common to have flexible work schedules than in the past.

When we consider men, 30.7% follows an abrupt retirement trajectory, 34.7% follows a partial retirement trajectory where full-time work is followed by part-time work, and 8.3% follows a retirement trajectory where part-time work is followed by full-time retirement. When we consider women, 6.4% follows an abrupt retirement trajectory, 12.1% follows a partial retirement trajectory where full-time work is followed by part-time work, and 41.0% follows a retirement trajectory where part-time work is followed by full-time retirement. A large group of women already work part-time at age 55 and therefore do not need to decrease hours towards full-

retirement. In Section 6 we found that men more often prefer abrupt retirement than women, now we also find that men more often indicate to follow or have followed an abrupt retirement trajectory compared to women.

In order to analyse if the stated preferences on retirement scenarios are predictive of actual behavior, we analyse if respondents who indicate to follow or have followed a certain trajectory, are more likely to prefer a retirement scenario that is most close to that retirement trajectory. More specifically, for respondents who indicate to follow an abrupt retirement trajectory, we analyse whether they are more likely to prefer abrupt retirement scenarios when choosing among three scenarios. In order to do so, we create a dummy variable which takes a value of 1 if the respondent indicates to follow or have followed an abrupt retirement trajectory, and a value of 0 if the respondent indicates to follow or have followed a partial retirement trajectory. We add this variable to the variables in Section 5, the results of the multinomial probit regression are shown in Table 19. We find that, with a significance level of 0.01, the probability of choosing early abrupt retirement is 8.4 percentage points higher and the probability of choosing partial retirement is 12.0 percentage points lower for a respondent who indicates to follow or have followed an abrupt retirement trajectory compared to a respondent who indicates to follow or have followed a partial retirement trajectory. The abrupt retirement indicator has a positive marginal effect on the probability of choosing late abrupt retirement as well, although not significant (p-value of 0.11). We can conclude that the stated preferences on retirement scenarios are predictive of actual behavior.

When we use the flexible definition, we find, with a significance level of 0.01, that the probability of choosing early abrupt retirement is 7.9 percentage points higher and the probability of choosing partial retirement is 11.0 percentage points lower for a respondent who indicates to follow or have followed an abrupt retirement trajectory compared to a respondent who indicates to follow or have followed a partial retirement trajectory. The results are still large in magnitude, although not as large as with the strict definition of partial retirement. It might be that respondents who indicate to follow or have followed a trajectory with full-time work followed by part-time work, did not use the part-time work option to reduce their working hours towards retirement. Instead, it might be that their employer forced them to reduce working hours whereas they prefer to work full-time because they need the money.

Table 18: Most common self-reported retirement sequences (%)

Rank	Sequence	Type	Frequency	Cumulative	Rank	Sequence	Type	Frequency	Cumulative
1	22222333	O	6.68	6.68	26	13333333	A	1.04	73.27
2	22222233	O	6.30	12.97	27	11223333	P	0.98	74.24
3	44444444	O	5.35	18.32	28	22333333	O	0.91	75.16
4	11111133	A	4.35	22.67	29	11123333	P	0.88	76.04
5	44444333	O	3.97	26.64	30	11111122	O	0.85	76.89
6	11111333	A	3.87	30.51	31	11122223	P	0.82	77.71
7	22223333	O	3.75	34.26	32	11222233	P	0.72	78.43
8	22233333	O	3.75	38.00	33	23333333	O	0.72	79.16
9	11113333	A	3.65	41.66	34	11111222	O	0.66	79.82
10	11133333	A	2.83	44.49	35	11112223	P	0.66	80.48
11	33333333	O	2.68	47.17	36	11111112	O	0.63	81.11
12	11122333	P	2.61	49.78	37	11144333	O	0.63	81.74
13	11112233	P	2.52	52.30	38	11444333	O	0.63	82.37
14	44444433	O	2.49	54.79	39	12223333	P	0.60	82.97
15	22222223	O	2.24	57.02	40	12222333	P	0.57	83.53
16	11111233	P	2.08	59.10	41	22244333	O	0.57	84.10
17	11122233	P	1.95	61.05	42	22444333	O	0.50	84.60
18	11112333	P	1.89	62.94	43	11233333	P	0.41	85.01
19	11111113	A	1.67	64.61	44	12233333	P	0.41	85.42
20	11111123	P	1.48	66.09	45	12222233	P	0.35	85.77
21	11333333	A	1.35	67.44	46	22224333	O	0.35	86.11
22	11111223	P	1.32	68.77	47	44444443	O	0.35	86.48
23	22222222	O	1.32	70.09	48	11114333	O	0.31	86.78
24	11222333	P	1.10	71.19	49	11122222	O	0.31	87.09
25	11111111	O	1.04	72.23					

Notes: 1. 1: Full-time work, 2: Part-time work, 3: Retired; 4: Other. 2. A: Retirement sequences where full-time work is followed immediately by abrupt full retirement. P: Retirement sequences where full-time work is followed by part-time work, and subsequently by full retirement. O: Retirement sequences of other types than of type A or P. 3. Retirement sequences are ranked according to the percentage of respondents who reported the sequence. 4. Observations are based on 3176 self-reports. 5. The eight elements of a given sequence refer to the self-reported work status at eight age categories given by 55-56, 57-58, 59-60, 61-62, 63-64, 65-66, 67-68, and 69 plus. 6. In total there are 65536 sequences, only the 49 sequences with highest frequency are displayed.

Table 19: Marginal effects for the probability of choosing one of the three retirement scenarios, including abrupt retirement indicator

	Early abrupt retirement		Partial retirement		Late abrupt retirement	
	M. effect	Std. Err.	M. effect	Std. Err.	M. effect	Std. Err.
Treatment variables						
Substitution effect low	0.018	0.025	−0.063**	0.025	0.046*	0.027
Substitution effect high	−0.024	0.024	−0.004	0.025	0.027	0.026
Income effect low	0.003	0.024	−0.033	0.025	0.030	0.027
Income effect high	0.034	0.025	−0.036	0.025	0.002	0.026
Retirement age 61	0.015	0.013	−0.064***	0.016	0.049***	0.013
Retirement age 65	−0.002	0.014	−0.021	0.017	0.023	0.015
Wage rate low	0.015	0.020	−0.033	0.020	0.018	0.021
Short duration regime	−0.009	0.020	0.001	0.020	0.008	0.021
Background characteristics						
Age	0.001	0.002	−0.003*	0.002	0.002	0.002
Male	0.019	0.025	−0.020	0.026	0.001	0.026
Married or living with partner	−0.028	0.030	0.041	0.030	−0.013	0.032
Household size	−0.003	0.012	−0.008	0.012	0.011	0.013
Highly educated	0.013	0.022	0.024	0.022	−0.038*	0.023
High income earner	0.011	0.031	0.010	0.030	−0.021	0.031
Home owner	0.020	0.027	0.020	0.027	−0.040	0.027
Self-employed	0.023	0.051	0.008	0.051	−0.031	0.051
Retired	−0.038	0.034	0.063*	0.036	−0.024	0.038
Unemployed	0.081	0.084	0.027	0.085	−0.108	0.070
Homemaker, disabled, etc.	0.057	0.056	−0.023	0.054	−0.033	0.053
Value work more than money	0.003	0.006	0.003	0.006	−0.006	0.006
Abrupt retirement indicator	0.084***	0.022	−0.120***	0.022	0.036	0.023
Observations	3450					
Log likelihood	−3679.765					
Count R-squared	0.35					
Wald test of model significance	93.68***					

Notes: 1. All the treatment variables are dummy variables to indicate respective regimes of the retirement income, retirement age, wage rate in partial retirement and duration regime of partial retirement. 2. Choices are based on pooling respondents' evaluations for two sets of retirement scenarios that differ with respect to retirement age regimes. 3. First, respondents are asked to choose between early abrupt retirement, partial retirement or late abrupt retirement. Respondents who prefer partial retirement are asked to choose between early and late abrupt retirement, in the case partial retirement would not be an option. Therefore, these marginal effects are based on respondents who would choose partial retirement if this is possible. 4. Standard errors are robust to heteroskedasticity and clustering on repeated observations of survey respondents. 5. ***, **, * indicate statistical significance at the 0.01, 0.05, 0.10 levels, respectively.

9 Conclusion

As the population is aging, the Dutch government faces the challenge of financing pension benefits. The government has to react to this demographic change by increasing the labor supply among older workers, which results in lower social security expenditure and more tax revenues. There are several measures the government can take to stimulate employment among older workers: pension incentives, increasing the retirement age, and provision of a partial retirement scheme. We have studied a theoretical model, accounting for partial retirement, and predicted how pension incentives and increasing the retirement age affect individuals' preferences to work longer. We have then conducted a stated preference analysis with people aged 40 or older in the Netherlands, to test the predictions of this theoretical model. For respondents who prefer a partial retirement plan, we have studied what they would choose in the absence of partial retirement. With this knowledge we were able to analyse whether provision of a partial retirement scheme increases or decreases the total labor supply of older people. Finally, we have studied what makes partial retirement attractive in terms of the number of hours worked and the number of steps partial retirement consists of.

We have several findings. First, we find that for all retirement age regimes, partial retirement is preferred to early abrupt retirement and late abrupt retirement. For retirement age regime 63, partial retirement is particularly attractive compared to retirement age regimes 61 and 65.

Second, we find that agents are responsive to incentives for delaying retirement (substitution effect). For retirement age regime 63 and 65, more respondents prefer partial retirement and fewer respondents prefer early retirement when the rewards for retiring later increase. This is in line with the predictions from our theoretical model. For retirement age regime 61 and 65, we find that the effect of partial retirement on total labor supply depends on the financial incentives for delaying retirement. When the rewards for retiring later increase, respondents who prefer partial retirement choose late retirement over early retirement in the absence of partial retirement. Partial retirement can increase the total labor supply for older workers, but only when the rewards for retiring later are actuarially fair or actuarially less than fair.

Third, we find that respondents are much less sensitive to changes in pension income irrespective of the retirement age (income effects). Moreover, the small income effects we find, contradict our assumption that leisure is a normal good.

Fourth, at retirement age regime 63, we find that partial retirement is preferred by respondents, irrespective of the financial incentives. Moreover, for this retirement age regime, a partial retirement scheme is an opportunity to keep older workers longer in the labor market, irrespective of the financial incentives. Agents think working full-time until age 63, working part-time between ages 63 and 68, and retiring at age 68 is an ideal balance between leisure and work. For retirement age 61 and 65, the preferences for the abrupt and partial retirement scenarios, and the effect of partial retirement on total labor supply, depend on the financial incentives.

Fifth, we address the stylized empirical fact that partial retirement induces a wage penalty when an agent moves to a part-time job in old age, and find that people with a part-time wage penalty are less likely to prefer partial retirement and more likely to prefer late abrupt retirement. However, this only holds for retirement age regimes 61 and 65. For retirement age regime 63, the part-time wage penalty does not affect the preference for partial retirement. In this retirement age regime, agents prefer partial retirement even if they face a decrease in hourly wage for working part-time.

Finally, we study what makes partial retirement attractive in terms of number of hours worked, and the number of steps partial retirement consists of. In terms of number of hours worked, we find that agents prefer to work 20 hours instead of 12 or 28 hours. In terms of the number of steps partial retirement consists of, we find that agents prefer to reduce working effort

in two steps instead of one step. Financial incentives and the retirement age do not have an effect on both the preferences for the number of hours worked and the number of steps partial retirement consists of.

Acknowledgments

First of all, I would like to thank my supervisor, Dr. Tunga Kantarcı, for guiding me throughout the process of my thesis and providing me with useful suggestions. I appreciate the weekly feedback. Furthermore, I would like to express my gratitude to the staff of CentERdata for providing the data.

Last but not least, I am grateful for my family and friends for all their support during my studies. This accomplishment would not have been possible without them. Thank you.

References

Atalay, K., Barrett, G. F., 2012. The impact of age pension eligibility age on retirement and program dependence: Evidence from an australian experiment. Social and Economic Dimensions of an Aging Population Research Papers 295, McMaster University.

Bonekamp, J., 2015. Gradual retirement of men in the Netherlands- analysis of trends with an age-period cohort model. Netspar Master Thesis.

Borjas, G., 1996. Labor Economics. Mc-Graw-Hill, New York.

Capretta, J., 2007. Global aging and the sustainability of public pension systems - an assessment of reform efforts in twelve developed countries. Technical report, Center for Strategic International Studies, Washington.

Ekerdt, D., DeViney, S., Kosloski, K., 1996. Profiling plans for retirement. Journal of Gerontology 51B (3), S140–S149.

Elsayed, A., Grip, A. D., Fouarge, D., Montizaan, R. M., 2015. Gradual retirement, financial incentives, and labour supply of older workers: Evidence from a stated preference analysis. Netspar Discussion Paper.

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.

Gielen, A., 2007. Performance pay, training and labor mobility. IZA Discussion Paper No. 2932.

Gordon, R. H., Blinder, A. S., 1980. Market wages, reservation wages and retirement. Journal of Public Economics 14 (2), 277–308.

Gustman, A., Steinmeier, T., 1982. Partial retirement and wage profiles of older workers. NBER Working Paper 1000.

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., 1984. Modeling the retirement process for policy evaluation and research. Monthly Labor Review 107 (7), 26–33.

Gustman, A. L., Steinmeier, T. L., 1985. The effect of partial retirement on wage profiles of older workers. Industrial Relations 24 (2), 257–265.

Hanemann, M. W., 1994. Valuing the environment through contingent valuation. Journal of Economic Perspectives 8 (4), 19–43.

Honig, M., Hanoch, G., 1985. Partial retirement as a separate mode of retirement behavior. The Journal of Human Resources 20 (1), 21–46.

Hutchens, R., 2010. Worker characteristics, job characteristics, and opportunities for phased retirement. Labour Economics 17 (6), 1010–1021.

Kantarcı, T., Smeets, I. A. J., van Soest, A., 2013. Implications of full and partial retirement for replacement rates in a defined benefit system. Geneva Papers on Risk and Insurance - Issues and Practice 38 (4), 824–856.

Kantarcı, T., van Soest, A., 2008. Gradual retirement: Preferences and limitations. De Economist 156 (2), 113–144.

Kantarcı, T., van Soest, A., 2015. Full or Partial Retirement? Effects of the Pension Incentives and Increasing Retirement Age in the United States and the Netherlands. Netspar Discussion Paper No. 10/2013-038, available at SSRN: https://ssrn.com/abstract=2343072 or http://dx.doi.org/10.2139/ssrn.2343072.

Long, J., Freese, J., 2006. Regression Models for Categorical Dependent Variables Using Stata. Stata Press, Texas.

Russo, G., Hassink, W., 2008. The part-time wage gap: a career perspective. De Economist 156 (2), 145–174.

Steiner, P., Atzmller, C., Su, D., 2016. Designing valid and reliable vignette experiments for survey research: A case study on the fair gender income gap. Journal of Methods and Measurement in the Social Sciences 7, 52–94.

Tolan, S., 2017. The effect of partial retirement on labor supply, public balances and the income distribution-evidence from a structural analysis. Netspar Discussion Paper.

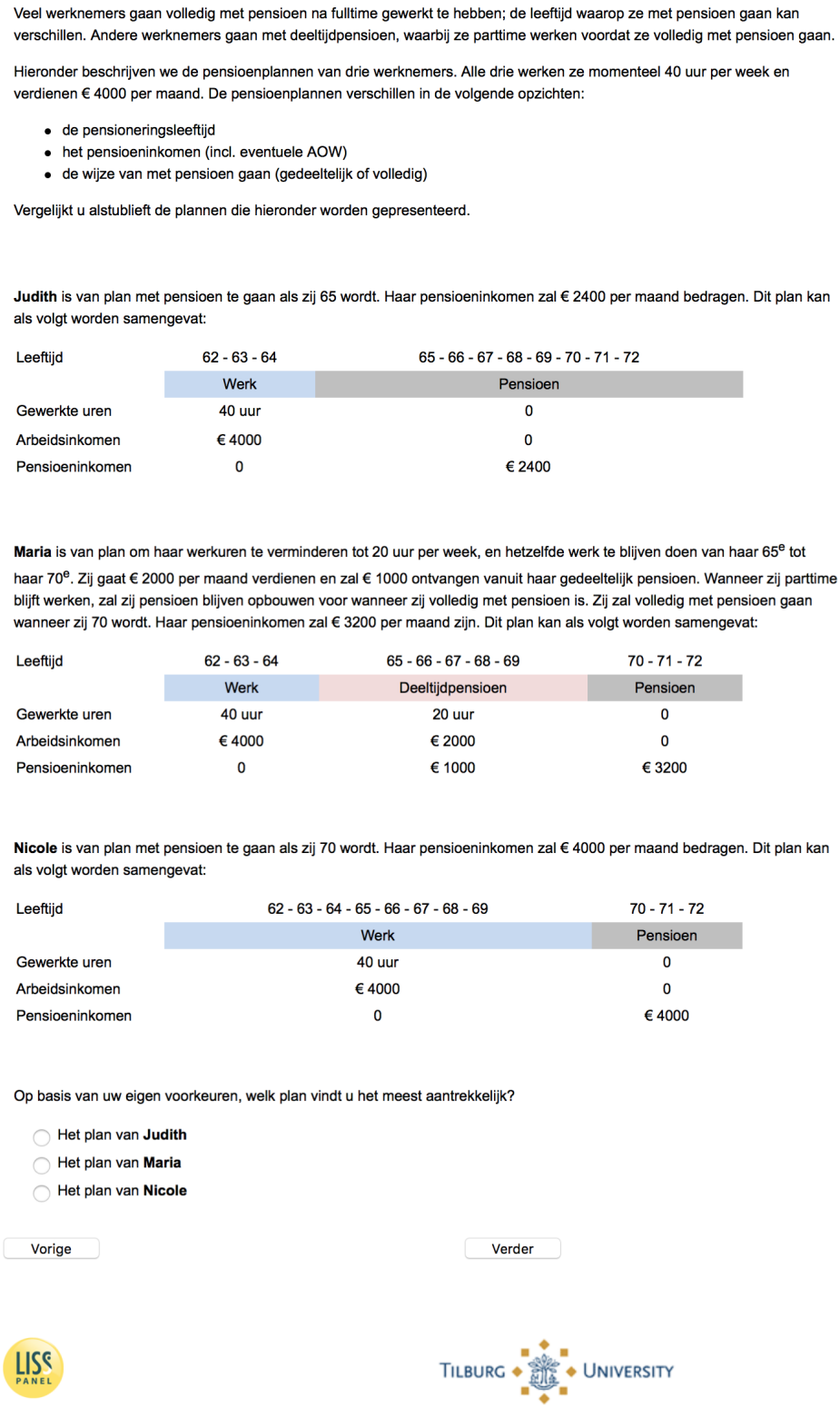
van Soest, A., Kapteyn, A., Zissimopoulos, J., 2006. Using stated preferences data to analyze preferences for full and partial retirement. De Nederlandsche Bank Working Papers 081.

van Soest, A., Vonkova, H., 2014. How sensitive are retirement decisions to financial incentives? a stated preference analysis. Journal of Applied Econometrics 29 (2), 246–264.

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



Veel werknemers gaan volledig met pensioen na fulltime gewerkt te hebben; de leeftijd waarop ze met pensioen gaan kan verschillen. Andere werknemers gaan met deeltijdpensioen, waarbij ze parttime werken voordat ze volledig met pensioen gaan.

Hieronder beschrijven we de pensioenplannen van drie werknemers. Alle drie werken ze momenteel 40 uur per week en verdienen € 4000 per maand. De pensioenplannen verschillen in de volgende opzichten:

- de pensioneringsleeftijd
- het pensioeninkomen (incl. eventuele AOW)
- de wijze van met pensioen gaan (gedeeltelijk of volledig)

Vergelijkt u alstublieft de plannen die hieronder worden gepresenteerd.

Judith is van plan met pensioen te gaan als zij 65 wordt. Haar pensioeninkomen zal € 2400 per maand bedragen. Dit plan kan als volgt worden samengevat:

Leeftijd	62 - 63 - 64	65 - 66 - 67 - 68 - 69 - 70 - 71 - 72
	Werk	Pensioen
Gewerkte uren	40 uur	0
Arbeidsinkomen	€ 4000	0
Pensioeninkomen	0	€ 2400

Maria is van plan om haar werkuren te verminderen tot 20 uur per week, en hetzelfde werk te blijven doen van haar 65e tot haar 70e. Zij gaat € 2000 per maand verdienen en zal € 1000 ontvangen vanuit haar gedeeltelijk pensioen. Wanneer zij parttime blijft werken, zal zij pensioen blijven opbouwen voor wanneer zij volledig met pensioen is. Zij zal volledig met pensioen gaan wanneer zij 70 wordt. Haar pensioeninkomen zal € 3200 per maand zijn. Dit plan kan als volgt worden samengevat:

Leeftijd	62 - 63 - 64	65 - 66 - 67 - 68 - 69	70 - 71 - 72
	Werk	Deeltijdpensioen	Pensioen
Gewerkte uren	40 uur	20 uur	0
Arbeidsinkomen	€ 4000	€ 2000	0
Pensioeninkomen	0	€ 1000	€ 3200

Nicole is van plan met pensioen te gaan als zij 70 wordt. Haar pensioeninkomen zal € 4000 per maand bedragen. Dit plan kan als volgt worden samengevat:

Leeftijd	62 - 63 - 64 - 65 - 66 - 67 - 68 - 69	70 - 71 - 72
	Werk	Pensioen
Gewerkte uren	40 uur	0
Arbeidsinkomen	€ 4000	0
Pensioeninkomen	0	€ 4000

Op basis van uw eigen voorkeuren, welk plan vindt u het meest aantrekkelijk?

- Het plan van **Judith**
- Het plan van **Maria**
- Het plan van **Nicole**

Vorige Verder

LISS PANEL

TILBURG UNIVERSITY

Figure 6: Survey representation of the competing retirement scenarios.

Figure 7: Survey representation of the time line outlining respondents retirement trajectory.

Table 20: Competing retirement scenarios with associated replacement rates corresponding to short duration regime

Ret. age regime	Type of ret.	Ret. age	Rep. rate during PR	Rep. rate during FR
65	FR	65		0.60/0.70/0.80
				0.60/0.70/0.80
				0.60/0.70/0.80
	PR	65-68	0.20/0.30/0.40	0.65/0.75/0.85
			0.25/0.35/0.45	0.75/0.85/0.95
			0.30/0.40/0.50	0.80/0.90/1.00
	FR	69		0.80/0.90/1.00
				0.90/1.00/1.10
				1.00/1.10/1.20
63	FR	63		0.50/0.60/0.70
				0.50/0.60/0.70
				0.50/0.60/0.70
	PR	63-66	0.15/0.25/0.35	0.55/0.65/0.75
			0.20/0.30/0.40	0.60/0.70/0.80
			0.25/0.35/0.45	0.65/0.75/0.85
	FR	67		0.60/0.70/0.80
				0.70/0.80/0.90
				0.80/0.90/1.00
61	FR	61		0.40/0.50/0.60
				0.40/0.50/0.60
				0.40/0.50/0.60
	PR	61-64	0.10/0.20/0.30	0.425/0.525/0.625
			0.15/0.25/0.35	0.45/0.55/0.65
			0.20/0.30/0.40	0.50/0.60/0.70
	FR	65		0.45/0.55/0.65
				0.50/0.60/0.70
				0.60/0.70/0.80

Notes: 1. PR and FR denotes partial and full retirement, respectively. 2. Looking at the replacement rates row-wise, the first, second and third rows refer, respectively, to the low, middle and high substitution effect regimes. Looking at the replacement rates column-wise, the first, second and third columns refer, respectively, to the low, middle and high income effect regimes. 3. The replacement rates during full retirement correspond to respondents with 4 years of partial retirement, i.e. short duration regime.

Table 21: Marginal effects for the interaction terms on the probability of choosing one of the three retirement scenarios

	Early abrupt retirement		Partial retirement		Late abrupt retirement	
	M. effect	Std. Err.	M. effect	Std. Err.	M. effect	Std. Err.
Treatment variables						
Subst. low × ret. age 65	0.036*	0.020	−0.062***	0.022	0.027	0.021
Subst. high × ret. age 65	−0.026	0.020	0.029	0.021	−0.004	0.021
Subst. low × ret. age 63	0.016	0.020	−0.056***	0.022	0.040*	0.021
Subst. high × ret. age 63	−0.007	0.020	0.003	0.021	0.004	0.021
Subst. low × ret. age 61	−0.008	0.020	−0.009	0.022	0.017	0.021
Subst. high × ret. age 61	0.006	0.020	−0.007	0.021	0.001	0.021
Inc. low × ret. age 65	−0.007	0.020	0.007	0.022	0.000	0.021
Inc. high × ret. age 65	−0.003	0.020	−0.031	0.022	0.034*	0.020
Inc. low × ret. age 63	0.001	0.020	0.010	0.022	−0.011	0.021
Inc. high × ret. age 63	−0.007	0.020	0.019	0.021	−0.012	0.021
Inc. low × ret. age 61	0.017	0.020	−0.014	0.022	−0.003	0.020
Inc. low × ret. age 61	0.004	0.020	0.023	0.022	−0.027	0.020
W. rate low × ret. age 65	0.030*	0.017	−0.044**	0.018	0.014	0.017
W. rate low × ret. age 63	0.007	0.017	−0.027	0.018	0.021	0.017
W. rate low × ret. age 61	0.023	0.017	−0.074***	0.018	0.051***	0.017
Dur. low × ret. age 65	0.004	0.017	−0.004	0.018	−0.000	0.017
Dur. low × ret. age 63	−0.002	0.017	0.008	0.018	−0.006	0.017
Dur. low × ret. age 61	0.000	0.017	−0.028	0.018	0.028*	0.017
Background characteristics						
Age	0.002	0.001	−0.004***	0.001	0.002**	0.001
Male	0.021	0.014	−0.056***	0.014	0.035**	0.014
Married or living with partner	−0.018	0.019	0.001	0.020	0.017	0.020
Household size	0.012	0.008	−0.003	0.008	−0.009	0.008
Highly educated	−0.010	0.015	0.029**	0.015	−0.020	0.015
High income earner	0.024	0.026	−0.011	0.026	−0.013	0.026
Home owner	−0.018	0.017	0.017	0.017	0.001	0.017
Self-employed	0.009	0.033	0.022	0.033	−0.032	0.034
Retired	0.006	0.023	0.037	0.024	−0.043*	0.024
Unemployed	0.009	0.035	0.003	0.036	−0.013	0.035
Homemaker, disabled, etc.	0.053**	0.021	−0.016	0.022	−0.037*	0.022
Value work more than money	−0.005	0.004	0.016***	0.004	−0.011***	0.004
Observations	8223					
Log likelihood	−8831.887					
Count R-squared	0.41					
Wald test of model significance	152.95***					

Notes: 1. Subst. low and Subst. high are indicators of substitution effect regime low and high respectively. 2. Inc. low and Inc. high are indicators of income effect regime low and high respectively. 3. W. rate low is an indicator of low wage rate. 4. Dur. low is an indicator of short duration regime. 5. Standard errors are robust to heteroskedasticity and clustering on repeated observations of survey respondents. 6. ***, **, * indicate statistical significance at the 0.01, 0.05, 0.10 levels, respectively.

Table 22: Marginal effects for the interaction terms on the probability of choosing late retirement in the absence of partial retirement

	M. effect	Std. Err.
Treatment effects		
Subst. low × ret. age 65	−0.058	0.091
Subst. high × ret. age 65	0.124	0.085
Subst. low × ret. age 63	−0.098	0.086
Subst. high × ret. age 63	−0.053	0.082
Subst. low × ret. age 61	−0.018	0.089
Subst. high × ret. age 61	0.190**	0.088
Inc. low × ret. age 65	0.005	0.088
Inc. high × ret. age 65	−0.033	0.089
Inc. low × ret. age 63	−0.028	0.086
Inc. high × ret. age 63	0.006	0.083
Inc. low × ret. age 61	0.023	0.090
Inc. high × ret. age 61	−0.081	0.087
W. rate low × ret. age 65	0.152**	0.073
W. rate low × ret. age 63	0.018	0.069
W. rate low × ret. age 61	0.008	0.074
Dur. low × ret. age 65	−0.099	0.073
Dur. low × ret. age 63	−0.001	0.070
Dur. low × ret. age 61	−0.043	0.074
Background characteristics		
Age	−0.005	0.004
Male	−0.013	0.052
Married or living with a partner	−0.029	0.069
Household size	−0.010	0.029
Highly educated	0.046	0.053
High income earner	−0.019	0.094
Home owner	−0.025	0.060
Self-employed	−0.130	0.110
Retired	0.060	0.086
Unemployed	−0.303**	0.129
Homemaker, disabled, etc.	−0.087	0.078
Value work more than money	0.004	0.014
Observations	3343	
Log likelihood	−2296.832	
Count R-squared	0.539	
Wald test of model significance	37.87	

Notes: 1. Subst. low and Subst. high are indicators of substitution effect regime low and high respectively. 2. Inc. low and Inc. high are indicators of income effect regime low and high respectively. 3. W. rate low is an indicator of low wage rate. 4. Dur. low is an indicator of short duration regime. 5. Choices are based on pooling respondents evaluations for two sets of retirement scenarios that differ with respect to retirement age regimes. 6. Standard errors are robust to heteroskedasticity and clustering on repeated observations of survey respondents. 7. ***, **, * indicate statistical significance at the 0.01, 0.05, 0.10 levels, respectively.