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Rob Euwals

Elisabetta Trevisan

Annemiek van Vuren

## **Labour Market Exit in the Health Care Sector: First Results from Administrative Data**

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# **Labour Market Exit in the Health Care Sector: First Results from Administrative Data<sup>1</sup>**

Rob Euwals

CPB, Netspar and IZA

Elisabetta Trevisan

University of Venice and Netspar

Annemiek van Vuren

CPB

## **Abstract**

The second-largest pension fund in the Netherlands, the health care sector fund PFZW (former PGGM), placed the administrative records of its participants for 1999 to 2007 at the disposal of Statistics Netherlands. The data contain precise information on pension and early retirement rights and can be merged to other administrative datasets. The data will help to understand labour market exit, and will, for example, allow for precise measurement of the impact of financial incentives. First empirical results show that labour market behaviour in the health care sector is in line with previous results for the Netherlands. In an actuarially unfair system many employees retire as soon as they can. For the early years there is evidence of substitution between early retirement and disability insurance.

Keywords: Pensions, Early Retirement, Labour Market Behaviour

JEL Classifications: C33, J26, J45

Contact: [r.w.euwals@cpb.nl](mailto:r.w.euwals@cpb.nl)

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# 1 Introduction

To guarantee the sustainability of the welfare and pension system, Dutch policy makers aim at an increasing participation rate of individuals aged 50 to 64. The participation rate of the age group was low during the 1980s, but it started to increase from the mid 1990s onwards. Policy measures are likely to have contributed to the increase. Administrative data collected from the second-largest pension fund in the Netherlands, the health care sector pension fund PFZW (former PGGM), will help to identify the impact of policy measures on labour market exit. This study describes the administrative data and presents first empirical results on labour market exit.

Until about one decade ago the financial incentive for an individual to continue working at old age was low. Most sectors of industry, including health care, had an actuarially unfair early retirement system during the 1980s and 1990s (section 2.1 discusses actuarial fairness in more detail). Health care workers with a career which met certain conditions, in particular on tenure within the sector, qualified for a so-called VUT early retirement benefit at age 60. The gross replacement rate of the benefit was 80% of the last earned wage. The net replacement rate was higher because of the progressive tax system. In case of postponement of early retirement the gross replacement rate remained 80% of the last earned wage. The implicit tax on continuing to work was 80 to 100%. The actuarially unfair system is held to be highly responsible for the low participation rate of elderly during the 1980s and 1990s (de Vos and Kapteyn, 2004).

Several policies improved the financial incentives to continue working at old age. First of all, the stakeholders of the early retirement system, the unions and employer organisations, decided to reform the system starting from the end of the 1990s onwards. Second, the Dutch government decided to stop the fiscally favourable treatment of actuarially unfair early retirement schemes from January 1, 2006 onwards. Below we discuss both reforms.

During the beginning of the 1990s, the unions and employer organisations decided to switch gradually to an actuarially fair early retirement system. The goal was to improve the incentives to continue working and to guarantee the sustainability of the system. The health care sector started the transition to the actuarially fair system on January 1, 1999. The employees of the sector were the second group to be confronted with a change in the early retirement conditions. The civil servants were the first group as their transition started on April 1, 1997.

From January 1, 1999, onwards workers of the health care sector had no access anymore to the actuarial unfair VUT benefit. Instead, workers had access to the actuarial fair FLEX benefit. Workers have a claim on a FLEX benefit on the first day of the month in he/she becomes 60 years. The benefit level at age 60 is 1.75% of the basic salary for each year of participation. The benefit can be advanced (postponed), with the month in which the worker becomes 55 (65) as the first (last) possible date. In case of advancement (postponement) the benefit level is adjusted in an actuarially fair manner. Actuarial fairness implies that advancement (postponement) of early retirement leads to an decrease (increase) in the benefit level.

To ease the pain of the abrupt change in the early retirement system the sector introduced a transitional OBU early retirement benefit. The reform was rather harsh for workers close to age 60 as the new FLEX scheme offers a substantially lower replacement rate than the old system. So workers born before January 1, 1949 who already worked in the sector on December 31, 1998 have a claim on an OBU early retirement benefit in case the worker participated uninterruptedly in the sector for the last ten years. The OBU scheme is a transitional scheme; the replacement rate is brought back from 80% for workers born before January 1, 1940, to 79% for workers born in 1940 and to 71% for workers born in 1948. So the replacement rate is gradually brought back from the replacement rate of the old VUT scheme to the new FLEX scheme. And like the old VUT scheme, the transitional OBU scheme is actuarially unfair.

The Dutch government decided to stop the fiscally favourable treatment of early retirement systems from January 1, 2006 onwards. Early retirement is now only possible by advancing the old age pension, leading to a actuarial fair lower pension benefit level. A higher participation rate of elderly was an explicit policy goal and so the government no longer wanted to subsidise arrangements that discourage participation. The unions and employer organisations had already decided to transform the system towards an actuarial fair system, and so the decision only speeded up the transition process. The speeding up was substantial; many sectors of industry were going to have an actuarial fair system in 2015. The policy implies that the implicit tax on continuing to work from that date onwards is low for all older workers (Euwals *et al.*, 2009).

The participation rate of individuals aged 55 to 64 started to increase from the mid 1990s onwards. As the transition of the early retirement systems started many years later, the change in the early retirement system clearly cannot fully explain the increase in participation of elderly (van Vuuren and Deelen, 2009). Nevertheless, the reforms are likely to have been important, and they are likely to remain important in the upcoming years (Euwals and Folmer, 2009). The exact size of the impact of the reforms is however still unclear.

The administrative pension fund data will contribute to the knowledge on individual labour market behaviour. The recent reforms provide an interesting ‘experiment’ for early retirement behaviour, which has been a major reason to collect the data. The merging of administrative datasets will provide more opportunities for future research, including consumption and savings behaviour, coordination behaviour of members of a household, substitution between different early retirement routes, and interactions between health, pensions and mortality.

## **2 Administrative data**

The empirical analysis in this study is based on administrative data from the second largest pension fund in the Netherlands, the health care sector pension fund PFZW (former PGGM). In 2007, the fund placed the administrative records of its participants for the years 1999 to 2007 at the disposal of Statistics Netherlands (CBS). The project was initiated by Netspar and financed

by Stichting Instituut GAK. Statistics Netherlands processed the data such that it could be merged to other administrative data records. The section first discusses the pension fund data. Second, the section discusses administrative municipality data which is available at Statistics Netherlands and will be merged to the pension fund data. Third, the section also discusses administrative employment data. The last data is part of the Social Statistical Database (SSB), which is available at Statistics Netherlands as well.

## 2.1 The health care sector pension fund data

The pension fund data is a yearly cross-sectional dataset that contains individual records of the participants of the fund. The data contains information on gender, date of birth, working hours, pension base (wage on which pension benefits are based), tenure and pension and early retirement rights. The dataset contains participants who receive a yearly pension overview. In principle it includes all individuals who contribute to the system. Former members of the pension fund, the so-called sleepers, receive a pension overview once every five years. So they all appear in the dataset in the years 2002 and 2007, while for administrative reasons in every year some of them appear in the dataset as well.

The number of observations in the dataset increases from 0.8 million in 1999 to 1.2 million in 2006. The number of observations is large in 2007 due to the sleepers that received a pension overview. The number of observations increases over time. First, the health care sector is growing due to population growth and population ageing. Second, the fund is expanding due to the acquisition of firms that belong to the sector but that were not yet participating in the fund.

### **Descriptive statistics**

The workforce of the health care sector has particular characteristics as the sector employs many part-time working women. This is due to many nursing type of jobs. The descriptive statistics of the data confirm the idea; more than 80% of the workforce is indeed woman and only 20% to 30% of the employees work full-time (table 2.1).

The workforce of the sector contains mostly individuals between age 25 and 50. Only few individuals have more than 30 years of tenure, which is largely the result of the relatively young workforce. A minority of the employees works full-time, whereby the fraction has increased from about one out of four in 1999 to about one out of three in 2006. The gross fulltime wages range from about 19 to 42 thousand euro per year in 2006. Wage inequality has increased over time; the gross fulltime wage of the upper quintile (Q90) has increased with 32% while for the lowest quintile (Q10) it increased with 26%.

The differences in the characteristics between men and women are substantial (table 2.2). Women are generally younger, they work much more often part-time and their tenure is on average lower. Over time, we observe however an increase in the working hours of women. Finally, looking at the wage distribution it appears that women have on average lower wages

than men and the gender wage gap is larger at the top of the distribution. The gap at the highest quintile (Q90) is rather stable over time; in 1999 the best earning men earned about 48% more than the best earning women while in 2006 the gap was about 46%.

<b>Table 2.1 Descriptive statistics, age 15-64, 1999-2006<sup>a,b</sup></b>							
	1999	2000	2001	2002	2003	2005	2006
Observations	787	881	808	1.158	1.032	1.018	1.109
Gender	%						
Female	82	82	83	82	83	84	84
Male	18	18	17	18	17	16	16
Age							
<20	1	1	2	2	2	2	1
20-24	6	7	8	8	9	9	8
25-29	12	10	10	10	10	11	10
30-34	14	14	13	13	11	11	10
35-39	16	16	15	14	13	13	12
40-44	17	17	16	16	15	15	14
45-49	15	19	15	15	15	15	15
50-54	12	12	12	12	12	13	13
55-49	6	7	7	8	9	9	10
60-65	2	2	3	3	3	2	6
Working hours							
1-11 hours	14	15	16	34	21	9	9
12-23 hours	31	30	29	23	27	27	28
24-31 hours	20	20	20	16	19	20	21
32-35 hours	11	11	12	9	12	12	12
36 and more hours	24	24	23	18	21	31	31
Tenure							
0-9 years	61	59	60	56	55	57	52
10-19 years	26	27	29	28	28	27	28
20-29 years	12	12	14	13	14	13	15
30-39 years	1	2	2	2	3	3	5
>40 years	0	0	0	0	0	0	0
Fulltime salary <sup>c</sup>	thousands						
Q10	15.4	15.7	16.4	16.9	18.0	18.9	19.4
Q25	17.9	18.4	19.2	19.8	21.2	22.3	22.8
Q50	22.0	22.6	23.8	24.5	26.6	27.9	28.4
Q75	26.6	27.5	28.9	30.2	32.5	33.9	34.3
Q90	31.7	32.9	34.6	36.4	38.9	40.9	41.7

<sup>a</sup> PFZW participants, including former participants (so-called 'sleepers') and excluding PGGM/PFZW employees. The PFZW participants include, for example, nurses, social workers, and physicians employed by for example a hospital.

<sup>b</sup> The years 2004 and 2007 are deleted from the table as the data are not reliable (complete) for that particular years.

<sup>c</sup> The so-called 'pensionable' salary, the salary is in gross terms.

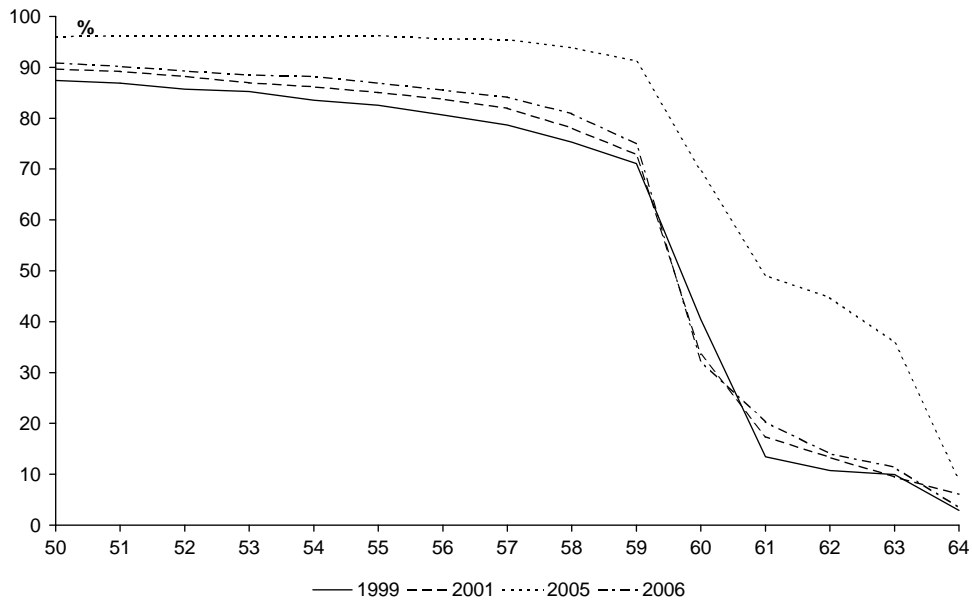
**Table 2.2** Descriptive statistics by gender, age 15-64, various years <sup>a</sup>

	1999		2001		2005		2006	
	men	women	men	women	men	women	men	women
Observations	142	643	140	663	165	849	179	926
Age	%							
<20	1	1	2	2	2	2	2	1
20-24	3	7	5	8	7	9	6	8
25-29	8	13	7	11	9	11	8	10
30-34	12	15	10	13	10	11	9	10
35-39	16	16	14	15	12	13	11	12
40-44	19	16	17	16	14	15	13	14
45-49	17	14	18	14	17	15	16	15
50-54	13	11	14	12	15	12	16	13
55-49	8	6	9	7	11	9	13	10
60-65	3	2	4	2	4	2	8	6
Working hours								
1-11 hours	7	16	9	17	5	10	4	10
12-23 hours	7	36	6	34	5	32	6	32
24-31 hours	13	21	11	22	10	22	10	23
32-35 hours	11	10	13	12	14	12	13	12
36 or more hours	63	16	62	15	66	24	66	23
Tenure								
0-9 years	50	63	50	56	55	57	50	52
10-19 years	28	25	26	30	23	28	23	29
20-29 years	20	10	20	13	17	13	18	15
30-39 years	2	1	4	4	5	2	9	4
>40 years	0	0	0	0	0	0	0	0
Fulltime salary <sup>b</sup>	thousands							
Q10	15.9	15.3	16.8	16.3	19.6	18.7	20.4	19.3
Q25	20.8	17.6	22.3	18.9	25.2	22.1	26.3	22.5
Q50	26.2	21.3	28.4	23.1	32.8	27.2	33.6	27.8
Q75	32.8	25.4	36.0	27.7	41.9	32.6	43.0	33.2
Q90	43.9	29.6	48.4	32.4	55.5	38.5	57.4	39.1

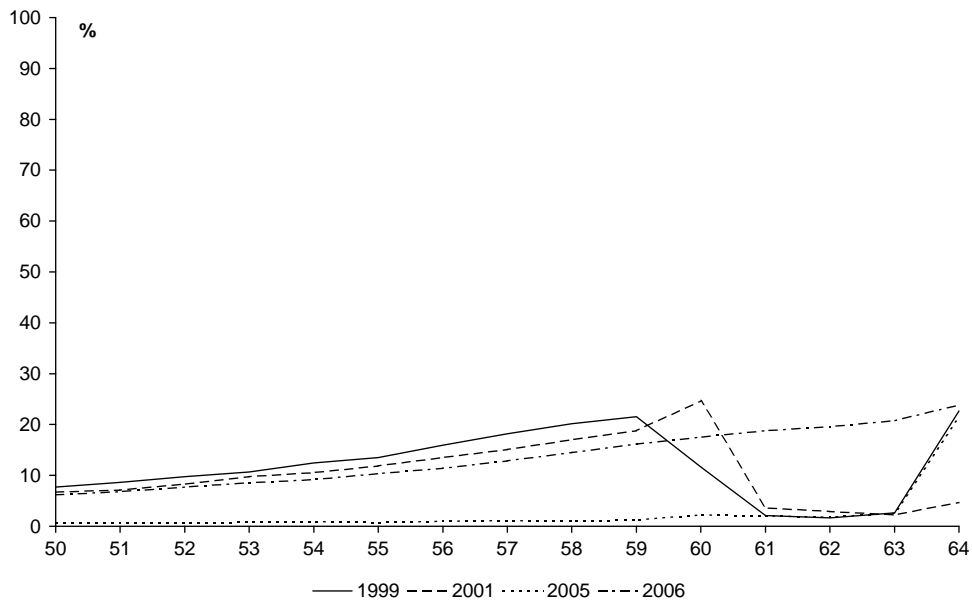
<sup>a</sup> All PFZW participants, including former participants (so-called 'sleepers') and excluding PGGM/PFZW employees..

<sup>b</sup> The so-called 'pensionable' salary, the salary is in gross terms.

**Figure 2.1 Employment by age<sup>a</sup>**



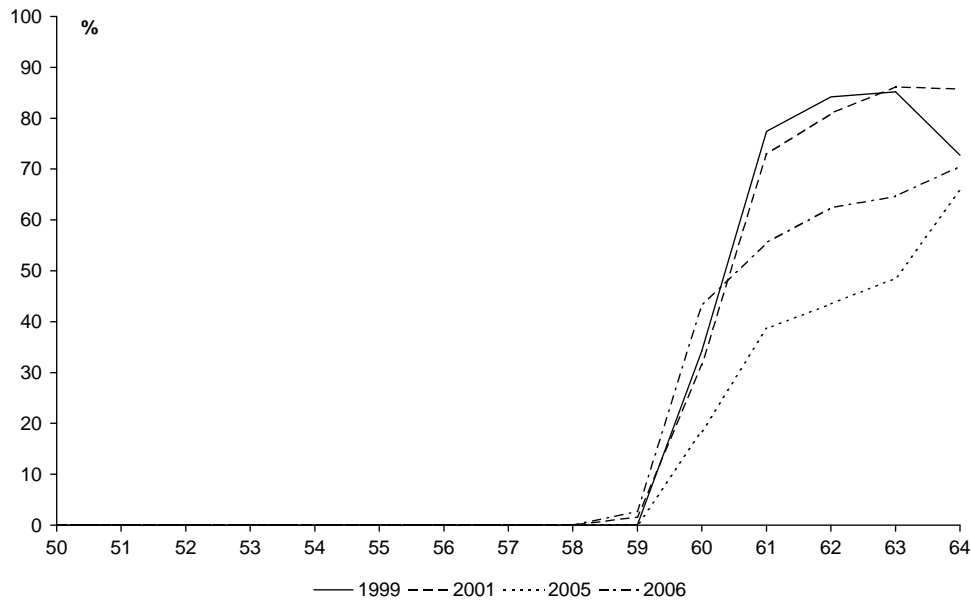
**Figure 2.2 Disability by age<sup>a</sup>**



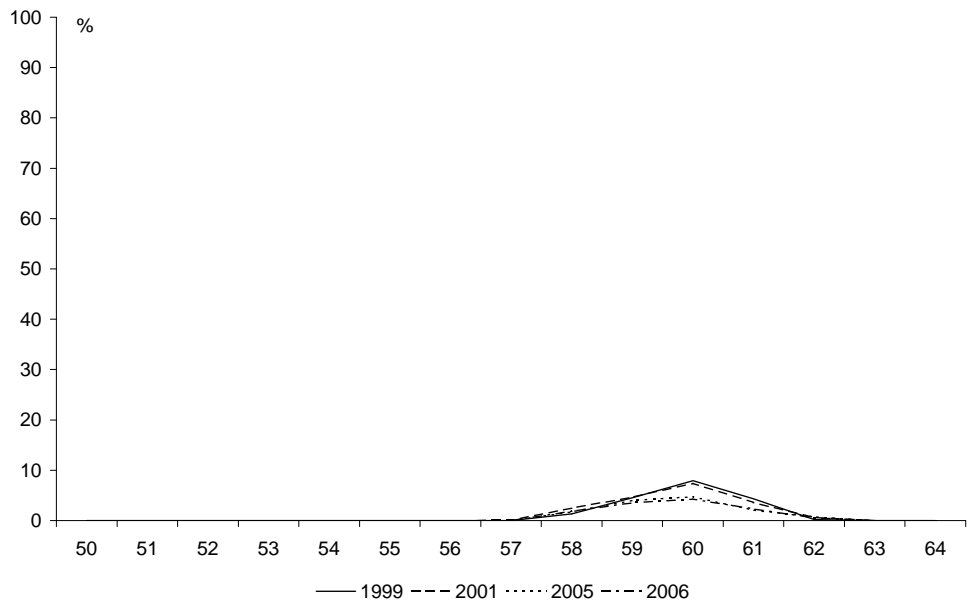
<sup>a</sup> Figures excluding former participants ('sleepers'). The number of former participants varies substantially per year due to administrative reasons, and this would heavily impact the figures on employment, disability and early retirement. Labour market outcomes for 2007 are not presented as there turns out to be a measurement problem for that particular year.



**Figure 2.3 OBU early retirement by age<sup>a,b</sup>**



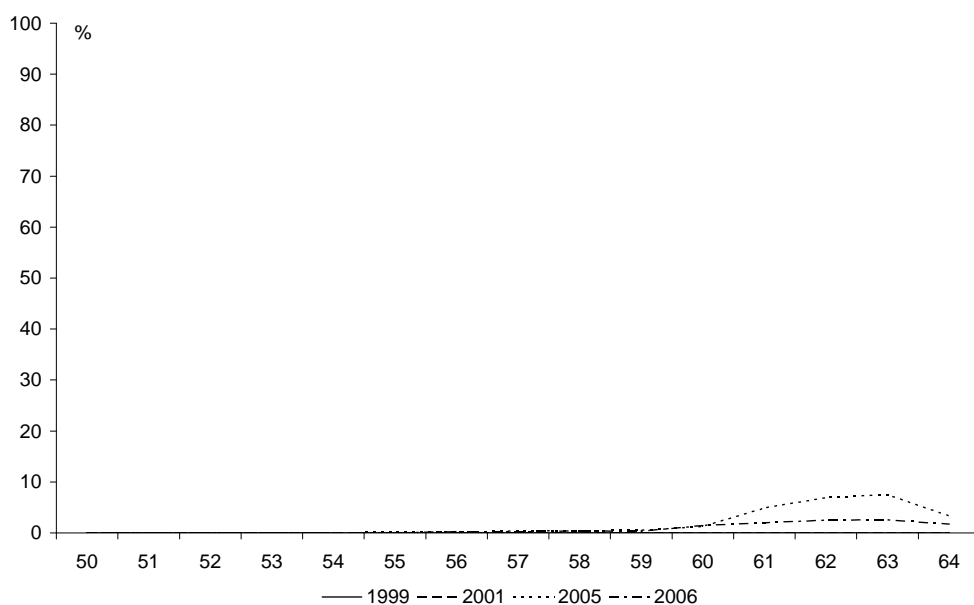
**Figure 2.4 Part-time OBU early retirement by age<sup>a,b</sup>**



<sup>a</sup> Figures excluding former participants ('sleepers'). The number of former participants varies substantially per year due to administrative reasons, and this would heavily impact the figures on employment, disability and early retirement. Labour market outcomes for 2007 are not presented as there turns out to be a measurement problem for that particular year.

<sup>b</sup> From 2001 onwards it is allowed to receive OBU and to be employed simultaneously. Total income must however stay below 100% of last earned income to be eligible to the favourable fiscal treatment of the early retirement benefit. In this paper we consider OBU claiming behaviour, we do not investigate employment behaviour of OBU recipients. We consider part-time OBU as a separate category, most of the recipients of part-time OBU work half of the last years' hours.

**Figure 2.5 FLEX early retirement by age <sup>a</sup>**



<sup>a</sup> Figures excluding former participants ('sleepers'). The number of former participants varies substantially per year due to administrative reasons, and this would heavily impact the figures on employment, disability and early retirement. Labour market outcomes for 2007 are not presented as there turns out to be a measurement problem for that particular year.

The fraction of employed in the dataset decreases slowly but steadily from age 50 to 59 (figure 2.1). The substantial decrease at age 60 is the result of early retirement. The fraction of disabled in 1999 and 2001 increases until age 60 and, like employment, decreases strongly at age 61 (figure 2.2). As disability is an absorbing state for most recipients, the decrease is likely to be the result of a change in the coding at that age. Section 3 discusses a method to construct reliable event history data. And due to the coding, the number of disabled is unrealistically low at all ages in 2005. Such an omission in the database could be repaired by using administrative data from the national employee insurance authority (UWV), which is available at Statistics Netherlands. This is however beyond the scope of the paper.

The age-pattern of part-time OBU retirement is the result of rules that regulate the access to this scheme. Workers who are eligible for OBU at age 60 are allowed to retire in part-time at age 59 (or 58) and receive 50% of the benefit level at ages 59 and 60 (or at ages 58 to 61). The scheme is called 'RuilOBU', which may be translated as 'ExchangeOBU'. The term 'part-time' refers to the early retirement benefit.<sup>2</sup> Although there is no obligation, most workers continue to work in part-time. After at age 61 or 62 they enter the ordinary OBU retirement scheme, and so they are full-time retired from that age onwards. Finally, the presence of workers retired with the FLEX scheme is registered from 2005 onwards. The percentage of individual retiring with FLEX is low as many have access to the financially more attractive OBU scheme.

<sup>2</sup> Part-time retirement is gradual retirement with a partial pension benefit that can be combined with part-time employment or with continuing payment of old age pension contributions.

### **Financial statistics**

An important advantage of administrative pension fund data is that it contains reliable and detailed information on the exact pension and early retirement rights of employees.<sup>3</sup> The pension fund data does contain such information. Three aspects are important for the measurement of the financial incentives of the early retirement system: (i) the age at which an employee gets access to an early retirement benefit, (ii) the replacement rate of the benefit, and (iii) the financial reward to postponement of early retirement. All employees have access to the FLEX scheme. The first age at which they have access is age 55. For OBU the first possible age to get access is age 60. An employee can however retire in part-time at age 59 or 58.

Most workers born before 1949 have access to OBU at age 60 (table 2.3). In 1999, about 3% of workers born in the 1940s had no access to OBU and about another 3 to 8% had access to OBU after age 60. Some workers born in the 1930s had access to OBU in the next year, but many need to wait one or two years to have access. This may be a selection effect; workers who have access to OBU in the next year may have retired already with part-time OBU. So given the constraint of at least 10 years of tenure in the sector, a small percentage of individuals becomes eligible at later ages. The number of employees who do not satisfy the requirements for OBU is higher in 2006. This may again be a selection effect.

There are some important differences in the characteristics of individuals who have and who do not have access to OBU (table 2.4). The main difference is represented by the tenure distribution: the majority of the 'non-eligible' has tenure lower than 10 years. Moreover, they mainly work part-time for 1 to 11 hours per week and, consequently, have lower wages. The percentage of men is relatively high among the non-eligible.

The replacement rates of OBU and FLEX vary by year of birth (table 2.5). The replacement rate of OBU decreases with year of birth due to the transitional nature of the scheme. Workers born before 1939 have a gross replacement rate of 80%, workers born in 1940 have a rate of 79% and workers born in 1948 have a rate of 71%. This is the transition from the old VUT system to the new FLEX system. The replacement rates observed in the data deviate from the official figures. This is due to data limitations: the benefit level and replacement rate observed in our data is based on the wage observed in the last year, while in reality the benefit level is based on the wage earned in the last two years and taking into account the part-time factor of the last five years. The deviation between the official and observed rates is small however.

The replacement rates of FLEX are increasing with year of birth (table 2.5). The rates have been calculated at age 60 for two different groups of individuals: OBU eligible and OBU non eligible (middle and lower panel of table 2.5). The increase with year of birth may be due to the employment patterns over the life course. Older individuals more often have gaps in their working careers, that is periods in which they did not work. Such gaps lead to a lower

<sup>3</sup> Such information may be observed in surveys as well, but it is likely to be less reliable.

replacement rate. This should be particularly true for the replacement rates of the OBU non eligible as such individuals typically have low tenure. For younger individuals it is assumed that they continue working until retirement, leading to a full employment career and therefore to a higher replacement rate. The younger generations may nevertheless end up with lower replacement rates as they may not work every year until retirement (like the older generations).

**Table 2.3 Eligibility age for OBU early retirement by year of birth, various years <sup>a</sup>**

	60	61	62	63	64	N/E
Year 1999						
Year of birth	%					
1935 (age 63)					52	48
1936 (age 62)				31	47	21
1937 (age 61)			31	36	28	5
1938 (age 60)		26	41	18	11	5
1939 (age 59)	29	27	17	8	5	19
1940 (age 58)	79	7	3	2	1	8
1941 (age 57)	85	3	2	1	1	7
1942 (age 56)	86	2	2	1	2	7
1943 (age 55)	87	2	2	2	3	5
1944 (age 54)	86	2	3	3	3	3
1945 (age 53)	88	3	3	2	1	3
1946 (age 52)	90	3	1	1		3
1947 (age 51)	93	3	1			3
1948 (age 50)	96	1				3
1949 (age 49)						100
>1950						100
Year 2006						
Year of birth						
1942 (age 63)					1	99
1943 (age 62)				4	38	58
1944 (age 61)			2	38	8	52
1945 (age 60)		5	42	7	4	42
1946 (age 59)	6	50	2	2	0	37
1947 (age 58)	74	4	1	0	0	20
1948 (age 57)	77	2	0	0	0	21
1949 (age 56)						100
>1950						100

<sup>a</sup> Employed individuals.

OBU eligible	1999		2001		2005		2006	
	Yes	No	Yes	No	Yes	No	Yes	No
Observations	95	4	76	8	43	11	31	12
Gender	%							
Female	78	68	77	73	23	24	77	74
Male	22	32	23	27	77	76	23	26
Age								
50-54	60	47	38	40	0	0	0	0
55-59	38	48	59	47	88	69	79	55
60-65	2	5	3	13	12	31	21	45
Working hours								
1-11 hours	13	23	11	23	9	24	8	23
12-23 hours	35	29	33	31	32	32	31	32
24-31 hours	18	12	19	14	20	14	21	15
32-35 hours	6	14	7	11	9	10	10	9
36 or more hours	28	22	30	21	30	20	31	20
Tenure								
0-9 years	39	79	20	82	12	82	10	78
10-19 years	25	6	34	7	36	6	36	7
20-29 years	30	12	34	8	25	4	24	5
30-39 years	6	2	12	3	27	8	29	9
>40 years	0	0	0	0	0	0	0	0
Fulltime salary	thousands							
Q10	17.4	14.1	19.3	15.3	22.3	18.7	23.0	19.4
Q25	19.1	15.2	21.5	16.5	25.7	20.1	26.6	21.1
Q50	23.3	19.1	25.7	19.1	30.4	23.0	31.0	24.4
Q75	29.3	25.2	32.6	25.2	38.7	28.5	39.0	30.6
Q90	38.7	34.3	43.4	34.3	49.6	38.6	50.1	43.0

<sup>a</sup> Employed individuals.

The large gap in the replacement rates at age 60 between OBU and FLEX is the result of differences in the rules. For OBU only employment in the last 10 years is required, the number of years contributed to the system does not matter. For FLEX the number of years determines the level of the benefit, and as many individuals do not reach the full 40 years of contribution the replacement rate is lower. The replacement rate for those not eligible for OBU is very low. The individuals are not eligible for OBU as they contributed to the system for a few years only, and exactly this leads to a low replacement rate.

Table 2.5 Replacement rates for OBU and FLEX early retirement by year of birth <sup>a,b,c</sup>							
	1999	2000	2001	2002	2003	2005	2006
OBU (OBU eligible)							
Year of birth							
1941	80	82	83	85	79	80	
1942	79	80	81	83	79	78	
1943	77	78	79	81	79	78	100
1944	75	76	77	78	81	77	100
1945	75	74	75	76	79	79	100
1946	74	73	74	74	75	77	93
1947	73	73	73	73	74	75	76
1948	73	72	73	72	72	73	74
FLEX (OBU eligible)							
Year of birth							
1941	42	41	39	34	30	16	
1942	43	43	46	41	36	23	
1943	42	43	46	47	40	31	18
1944	42	43	46	47	49	35	29
1945	43	44	46	47	50	44	38
1946	45	46	47	48	47	47	44
1947	47	47	48	48	49	48	47
1948	49	49	50	50	50	49	49
FLEX (non OBU eligible)							
Year of birth							
1941	5	4	7	6	4	2	
1942	7	6	8	7	5	4	
1943	8	7	9	8	8	6	6
1944	10	9	9	8	10	8	8
1945	13	10	11	11	11	10	9
1946	14	12	12	12	13	13	12
1947	15	14	14	13	14	14	14
1948	17	16	15	15	15	16	14

<sup>a</sup> Replacement rate is the ratio between the benefit individuals will received if they retire at age 60 and pension base.

<sup>b</sup> Employed individuals, workers are assumed to stay employed until retirement and remain earning the same wage.

<sup>c</sup> The year 2004 is deleted from the table as the data are not reliable for that particular year.

The last important element to consider for the assessment of the effects of financial incentives on early retirement is the actuarial fairness of the two early retirement schemes. In order to do so, we first calculate the Net Present Value of the early retirement benefits and related old age pension, both for OBU and FLEX, by eligibility age, using these formulas:

$$NPV_S^{FLEX}(R) = \sum_{t=R}^{64} ERB_t^{FLEX}(R) \gamma_t \delta^{t-S} + \sum_{t=65}^T PB_t^{FLEX}(R) \gamma_t \delta^{t-S}$$

$$NPV_S^{OBU}(R) = \sum_{t=R}^{64} ERB_t^{OBU}(R) \gamma_t \delta^{t-S} + \sum_{t=65}^T PB_t^{OBU}(R) \gamma_t \delta^{t-S}$$

Where  $S$  is the current age,  $R$  is the retirement age,  $\delta$  is the discount factor,  $\gamma$  is the survival probability,  $ERB$  are the early retirement benefits, and  $PB$  are old age pension benefits when retiring with FLEX or OBU. In order to calculate the financial rewards to postponement (anticipation) of early retirement with respect to age 60, we calculate an index of the Net Present Values where age 60 is used as a base age. The time discount factor (3%) and the survivor probability table are provided by PFZW.

Until the year 2005 the OBU scheme was not actuarially fair, the net present value of the benefit decreased with retirement age (table 2.6). This highlights the convenience to retire at age 60. From 2006, the OBU scheme has become 'actuarially fair'; the net present value of the benefit is independent of retirement age. So there is no financial loss from retiring later. The net present value does not change in case an individual retires with part-time OBU.

The net present value of the FLEX benefit increases with retirement age. The FLEX benefit is in itself actuarially fair, but in contrast to the OBU scheme continuing to work also leads to a higher benefit level of the old age pension (the pension starting at age 65). In the OBU scheme the contribution to the old age pension is automatically continued, so there is no additional gain from continuing to work. In the FLEX scheme continuing to work is financially attractive as one additionally collects old age pension rights.

**Table 2.6 Actuarial fairness of OBU and Flex early retirement by retirement age of retirement**

OBU	1999	2001	2005	2006
58 <sup>b</sup>	1.00	1.00	1.00	1.00
59 <sup>b</sup>	1.00	1.00	1.00	1.00
<b>60</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>
61	0.88	0.88	0.89	1.00
62	0.77	0.78	0.78	1.00
63	0.66	0.67	0.68	1.00
64	0.55	0.57	0.58	1.01
FLEX	1999	2001	2005	2006
55	0.94	0.94	0.83	0.85
56	0.95	0.95	0.86	0.87
57	0.96	0.96	0.89	0.90
58	0.97	0.97	0.92	0.93
59	0.98	0.98	0.96	0.97
<b>60</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>
61	1.03	1.02	1.04	1.04
62	1.05	1.04	1.09	1.09
63	1.08	1.08	1.13	1.13
64	1.10	1.11	1.19	1.17

<sup>a</sup> Actuarial fairness implies that the Net Present Value (NPV) of the pension and early retirement benefit is independent of age of (early) retirement. Actuarial fairness is measured as a fraction of the NPV of a pension and early retirement benefit at a certain age relative to the NPV at age 60. So at age 60 the fraction is 1.00 by definition.

<sup>b</sup> Retirement with OBU before age 60 is possible only with the so-called 'Ruil OBU'. We assume individuals continue to work part-time, which is in practice true for about 90% of the individuals.

## 2.2 Administrative municipality data

The municipality data is based on municipality population registers, the so-called *Gemeentelijke Basisadministratie voor persoonsgegevens* (GBA). The information is collected by local municipalities and it contains typical demographic information related to births, marriages, local migration and mortality. The municipality dataset is administrated by Statistics Netherlands and it can be linked to the pension fund data using an anonymous version of the Dutch social security code.

The large majority of PFZW participants are Dutch, married, and have children. Slightly more than 10 percent are first or second generation immigrants (table 2.7). Most participants with an immigration background come from another EU country. The major immigrant groups in the Netherlands come however from Suriname, Turkey, Morocco and Antilles and Aruba. In other words, the participation of these groups in the health care sector is relatively low.

## 2.3 Administrative employment data

The employment data is based on the national employment insurance registers and on the registers of the Dutch tax authorities. Employees need to be registered at the national employee insurance authority (the so-called UWV) at the first working day. The register contains information on working hours, salary and some firm information. The employment dataset is administrated by Statistics Netherlands, and they linked it to tax and salary information from the tax registers. The data can be linked to the municipality and pension fund data using the anonymous version of the Dutch social security code.

The large majority of PFZW participants work in the health care sector (table 2.8). The pension fund also covers the environmental sector, which is however not particularly large. Furthermore the pension fund covers some private sector workers as well. These participants work in health, cultural activities and sports, but according to the SBI codes of the tax authorities they work in the private sector. During the year, a vast majority of the employed has one job only. The wage distribution depends on the data source, which is no surprise as the definition of the wage is not the same. At the lower end of the wage distribution the differences are generally small, while at the upper end the pensionable wage, as measured by PFZW, is about 10% higher than the taxable wage.



**Table 2.7** Descriptive statistics from administrative municipality data, age 15-64, 1999-2006<sup>a,b</sup>

	1999	2000	2001	2002	2003	2005	2006
Observations	787	881	808	1.158	1.032	1.018	1.109
	thousands						
Immigrant status	%						
Dutch	88	88	87	86	87	87	87
Morocco	1	1	1	1	1	1	1
Turkey	1	1	1	1	1	1	1
Suriname	2	2	2	3	2	3	2
Antilles and Aruba	1	1	1	1	1	1	1
Other non-western	1	1	1	1	2	2	1
Other western	7	7	7	8	7	7	7
Generation							
Dutch	88	88	87	86	87	87	87
1st generation	7	7	7	8	8	7	7
2nd gen (1 parent)	4	4	4	4	4	4	4
2nd gen (2 parents)	1	1	1	1	1	2	1
Marital status							
Single	31	31	32	33	33	34	33
Married	59	59	58	56	56	55	56
Widow	1	1	1	1	1	1	1
Divorced	9	9	9	9	9	9	10
Household type							
One person	15	14	14	14	14	14	15
Not married, no child	10	10	10	10	10	10	10
Married, no child	17	16	16	15	16	15	17
Not married, with child	4	4	4	5	5	6	6
married with children	47	48	48	48	47	48	45
one parent household	6	6	7	7	7	7	7
Children							
0	27	26	26	25	26	25	27
1	20	20	20	20	20	20	20
2	26	27	27	27	27	28	27
3	9	10	10	10	10	10	9
4 or more	17	17	17	18	17	17	17

<sup>a</sup> All PFZW participants, so including the so-called 'sleepers'.

<sup>b</sup> The year 2004 is deleted from the table as the PFZW data are not reliable for that particular year.

<b>Table 2.8 Descriptive statistics from employment data, age 50-64, 1999-2005<sup>a,b</sup></b>						
	1999	2000	2001	2002	2003	2005
	thousands					
Observations	37	149	150	201	204	230
	%					
Sector <sup>c</sup>						
Private	4	5	4	5	5	4
Public	1	1	1	1	1	0
Education	1	1	1	1	1	1
Health care	90	89	90	89	89	92
Environment	4	4	4	4	4	3
	Number of jobs <sup>d</sup>					
1	89	88	88	87	89	90
2	9	9	10	11	9	9
3	2	2	2	2	1	1
4 or more	0	1	0	1	1	0
	thousands					
Taxable salary						
Q10	21.0	21.2	22.2	23.6	23.9	24.3
Q25	24.2	24.7	26.2	27.9	28.4	28.5
Q50	28.4	29.1	30.8	33.4	34.1	34.2
Q75	35.5	37.1	39.1	42.3	42.9	42.6
Q90	50.8	52.8	55.1	57.7	58.4	57.9
	Pensionable salary					
Q10	20.5	21.0	21.3	22.1	23.1	24.3
Q25	23.5	24.5	25.5	27.2	28.6	29.4
Q50	29.1	30.5	31.6	33.7	35.5	37.1
Q75	38.7	40.6	42.3	44.6	46.7	48.0
Q90	55.0	58.0	60.2	63.5	66.6	68.4

<sup>a</sup> Employed individuals, excluding former participants ('sleepers'). Data for the year 2006 is not yet available.

<sup>b</sup> The year 2004 is deleted from the table as the data are not reliable for that particular year.

<sup>c</sup> Sector coding according to the information from the tax authorities, based on SBI codes.

<sup>d</sup> Number of jobs during the year.

### 3 Event history data

The pension fund data is a yearly dataset that contains individual records of the participants. To study labour market exit the dataset has to be transformed into event history data. This is not an obvious task: panel attrition occurs although the dataset should contain all participants. In panel surveys panel attrition often occurs because respondents stop their participation. That is not a problem for the pension fund data, but in turn there are administrative reasons for attrition.

We restrict the creation of event history data to individuals age 50 to 64.<sup>4</sup> We stack all yearly observations per individual underneath each other and we derive the labour market status

<sup>4</sup> The creation of event history data for the complete dataset is possible, but due to the size it is time-consuming

for the next year. And indeed attrition occurs. For several reasons many individuals are not observed in the next year. Attrition occurs, for example, in case a participant has submitted an application for retirement. Such an individual does not receive a formal pension overview as the pension rights are communicated by PFZW via a separate correspondence. Other reasons why individuals disappear from the dataset are because their address is unknown, they became a sleeper, or the authority which arranges their pension scheme at PFZW has arrears of payment.

**Table 3.1 Total number of observations each year and availability of the status within the next two years<sup>a</sup>**

Year	Observations (age 50-65 & active)	Observation of which the status is available in the next period (t+1)	% not available in period t+1	Observation of which the status is available in the next period (t+1) or in period (t+2)	% not available (in period t+1 or t+2)	Observations (age 50-65 & OBU-eligible)
1999	116474	108291	7	115633	1	95265
2000	133717	114382	14	132164	1	91231
2001	138149	130076	6	136798	1	75955
2002	165744	154328	7	163612	1	73140
2003	181663	84876	53	179973	1	62673
2004	113677	106814	6	112136	1	1303
2005	212614	201590	5	210125	1	43408
2006	228600	222810	3	222810	3	31192

<sup>a</sup> The large fraction of missing at time t+1 for 2003 is the result of the unreliable data of 2004. So the event history data for the transitions of 2003 to 2004 and of 2004 to 2005 turn out not to be reliable.

**Table 3.2 Next year's labour market status of active individuals age 50-64 1999-2002, 2005-2006**

	1999	2000	2001	2002	2005	2006
Next year's status	%					
1:= Active in sector	92.9	90.8	92.3	89.9	91.1	98.4
2:= Stand-by-employee	0.3	0.2	0.2	0.2	0.3	0.3
3:= Sleeper	2.1	2.9	2.3	3.8	3.3	0.3
4:= Disabled	0.9	1.3	1.3	1.3	0.2	0.2
5:= OBU-pre-pension <sup>b</sup>	3.9	4.8	3.8	4.6	4.8	0.7
6:= FLEX-pre-pension	0.0	0.0	0.1	0.3	0.3	0.1

<sup>a</sup> The status of year t+2 is imputed in case the status of year t+1 (the next year's status) is missing.

<sup>b</sup> The table reports claiming behaviour and disregards the possibility that recipients may be employed simultaneously, see footnote b of figures 2.3 and 2.4.

Attrition is problematic as individuals may still be employed, or may be retired. To counteract the problem we use information from the second-next year as well. Imputing information from the second-next year may introduce measurement error. For example, in case an individual changed status between two years we do not know in which year the change happened. We use

the employment register data to reduce the measurement error; from the register we at least know the employment status in the missing year. The imputation procedure makes the number of observations with attrition drop substantially. For example, by using information from the second-next year for the employed individuals aged 50 to 64 in the year 2000 attrition drops from 14% to 1% (table 3.1).

Most workers age 50 to 65 are still active in the sector in the next year (table 3.2). Mobility, in the sense that the workers leave the sector and become a sleeper has been large in the years 2002 and 2005. The number of individuals that have started to receive a disability pension has decreased substantially over time. This is in line with the reforms in the disability scheme. The number of individuals that started to receive a OBU early retirement pension decreased over the years 2000 to 2003, but peaked again in the year before the reforms of the year 2006. The transitions from 2006 to 2007 do not represent the inflow in disability and early retirement for the complete year. Therefore the outcomes for the last year cannot be compared to the previous years, and so they cannot be used for empirical analysis.

## **4 Descriptive analysis and future research**

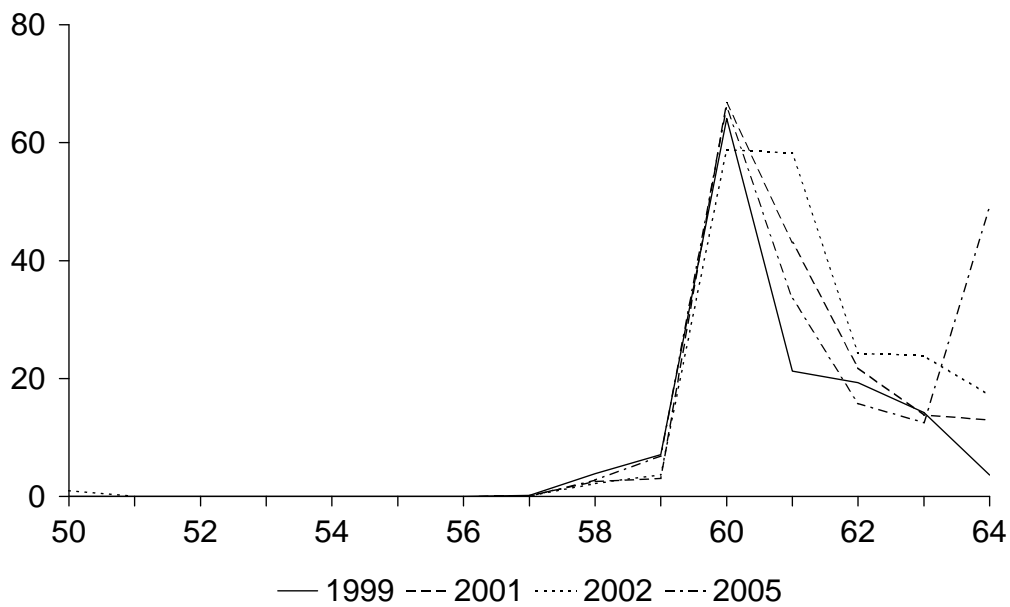
The section presents first empirical results using the new administrative data. The idea is to present descriptive analysis based on the event history data. How does labour market exit develop over time? Can changes in the use of different exit routes be related to policy changes? The descriptive analysis will not give final answers; instead the first results will be used to formulate research questions. Future research using sophisticated empirical methods will give more reliable answers in future research.

Until 2006 employees who are eligible for an OBU early retirement benefit are likely to stop working as soon as they become eligible. The data reveal that about four out of five workers who are eligible for OBU at age 60 claim the benefit at that particular age. The reason is that postponing is financially not attractive, the effective tax rate on continuing working is high as the benefit level hardly increases in case of postponement. Furthermore, OBU early retirement is also attractive relative to other exit routes. So individuals who are eligible for OBU an early retirement benefit should have a relatively low probability to enter the disability scheme.

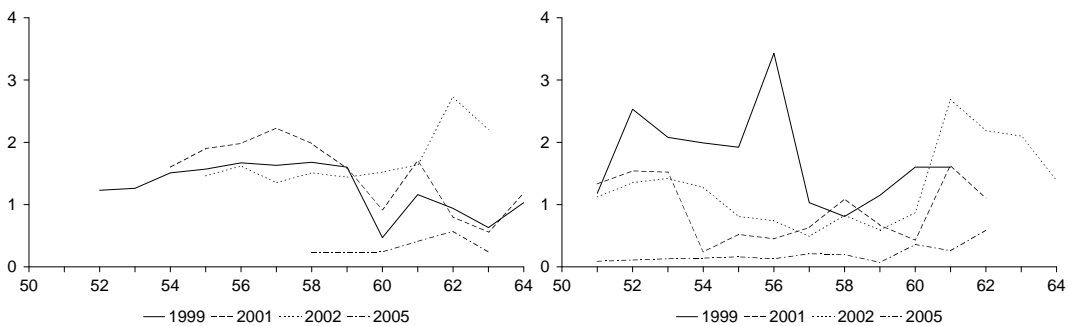
The first age at which workers start to retire is age 58 (figure 4.1). Workers who have access to OBU early retirement at age 60 are allowed to retire part-time at first at age 58. Nevertheless the conditional probability to retire at age 58 is small. Kantarci and van Soest (2008) show that actually a rather large part of Dutch elderly prefers to retire part-time. A complicating factor for the health care sector is however that many already work part-time during a large part of their career. So for most individuals retirement with part-time OBU would imply working even fewer hours. The issue of part-time retirement in the sector is therefore an issue for future research.

A large part of employees eligible for OBU at some age retire at age 60. Almost 70% of the employed at age 59 decide to retire at age 60. The result is in line with previous research on the Netherlands, by Kerkhofs *et al.* (1999) and de Vos and Kapteyn (2004), whereby the former authors even described the actuarial unfair early retirement option as an ‘offer you cannot refuse’. The conditional probability to retire at age 60 seems rather stable over time. On the one hand this seems somewhat surprising as the replacement rate of the OBU scheme decreases over the consecutive generations (table 2.5). On the other hand, previous research has shown that the impact of the decreasing replacement rate, the income effect, is small (Euwals *et al.*, 2009). Nevertheless the precise size of the income effect is still an issue for future research.

**Figure 4.1 Hazard rate into OBU early retirement for those eligible for OBU at some age<sup>a</sup>**



**Figure 4.2 Hazard rate into disability for those eligible (left) and non-eligible (right) for OBU at some age**



<sup>a</sup> The hazard rate is defined as the probability that an individual will receive an OBU early retirement benefit at age  $a$  conditional on being active at age  $a-1$ . The figure presents the so-called Kaplan-Meier estimator of the hazard rate.

The conditional probability to enter the disability insurance (DI) changes substantially between 2001 and 2005 (figure 4.2). The conditional probability of entering DI in 2005 is for all ages less than a quarter of the same probability in 2001. This is likely to be related to the reforms in the disability insurance. The decline in conditional probabilities for higher ages could be a consequence of individuals exiting the labour market using the early retirement scheme. For the years 1999 and 2001, the figures reveal a substantial drop in the probability for those being eligible for the OBU scheme at age 60, which is exactly the age at which the probability to enter the OBU scheme peaks. So for these years there is evidence of a substitution effect between early retirement and disability. The disability enrolment is however independent of age in the years 2005. This may be related to the reforms as substitution between the exit routes may have decreased. Again, also this is an issue for future research.

## **5 Conclusion**

The second-largest pension fund in the Netherlands, the health care sector pension fund PFZW (former PGGM), placed the administrative records of its participants for the years 1999 to 2007 at the disposal of Statistics Netherlands (CBS). The project was initiated by Netspar and financed by Stichting Instituut GAK. Statistics Netherlands processed the data such that it can be merged to other administrative data records. The data will help to understand labour market behaviour, and for example will help to identify the impact of financial incentives on labour market exit.

First empirical results show that early retirement behaviour in the health care sector is in line with results from previous research on the Netherlands. In an actuarial unfair early retirement scheme many employees retire as soon as they can. For the years 1999 to 2001 there is evidence of substitution between early retirement and disability insurance. Previous research was based on survey data with imprecise measurement of the exact financial incentives to retire. The administrative data contains precise information on early retirement and pension rights of individuals' employees. This will allow future research to be more precise on the importance of financial incentives for early retirement behaviour. The possibility to merge pension fund data to other administrative data, like national employee insurance information and employer information will allow for innovative research on labour market exit. The main goal of this paper was to describe the administrative pension data. Much more empirical research on basis of administrative pension fund data will follow in the coming years, and it may include research on consumption and savings behaviour, coordination behaviour of members of a household, substitution between different early retirement routes, and interactions between health, pensions and mortality.

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## Appendix A: Imputation of financial variables

Administrative data has several advantages over survey data, but still it should be clear that both kinds of data have disadvantages. One issue is that also administrative data does not contain all information that a researcher would like to have. In order to make the data suitable for research some missing information has to be imputed.

### Imputation 1: FLEX early retirement at ages 55 to 59

Each individual working at the 1st January 1999 is eligible for FLEX from age 55 onwards. The administrative data reports the FLEX benefit level for ages 60 to 64; the variables are coded from FLEX60 to FLEX64.<sup>5</sup> So the FLEX benefit profile from age 55 to 59 has to be imputed. The imputation implies the production of five additional variables, FLEX55 to, FLEX59. To build these variables, and to impute the missing values for FLEX60, FLEX61 and so on, the table of FLEX pension-factors made available by PFZW has been used. In particular, given that these factors are expressed as a percentage of FLEX60, first it has been calculated for each individual using the following formula:

$$FLEX_{60} = \frac{100 * FLEX_t}{pensionfactor_t}$$

Where t is the first age at which the variable FLEX is greater than zero<sup>6</sup>. After building FLEX60 for each individual the entire benefit profile has been imputed basing on the following formula:

$$FLEX_t = \frac{pensionfactor_t * FLEX_{60}}{100}$$

### Imputation 2: old age pension (OP) for FLEX early retirement ages 55 to 59

Secondly, the variable OPNAFL (i.e. old age pension individual will receive if early retire with FLEX) has been built for ages 55 to 59. To calculate these variables we use the following approximation. We first calculate the increase in the OPNAFL between the first two available ages. Successively, we apply this increase to reduce the OPNAFL for ages between 55 and 59 in this way:

$$OPNAFL_t = OPNAFL_{t+1} (1 - \Delta_{T,T-1})$$

<sup>5</sup> The variables FLEX 60 and FLEX61 (and OPNAFL60 and OPNAFL62) are missing in case an individual is age 62.

<sup>6</sup> This is determined by the information given by PFZW.



Where  $\Delta_{T,T-1}$  is the increase in old age pension benefit level between the two first available ages. The underlying assumption is that the increase in the benefit level due to one more year of working and contributing can be subtracted in case of one year working less. This is of course an approximation, but according to PFZW it is reasonable for most participants.

**Imputation 3: OBU early retirement for the years 1999 to 2005**

For years 1999 to 2005 the variables OBU60 to OBU64 are not observed in the dataset. Instead the first age of access is observed, together with the benefit level at the first age. To impute the variables we use the following structure:

**Observed in the data:**

LFTVROBU(first age at which the individual retires with OBU)=61

OBULFTVR(how much the individual receives when he retires with OBU)=X

**Imputed:**

OBU60=0

OBU61=X

OBU62=X

OBU63=X

OBU64=X

The variables OPNAOB60 to OPNAOB64 on old age pension for OBU retirement are built in the same way using the variable OPNAVROB(how much old age pension the individuals receives when he retires with OBU).

**Imputation 4: RuilOBU early retirement**

Finally, the variables for RuilOBU and OPNAOB58 and OPNAOB59 (old age pension when retiring with RuitOBU at age 58 and 59 respectively) have to be imputed. For the RuilOBU from year 1999 to 2005 the structure is the following:

**Observed in the data**

LFTVROBU(first age at which the individual retires with OBU)=60

OBULFTVR(how much the individual receives when he retires with OBU)=X

**Imputed:**

OBU58\_R58=1/2 X

OBU59\_R58=1/2 X    OBU59\_R59=1/2 X

OBU60\_R58=1/2 X    OBU60\_R59=1/2 X

OBU61_R58=1/2 X	OBU61_R59= X
OBU62_R58=X	OBU62_R59= X
OBU63_R58=X	OBU63_R59= X
OBU64_R58=X	OBU64_R59= X

For the years 2006 and 2007, the structure is the following:

**Observed in the data**

OBU60>0 then first age at which the individual retires with OBU=60

OBU60 to OBU64(amount individual receives retiring with OBU at age 60 to 64)

**Imputed:**

OBU58\_R58=1/2 OBU60

OBU59\_R58=1/2 OBU60    OBU59\_R59=1/2 OBU60

OBU60\_R58=1/2 OBU60    OBU60\_R59=1/2 OBU60

OBU61\_R58=1/2 OBU60    OBU61\_R59= X61

OBU62\_R58=X62            OBU62\_R59= X62

OBU63\_R58=X63            OBU63\_R59= X63

OBU64\_R58=X64            OBU64\_R59= X64

To impute the variables OPNAOB58 and OPNAOB59, the old age pension benefit level in case of retirement with RuilOBU, we assume that the individual in the same period continues to work part time or pays herself for the remaining part of the contribution. This implies that OPNAOB58=OPNAOB59=OPNAOB60.