# How eligibility criteria and entitlement characteristics of unemployment benefits affect job finding rates of elderly workers

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**Abstract**

In the Netherlands eligibility criteria for unemployment benefits are age-specific. Once workers reach age 57.5 they are no longer required to actively search for work. Furthermore, if workers become unemployed after age 57.5 they are entitled to unemployment benefits up to the age of 65 (after which they will receive old age pensions). This paper investigates the effects of eligibility criteria and entitlement characteristics on the job finding rates of elderly workers. We find substantial effects.

*Keywords*: eligibility criteria, entitlement characteristics, unemployment benefits, job finding rates, elderly workers

*JEL-codes*: C41, H55, J64, J65

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# 1 Introduction

It is well known that employment rates (employment as a percentage of the population) among elderly workers are much lower than among prime age workers. In 2003 averaged across the OECD the employment rate of men aged 25 to 54 years was 86.7% while the employment rate of men aged 55 to 64 years was 60.8%.[1] For women these numbers were 64.1% and 40.0%. The Netherlands are no exception to this rule. In 2003 in the Netherlands the employment rates among prime age individuals were 90.7% for men and 73.5% for women, while among elderly workers they were 57.4% for men and 32.2% for women. The main reasons for the low employment rates among elderly individuals are early retirement, a high incidence of disability, and voluntary withdrawal from the labor force (especially among women). In many countries the low employment rates of elderly workers are considered problematic and there are all kinds of policy initiatives to increase the low employment rates. Unemployment rates among elderly workers in many countries are about the same of even somewhat lower than among prime age workers. In 2003 for example across the OECD the average unemployment rate among prime age men was 5.8%, while it was 5.2% among elderly men, for the Netherlands these numbers were 3.0% and 2.2%.[2] So, at first sight the labor market position of elderly workers is no reason for concern. However, keeping in mind that elderly workers often have steady jobs, while many prime age workers are still in the process of finding a steady job, the unemployment rate among elderly workers is not as low as one would expect. Indeed, unemployment – in particular the use of UI-benefits – is often used as pathway to

[1] See the OECD Employment Outlook, Paris, 2004.

[2] For women these numbers are very similar.

retirement (Heyma, 2001).

Concerning unemployment benefits both eligibility criteria and entitlement characteristics affect the behavior of unemployed workers and both have been subject to empirical analysis. The relationship between eligibility requirements and job finding rates has been studied mostly through the analysis of the effects of benefit sanctions – temporary reductions in unemployment benefits due to non-compliance with eligibility requirements. The entitlement characteristics of which the effects have been studied most frequently are the replacement rate and the potential benefit duration.

Benefit sanctions may affect unemployment duration through two channels. Benefit sanctions will increase the search intensity of the sanctioned due to the reduction in the value of being unemployed. This effect is the so called ex-post effect, the effect that an actually imposed benefit reduction stimulates a worker in his or her search effort. Furthermore, also the non-sanctioned may increase search intensity due to more strict enforcement of job-search requirements. This second effect is the ex-ante effect, the effect that the risk of getting a benefit sanction influences the search behavior of the unemployed worker.

In many countries benefit sanctions are used in different ways as a response to non-compliance with eligibility requirements (see Grubb (2000) for an overview). There is a small literature that deals with estimating the ex-post effect of benefit sanctions. Two Dutch studies find that a reduction of unemployment benefits may have a substantial effect on the outflow from unemployment to a job. Abbring et al. (2005) study the effect of financial incentives by comparing the unemployment duration of individuals that have faced a benefit reduction with similar individuals that have not been penalized. They find that benefit sanctions have a large positive

effect on individual transition rates from unemployment to a job. Van den Berg et al. (2004) perform a similar study for welfare recipients in the city of Rotterdam. Although this group of unemployed has a labor market position that is often considered to be very weak they too find that benefit sanctions stimulate the transitions from welfare to work a lot. From this study it also appears that the size of the benefit sanction is not very relevant. It is the shock of getting a benefit sanction imposed that activates the job seeker, not the size of that sanction. In fact, financial incentives may not be the main driving force of the increase in job finding rates. Gorter and Kalb [1996] find that just by giving attention to unemployed workers employment offices stimulate them to find a job more quickly. Dolton and O'Neill [1996] find effects of the so-called Restart experiments in the UK, where unemployment benefit claimants were obliged to attend meetings with a counsellor to receive advice on for example search behavior and training courses. Black et al. [2003] who study mandatory employment and training programs for unemployed workers find that some unemployed workers that are informed about the mandatory character leave unemployment before they have to enter a program. Apparently these unemployed consider the programs as sanctions they want to avoid. Lalive et al. (2005) find that in Switzerland not only the actual reduction of the benefits stimulates unemployed to leave unemployment more quickly. Already the warning that a sanction may come has a similar and quantitatively important effect. Lalive et al. (2005) also find that the ex-ante effect is of quantitative importance.[3]

Empirical studies have also investigated the link between the PBD – one of

[3]This is the only empirical study that investigates the ex ante effect. See for a theoretical analysis of the ex ante effect of benefit sanctions Boone and Van Ours (2005).

the main entitlement characteristics of an unemployment benefit system – and the duration of unemployment.[4] Katz and Meyer (1990), for example, estimate that a one-week increase in PBD increases the average duration of unemployment for U.S. recipients of UI by about one day. Card and Levine (2000) report a disincentive effect of about 0.5 day per additional week of PBD, also based on U.S. data. Lalive and Zweimüller (2004) report a disincentive effect of about 0.4 day for Austrian benefit recipients. Van Ours and Vodopivec (2004) find for Slovenia that the reduction in PBD reduced unemployment durations substantially, for the median worker one week of reduction in the PBD reduced unemployment duration with about 1.3 day. The PBD affects not only the duration of unemployment but also the pattern of the exit rate. Many studies find a sharp increase in the exit rate from unemployment just before benefits expire.[5]

The current study investigates the effects of both eligibility requirements and entitlement characteristics of unemployment benefits on the job finding rate of elderly workers in the Netherlands. The focus is different from previous studies in two ways. First, we study the effect of *removing* an eligibility requirement. Up to January 1, 2004 in the Netherlands all unemployed workers were obliged to register at the employment office and had to accept a 'suitable job' but once workers reach age 57.5 they are no longer required to actively search for work. The removal of the search requirement may affect the job finding rate since this removal is equivalent to

[4]See Atkinson and Micklewright (1991) for an overview of theoretical and empirical evidence on the effect of the other main entitlement characteristic – the unemployment benefit replacement rate. Meyer (1995) also gives an overview of relevant incentive mechanisms.

[5]Katz and Meyer (1990), Card and Levine (2000), find such spikes for U.S. benefit recipients. Lalive and Zweimüller (2004) and Lalive, Van Ours, and Zweimüller (2004) find them for Austria and Van Ours and Vodopivec (2004) find clear end-of-benefit spikes for Slovenia.

removing – at least partly – the threat of benefit sanctions and removing the 'moral pressure' to actively look for a job. Second, we investigate the effects of extending a PBD up to 'infinity', i.e. up to retirement age. In the Netherlands – up to August 2003 – once workers reached the age of 57.5 they were entitled to unemployment benefits up to the age of 65 after which they are entitled to old age benefits. While usually in studies of PBD the emphasis is on end-of-period behavior with spikes in the exit rates, in this study we focus on beginning-of-the-period behavior. After all, workers above age 57.5 know from the start of their unemployment spell that they can keep their benefits until they retire. Note that this knowledge also creates a problem. If employed workers who are bound to be dismissed have some control over the timing of their dismissal they will try to become unemployed after the age of 57.5. The inflow into unemployment will peak at this age and shortly thereafter. Therefore the people entering unemployment just after the age of 57.5 may be different – partly for unknown reasons – then people that entered unemployment just before age 57.5.

In the next section, we discuss eligibility criteria for unemployment benefits in more detail. In section 3 we present our data and give some illustrations of the unemployment dynamics of elderly workers. Section 4 gives the details of the empirical analysis and section 5 concludes.

# 2 Eligibility criteria for unemployment benefits

This section describes institutional details of the eligibility rules for unemployment benefits as they were in operation during the period we study. Individuals entitled to Unemployment Insurance (UI) benefits are all employees who involuntarily become

unemployed and loose their earnings for at least 5 or half of their working hours. They must have been employed for at least 26 consecutive weeks out of the 39 weeks prior to unemployment (26 out of 39 weeks condition). Excluded from UI-benefits are individuals who receive fulltime disability benefits or have reached the age of 65. Benefits end when individuals are no longer unemployed or reach the maximum benefit duration. The potential benefit duration (PBD) and the benefit level depend on the type of UI-benefits that can be collected. Individuals may be eligible for short term benefits, wage dependent benefits or extended benefits. Eligibility for these three benefit types depends on labor experience and the age at which the individual becomes unemployed.

If an unemployed individual meets the 26 out of 39 weeks condition and has also received wages for at least 52 days in the 4 calendar years during the 5 years prior to unemployment (4 out of 5 years condition), he or she qualifies for wage dependent benefits. These benefits last for at least 6 months and are extended with 3 months to 4.5 years, depending on labor experience. Labor experience is calculated as the number of years in the 5 calendar years prior to unemployment in which the individual has received wages for at least 52 days, plus the number of calendar years between the year that the individual turned 18 and the 5 years prior to unemployment. As a result of the 4 out of 5 years condition, the PBD for wage related benefits depends almost completely on the age at which the individual becomes unemployed.

All individuals who started to receive wage related UI-benefits before August 11, 2003, also receive extended benefits. From August 11, 2003 on, extended benefits have been abolished, but this fact is irrelevant for the population under consideration

(UI-inflow between January 1999 and December 2001). For the duration of extended benefits, age was the only criterion. For individuals who became unemployed before the age of 57.5, this duration was equal to 2 years, for older individuals extended benefits would last up to 3 years. Therefore, if unemployed individuals meet the conditions for wage related benefits, the PBD at least amounts to 2 years, but may have been as long as a total of 7.5 years. Individuals who became unemployed at the age of 57.5 would therefore receive UI-benefits until the normal retirement age of 65. Thus, UI-benefits have in the past been used as retirement pathway (see Heyma, 2001). When the 4 out of 5 years condition is not met, but the 26 out of 39 weeks condition is, unemployed individuals receive short term benefits for a maximum duration of 6 months. The UI-benefit level also depends on the benefit type. UI-beneficiaries with wage related benefits receive 70 percent of a standardization of their last wages. The standardized wage level is the average level in the job from which a person becomes unemployed. The level is regularly adjusted to a general index of wages and limited to a maximum, which amounted to 152.62 Euro per day in 2001. When wage related benefits are replaced by extended benefits, the benefit level decreases to 70 percent of the minimum wage level, which amounted to 80.00 Euro per day in 2001.

# 3 Data

## 3.1 Sources, measurement and definition

We use administrative data from the Dutch social benefits organization (UWV) that contain information on unemployed individuals who start to collect UI-benefits

between January 1, 1999 and December 31, 2001. Individuals in the data can be followed up to April 31, 2002. The UWV data contain the start and end date of UI-benefit spells, the reason for the termination of UI-benefits, the type of benefits, the number of hours for which UI-benefits are collected, whether unemployment is entered from employment or otherwise, like a period of sickness, whether UI-benefits are collected in combination with disability benefits, whether unemployment is seasonal, and an indication of the sectoral office of UWV that is responsible for the benefit provision. Personal characteristics in the data include gender, age, and household situation. Information available on the former employment situation includes the number of working hours and the standardized wage level.

For the analysis of the effects on job finding rates, this information is rather limited. Indicators of the level of human capital, which is expected to considerably influence both the job finding rate through labor experience, are completely absent from the administrative UWV-data. We therefore linked administrative data on job searchers from the Center for Work and Income (CWI) to the UWV-data. At CWI, individuals who become unemployed must register as job searchers before becoming eligible for any kind of social support, including UI-benefits. Individual records from both administrative data sources are linked based on the individual social security number.[6] The CWI-data contain information on educational levels, nationality, residence by postal code, type of contract (permanent or temporary) and industrial sector in the former job, and an indication of labor market chances, categorized in 4 levels that describe an increasing 'distance to labor', as determined

[6]For privacy reasons, true social security numbers have been replaced in all files by constructed but unique numbers. This process has been performed by TNO Work and Employment company, for which we like to thank them, in particular Edwin de Vos.

by CWI by the time an individual is registered as unemployed.

Based on the available information, we selected a to a large extent homogeneous sample to perform our analysis as follows:

- Age between 55.5 and 59.5; so we have age ranges of two years before the critical age of 57.5 and two years after.

- Dutch nationality: In the administrative data, more than 80 percent has the Dutch nationality. By selecting unemployed individuals with the Dutch nationality only, we abstain from issues on the labor market position of immigrants that could disturb our analysis.

- Number of hours unemployed equal to the number of former working hours: For a relatively small group, the number of unemployment hours is not equal to the number of former working hours. This group receives both unemployment benefits and wages. Job search activities and motivation may be completely different for this group than it is for people who loose their job completely. We therefore limit ourselves to this latter group.

- Unemployed and formerly employed for at least 12 hours: We restrict our analysis to unemployment as officially registered by Statistics Netherlands, the Dutch central bureau of statistics, i.e. for at least 12 hours per week.

- No seasonal unemployment: For seasonal unemployment, the seasonal pattern may be more important for the search intensity than the PBD.

- Unemployment directly from labor: We limit our analysis to individuals who enter unemployment directly from work. People may enter unemployment

from a period of sickness, but it is unknown whether sickness was entered from employment or an earlier period of unemployed. Including these latter individuals would disturb the analysis of unemployment duration.

- No disability benefits: Individuals who are partly disabled and therefore collect a limited amount of disability benefits, may receive UI-benefits for the remaining part. The reason for unemployment and the search activities of these individuals are expected to be significant different from individuals who are completely unemployed. They are therefore not included in our sample.

- No workers with only a short potential benefit duration (of 6 months): workers in our sample are either entitled to maximum benefit duration of 6 years (if at the moment they enter unemployment they are younger than 57) or 7.5 years (if at the moment they enter unemployment they are at least 57.5).

## 3.2 Unemployment dynamics elderly workers

Figure 1 shows the evolution of the inflow into unemployment by monthly age. For males the inflow is about 200 per month up to the age of 57.5. Then, at that age unemployment inflow jumps to about 400 a month to decline in the months thereafter. Apparently, for a lot of unemployed workers it is possible to postpone entrance into unemployment to the age at which there is no search requirement and perhaps more important to the age when the potential benefit duration lasts until retirement at age 65. The numbers of females becoming unemployed is substantially smaller but here to there is a jump at age 57.5.

Figure 2 shows the probability to find a job after 3, 6 and 12 months by monthly

age at inflow into unemployment. The outflow probabilities are roughly constant up to the age of 57. About 15% of the male workers finds a job within 3 months, 25% finds a job within 6 months and 30-35% finds a job within a year after having entering unemployment. From age 57 onwards the job finding rates start decreasing. From age 57.5 onwards the outflow probabilities are fluctuating but again sort of constant. The probability to find a job within 3 months is now about 5%, while after 6 months about 10% of the males has found a job; between 6 months and 12 months hardly any worker finds a job. The fluctuations in job finding rates are larger for females but the patterns are roughly the same.

Figure 3 plots the job finding rates by duration of unemployment for two groups of unemployed, those that entered before age 57.5 and those that entered from age 57.5 onwards.[7] There are clear differences in the job finding rates. Males that enter unemployment before age 57.5 have a monthly job finding rate of 5 to 6% in the first months of unemployment. The job finding rate drops to about 4% after 6 months of unemployment and then drops sharply to about 1 to 2%. Males that enter unemployment after age 57.5 have substantially lower job finding rates. In fact, after 6 months hardly any males find a job. For females the patterns of duration dependence are very similar.

# 4 Empirical analysis

The focus of the empirical analysis is on job finding rates, which are investigate using hazard rate models (see Van den Berg (2001) for a recent overview of these

[7] In the calculation of the job finding rates exits to other destinations have been treated as right-censored.

models).

## 4.1 Statistical model

Consider individuals receiving unemployment benefits for $t$ units of time. We assume that differences in transition rates from welfare to work can be characterized by the observed characteristics $x$, the elapsed duration of unemployment itself, and a variable indicating whether the individual is required to actively search for a job. We assume $x$ to be constant. Let $t_s$ be the moment at which the search requirement is obsolete and $\mathrm{I}(t_s < t)$ the variable indicating whether or not the search requirement is obsolete, where ($\mathrm{I}(\cdot)$ is an indicator function). Then, the job finding rate at $t$ conditional on $x$ and $t_s$ is denoted by $\theta(t|x, t_s)$, which is assumed to have a Proportional Hazard (PH) specification

$$\theta_(t|x, t_s) = \lambda(t) \exp(x'\beta + \delta \cdot \mathrm{I}(t_s < t)) \tag{1}$$

in which $\lambda(t)$ represents the individual duration dependence and $\delta$ gives the effect of abolishing the search requirements. Individual duration dependence is modelled in a flexible way by using step functions:

$$\lambda(t) = \exp(\Sigma_k \mu_k I_k(t)) \tag{2}$$

where $k$ (= 1,..,N) is a subscript for duration intervals. We use 15 duration intervals, 12 monthly intervals in the first year of unemployment, then 2 half-yearly intervals, and finally an open interval of $\geq$ 24 months. For reasons of normalization we impose $\mu_1$=0.

Let $t_u$ be the realized duration when leaving to employment. The conditional

density function of $t_u|x, t_s$ can be written as

$$f(t_u|x, t_s) = \theta(t_u|x, t_s) \exp\left(-\int_0^{t_u} \theta(z|x, t_s)\, dz\right) \tag{3}$$

Since we analyze an inflow sample the log-likelihood $L$ of the model is rather straightforward, consisting of two components

$$L = d\Sigma log(f(t_e \mid x)) + (1-d)\Sigma log(1 - F(t_e \mid x)) \tag{4}$$

where $F$ is the distribution function of $f$ and $d$ is a dummy variable with a value of 1 if the observation refers a worker that found a job and a value of 0 if the worker is still unemployed or left unemployment for other reasons.[8]

## 4.2 Explanatory variables

In the analysis we use the following explanatory variables:

- Single: dummy variable if individual is single, reference group: individual has a spouse
- Education: three dummy variables for primary, secondary and higher education; reference group: basic education
- Phase 1: dummy variable if the individual has a strong labor market position according to the classification of the placement office

[8]So, those that leave unemployment for other reasons are assumed to have a right-censored duration with respect to the job finding process. Note that we can estimate the parameters of the job finding rate separately from the exit rate to other destinations because they are assumed to be independent.

- GAK: dummy variable if the individual was registered at a social benefits organization that used to be more efficient in bringing back unemployed to work than other organizations
- Industry: dummy variables for manufacturing, trade, employment services, commercial services
- Search requirement: dummy variable if the individual is required to search for a job, i.e. has not yet reached age 57.5
- Age $\geq$ 57.5: dummy variable if the worker is at least 57.5 at the time of the inflow

To give some idea about the distribution of the observed characteristics among different age categories table 1 presents a general overview. In this table four age categories are distinguished: 55.5-56.5, 56.5-57.5, 57.5-58.5, and 58.5-59.5. Note that the third age category is substantially higher than the other categories, which reflect the spike in the inflow in this age category. As shown among men the percentage of singles is lower after age 57.5. Apparently, married (or cohabiting) men are more likely to wait until the age of 57.5 and then they become unemployed. The same holds for men that have a bad labor market position. While among the unemployed younger than 57.5 the share of phase 1 individuals is about 65%, it is only 54.1% among males that entered while being 57.5 or slightly above. Among women there is no effect of marital status but the effect of the labor market position is very similar as with men. Apparently, if individuals have a weak labor market position they are inclined to wait until age 57.5 before they enter unemployment. A similar

shift in average characteristics occurs for men in manufacturing and for women in trade. Some characteristics are clearly different in the age category 57.5-58.5 from those in the higher or lower age categories. Apparently, in the peak in the inflow into unemployment there is an under-representation of high educated workers, and an over-representation of workers in the administrative unit GAK. Clearly the peak in the inflow into unemployment is not randomly distributed among the personal characteristics of the workers involved.

## 4.3 Parameter estimates

The parameters are estimated using the method of Maximum Likelihood. The analysis is done separately for males and females and for three groups of workers. The first analysis is for workers that are younger than 57.5 when entering unemployment. These workers have an obligation to search for a job until they reach age 57.5. In this analysis we can establish how the obligation to search affects the job finding rate. The second analysis is for workers that are at least 57.5 when they enter unemployment. These workers have no obligation to search and are entitled to benefits up to retirement at age 65. The third analysis is for the whole group of workers aged 55.5-59.5. In this analysis we can establish both the effect of the search requirement and the effect of having an 'infinite' benefit entitlement. The parameter estimates are shown in Table 2.[9]

The first column presents the parameter estimates for males that enter unemployment below age 57.5 and are thus all required to search for a job, but as soon as they come at age 57.5 they are no longer required to search for a job. As shown,

[9]We do not discuss the patterns of duration dependence which resemble the patterns plotted in figure 3.

single males have similar job finding rates as non-singles. Furthermore, the job finding rate decreases with the educational level, and is higher is workers that are classified as 'phase 1', indicating a strong labor market position. Whether or not the worker is from the 'GAK' does not affect the job finding rate. The job finding rate is highest for workers that came from the employment services industries and lowest for the reference group of industries. The most interesting result is the effect of 'search requirement'; as soon as search is no longer obligatory the job finding rate drops with 32% ($exp$(-0.39)). The second column presents the parameter estimates for males that enter unemployment from age 57.5 onwards; so none of them are required to search for a job, and they all have a potential benefit duration up to age 65 when they qualify for old-age benefits. The parameter estimates are very similar as those in column 1 with two main exceptions. First, male unemployed from the manufacturing sector now have the lowest job finding rate, while workers that are from 'GAK' also have a job finding rate that is significantly lower that those that are from other social security administrations. It could be that the two are related (most unemployed from the manufacturing sector 'belong' to GAK) and most likely the negative effect has to do with selectivity: those that want to 'wait' in unemployment until they retire manage to enter unemployment at age 57.5 or thereafter and it is especially workers in manufacturing/GAK that have this possibility. The third column shows the parameter estimates if we merge both samples. Conditional on the parameter estimates being the same for both groups we can investigate whether the unemployed that enter at age 57.5 or thereafter have a lower job finding rate. Indeed they have. The job finding rate is almost 50% lower ($exp$(-0.67)).

The parameter estimates for females are very similar and are therefore not in

need of discussion.

## 4.4 Sensitivity analysis

By way of sensitivity analysis we first introduce age as an explanatory variable, allowing for different effects before age 57.5 and from age 57.5 onwards (see table 3). For ease of comparison the first column of table 3 contains the same estimates as in columns (3) and (6) of table 2. The second column shows the parameter estimates if age is an explanatory variable in the job finding rate before age 57.5. Age has a negative effect, both for males and females. Apparently, if workers approach the age of 57.5 they already start decreasing their search intensity.[10] As shown the effect of the search requirement becomes smaller, but is still positive and different from zero at conventional levels of significance. So, allowing for an anticipation effect decreases the direct effect of the abolition of the search requirement. From age 57.5 onwards for males age has a positive effect on the job finding rate, while there is no significant effect for females. A positive effect of age on the job finding rate for males above 57.5 seems unlikely. After all, why would workers above 57.5 increase their search intensity or decrease their reservation wage if they grow older. Furthermore, it does not seem likely that employers increase their acceptance probability as workers grow older. The alternative explanation is that the increased inflow right after age 57.5 contains a relative high share of workers with low job finding rates, possibly for unknown reasons. Therefore, we introduce unobserved heterogeneity in the job finding rate. Now, the job finding rate conditional on the duration of unemployment, observed characteristics and unobserved characteristics $v$ equals

[10] Alternatively they could become less attractive for employers, but this does not seem to be very likely because of the small age range.

$$\theta(t|x, t_s, v) = \lambda(t) \exp(x'\beta + \delta \cdot \mathrm{I}(t_s < t) + v) \tag{5}$$

where the distribution of $v$ is supposed to follow a discrete distribution with two points of support $p_1$ and $p_2$

$$Pr(v = v_a) = p_1 \quad Pr(v = v_b) = p_2 \tag{6}$$

in which the discrete distribution is supposed to have a multinomial logit specification with $p_1 = \frac{e^{\alpha_1}}{\Sigma_{i=1}^{2} e^{\alpha_i}}$, $i$=(1,2), and $\alpha_2 = 0$ is used for normalization . We remove the unobserved components by taking expectations:

$$f(t \mid x, t_s) = E_v[f(t \mid x, t_s, v)] \tag{7}$$

The log-likelihood is similar as before and the parameters are again estimated with the method of Maximum Likelihood. In the estimates it appeared that the second job finding rate was very small, so we imposed $v_b = -\infty$. The new parameter estimates are shown in column (4) of table 3. The value of $\alpha_1$ implies that for males, there is a group of workers representing about 97% of the sample which has a positive job finding rate, while about 3% of the sample has a zero job finding rate. By introducing unobserved heterogeneity the positive age effect does not change. Also, the value of the loglikelihood hardly changes after introducing unobserved heterogeneity.[11] For females there is a group of about 75% with a positive job finding rate while about 25% has a zero job finding rate. Also for females the introduction of unobserved heterogeneity hardly affects the overall estimation results.

[11]Note that there is no formal likelihood ratio test for the presence of unobserved heterogeneity since one of the parameters is not identified in the model without unobserved heterogeneity.

Finally, we performed estimates in which we assumed that there was no unobserved heterogeneity except for the inflow in the age range 57.5-58.5. The idea is that only in the year after the crucial age of 57.5 the inflow is different from other years of age. For men there is in the crucial year a share of about 10% that has a zero job finding rate. And, the positive age effect after age 57.5 vanishes. Nevertheless, here too the overall estimation results hardly improve. The same holds for females.

# 5 Conclusions

Investigating job finding rates for elderly workers in the Netherlands we find that eligibility criteria and entitlement characteristics have strong negative incentive effects. The abolition of the requirement to actively search for a job as soon as a worker reaches the age of 57.5 has a large negative effect on the job finding rate. Furthermore, for men even before that age there is a negative anticipation effect. Male unemployed that are getting close to the age of 57.5 already reduce their search intensity. We also find that the entitlement rule which states that from age 57.5 onwards can keep his or her unemployment benefits until the age of 65 has a large negative effect on the job finding rate. This rule also induces some workers to try to remain employed up to age of 57.5 and then become unemployed. This leads to a spike in the inflow into unemployment after age 57.5.

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**Table 1: Distribution of personal characteristics by age (percentages)**

| Age | 55.5-56.5 | 56.5-57.5 | 57.5-58.5 | 58.5-59.5 | Total |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| *Males* | | | | | |
| Single | 12.8 | 12.7 | 10.9 | 9.4 | 11.4 |
| Primary education | 30.8 | 33.0 | 34.3 | 31.1 | 32.6 |
| Secondary education | 33.4 | 29.6 | 30.3 | 30.8 | 30.9 |
| Higher education | 23.1 | 22.5 | 19.4 | 21.5 | 21.3 |
| Phase 1 | 65.6 | 63.9 | 54.1 | 48.4 | 57.8 |
| GAK | 80.7 | 82.5 | 84.5 | 79.2 | 82.2 |
| Manufacturing | 17.2 | 16.9 | 21.3 | 20.5 | 19.2 |
| Trade | 6.3 | 5.0 | 5.0 | 6.8 | 5.6 |
| Employment services | 7.7 | 6.9 | 3.8 | 5.4 | 5.7 |
| Commercial services | 14.2 | 10.4 | 15.1 | 16.4 | 14.0 |
| N | 2095 | 2168 | 3348 | 1806 | 9415 |
| *Females* | | | | | |
| Single | 19.7 | 17.0 | 19.5 | 20.0 | 19.0 |
| Primary education | 48.5 | 51.7 | 51.6 | 49.2 | 50.4 |
| Secondary education | 26.5 | 25.6 | 25.5 | 25.5 | 25.8 |
| Higher education | 13.9 | 12.8 | 9.8 | 10.1 | 11.7 |
| Phase 1 | 58.4 | 54.1 | 46.6 | 39.8 | 50.3 |
| GAK | 59.9 | 60.9 | 62.1 | 53.1 | 59.6 |
| Manufacturing | 8.9 | 10.9 | 10.9 | 12.6 | 10.7 |
| Trade | 15.8 | 13.8 | 17.0 | 22.2 | 16.8 |
| Employment services | 10.7 | 9.7 | 6.3 | 6.9 | 8.4 |
| Commercial services | 14.7 | 13.7 | 18.0 | 13.9 | 15.4 |
| N | 841 | 874 | 1044 | 595 | 3354 |

**Table 2: Parameter estimates hazard rate models**

| | Males | | | Females | | |
|---|---|---|---|---|---|---|
| Age | 55.5-57.5 | 57.5-59.5 | 55.5-59.5 | 55.5-57.5 | 57.5-59.5 | 55.5-59.5 |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Single | -0.03 (0.4) | 0.18 (1.4) | 0.03 (0.4) | 0.21 (1.7) | 0.78 (3.4)* | 0.33 (3.0)* |
| Prim. ed. | -0.20 (2.3)* | -0.30 (2.3)* | -0.22 (3.1)* | 0.02 (0.1) | -0.83 (3.3)* | -0.21 (1.5) |
| Sec. ed. | -0.25 (2.9)* | -0.26 (2.0)* | -0.24 (3.3)* | -0.03 (0.1) | -0.88 (3.2)* | -0.25 (1.7) |
| Higher ed. | -0.34 (3.6)* | -0.09 (0.6) | -0.28 (3.5)* | 0.10 (0.5) | -0.42 (1.3) | -0.08 (0.5) |
| Phase 1 | 0.62 (9.6)* | 0.56 (6.2)* | 0.60 (11.5)* | 0.42 (4.1)* | 0.57 (2.9)* | 0.46 (5.1)* |
| GAK | -0.02 (0.2) | -0.82 (6.5)* | -0.28 (3.5)* | -0.01 (0.0) | -0.88 (3.3)* | -0.19 (1.6) |
| Manuf. | 0.18 (2.1)* | -0.29 (2.0)* | 0.04 (0.6) | -0.56 (2.5)* | -1.64 (2.7)* | -0.73 (3.5)* |
| Trade | 1.02 (8.2)* | 0.46 (2.7)* | 0.84 (8.3)* | -0.06 (0.3) | -0.68 (2.2)* | -0.21 (1.4) |
| Empl. serv. | 1.65 (20.2)* | 2.01 (15.3)* | 1.76 (25.1)* | 1.04 (7.2)* | 1.45 (5.3)* | 1.11 (8.7)* |
| Com. serv. | 0.51 (5.6)* | 0.70 (6.1)* | 0.84 (8.3)* | 0.16 (1.1) | -0.43 (1.3) | 0.04 (0.3) |
| Search req. | 0.39 (7.8)* | – | 0.37 (7.5)* | 0.50 (6.1)* | – | 0.46 (5.7)* |
| Age $\geq$ 57.5 | – | – | -0.67 (9.3)* | – | – | -0.77 (5.7)* |
| Constant | -7.52 (48.8)* | -7.42 (38.9)* | -7.26 (57.2)* | -7.98 (30.2)* | -8.02 (18.6)* | -7.70 (34.1)* |
| Month 2 | 0.24 (2.5)* | 0.22 (1.4) | 0.24 (2.9)* | 0.61 (3.5)* | 0.59 (1.4) | 0.60 (3.7)* |
| Month 3 | 0.20 (2.1)* | 0.22 (1.5) | 0.21 (2.6)* | 0.11 (0.6) | 1.28 (3.2)* | 0.38 (2.2)* |
| Month 4 | 0.02 (0.2) | -0.02 (0.1) | 0.01 (0.1) | 0.22 (1.1) | 0.32 (0.67) | 0.22 (1.2) |
| Month 5 | -0.12 (1.0) | -0.15 (1.0) | -0.12 (1.3) | -0.09 (0.4) | 0.84 (2.0)* | 0.11 (0.6) |
| Month 6 | -0.08 (0.7) | -0.42 (2.3)* | -0.18 (1.9) | 0.03 (0.1) | 0.45 (1.0) | 0.09 (0.5) |
| Month 7 | -0.91 (4.8)* | -1.51 (4.5)* | -1.08 (6.5)* | -0.73 (2.2)* | 0.24 (0.4) | -0.51 (1.9) |
| Month 8 | -1.17 (6.0)* | -1.23 (4.6)* | -1.19 (7.6)* | -0.21 (0.8) | 0.41 (0.8) | -0.10 (0.5) |
| Month 9 | -0.69 (4.2)* | -1.28 (4.5)* | -0.87 (6.1)* | -0.46 (1.6) | -0.60 (0.9) | -0.52 (2.0)* |
| Month 10 | -1.03 (5.3)* | -1.57 (4.9)* | -1.20 (7.2)* | -0.80 (2.4)* | -0.30 (0.5) | -0.72 (2.5)* |
| Month 11 | -1.46 (5.9)* | -2.50 (4.9)* | -1.74 (7.8)* | -2.40 (3.3)* | -0.92 (1.2) | -1.95 (3.8)* |
| Month 12 | -1.49 (5.9)* | -2.07 (4.9)* | -1.67 (7.7)* | -0.85 (2.3)* | -0.91 (1.2) | -0.90 (2.7)* |
| Month 13-18 | -1.87 (12.1)* | -1.89 (9.3)* | -1.87 (15.2)* | -1.20 (5.1)* | -1.39 (2.6)* | -1.28 (6.0)* |
| Month 19-24 | -1.93 (9.7)* | -2.04 (7.8)* | -1.98 (12.4)* | -1.64 (4.5)* | -3.30 (3.1)* | -1.89 (5.6)* |
| Month 24+ | -2.43 (9.0)* | -2.84 (6.7)* | -2.57 (12.5)* | -1.90 (4.5)* | -3.30 (3.1)* | -2.19 (5.4)* |
| N | 4261 | 5154 | 9415 | 1715 | 1639 | 3354 |
| -Logl. | 9951.9 | 4973.3 | 14959.5 | 3455.9 | 1102.5 | 4589.9 |

Absolute t-values in parentheses; a * = different from zero at a 95% level of significance

**Table 3: Parameter estimates hazard rate models; extended analysis**

| | No unobserved heterogeneity | | | Unobserved heterogeneity | |
|---|---|---|---|---|---|
| Males | (1) | (2) | (3) | (4) | (5) |
| Search req. | 0.37 (7.5)* | 0.14 (2.2)* | 0.14 (2.2)* | 0.15 (2.2)* | 0.15 (2.2)* |
| Age $\geq$ 57.5 | -0.67 (9.3)* | -0.54 (6.8)* | -0.70 (7.0)* | -0.70 (6.9)* | -0.55 (2.5)* |
| Age if $<$ 57.5 | – | -0.34 (5.1)* | -0.34 (5.1)* | -0.34 (5.1)* | -0.33 (5.1)* |
| Age if $\geq$ 57.5 | – | – | 0.20 (2.7)* | 0.21 (2.7) | 0.12 (0.8) |
| $\alpha_1$ | – | – | – | 3.48 (2.2)* | 2.17 (1.5) |
| -Loglikelihood | 14,959.5 | 13,947.2 | 14,943.4 | 14,943.2 | 14,943.1 |
| Females | (1) | (2) | (3) | (4) | (5) |
| Search req. | 0.46 (5.7)* | 0.22 (2.0)* | 0.22 (2.0)* | 0.22 (1.9) | 0.22 (2.0)* |
| Age $\geq$ 57.5 | -0.77 (5.7)* | -0.62 (4.2)* | -0.76 (3.8)* | -0.78 (3.7)* | -0.67 (1.5) |
| Age if $<$ 57.5 | – | -0.36 (3.0)* | -0.36 (3.0)* | -0.40 (3.0)* | -0.36 (3.0)* |
| Age if $\geq$ 57.5 | – | – | 0.17 (1.0) | 0.19 (1.1) | 0.12 (0.4) |
| $\alpha_1$ | – | – | – | 1.06 (1.9) | 2.68 (0.5) |
| -Loglikelihood | 4589.9 | 4585.6 | 4585.0 | 4583.2 | 4585.0 |

All estimates contain the same explanatory variables and duration dependence parameters as in Table 1; absolute t-values in parentheses; 9415 males, 3354 females; a * = different from zero at a 95% level of significance

**Figure 1: Inflow into unemployment by age**

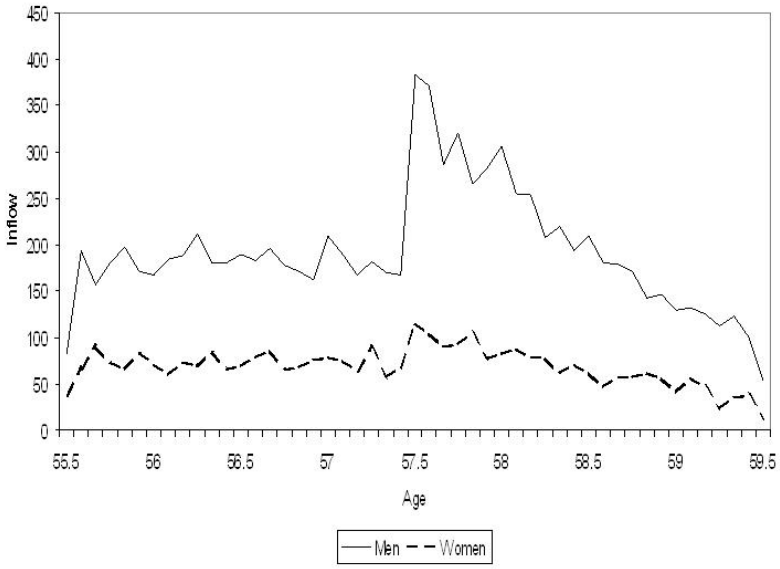
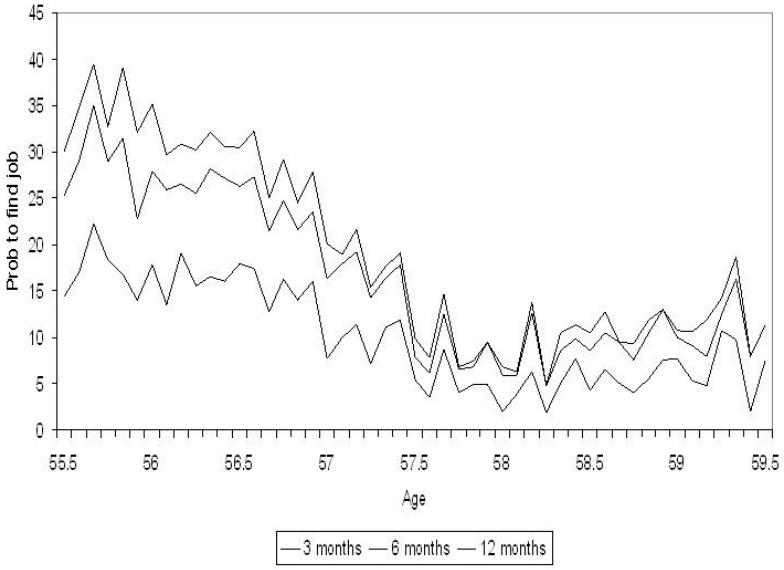
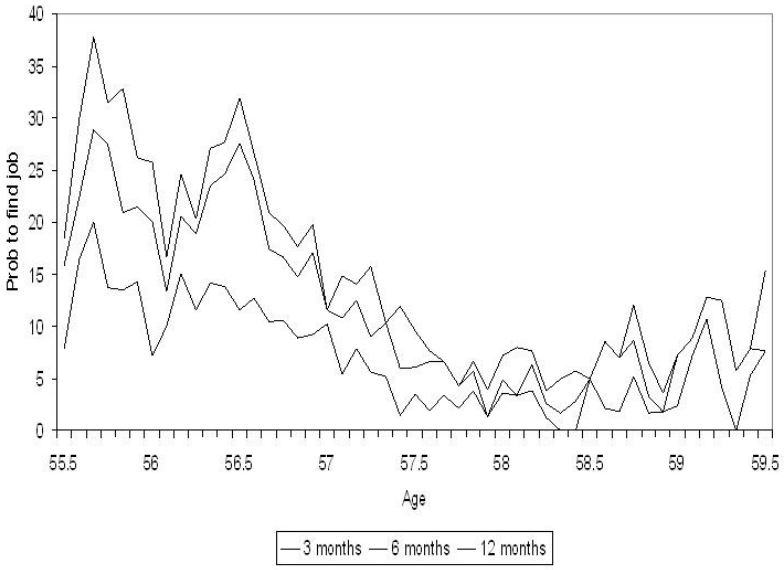


**Figure 2: Probability to find a job by age at inflow into unemployment**

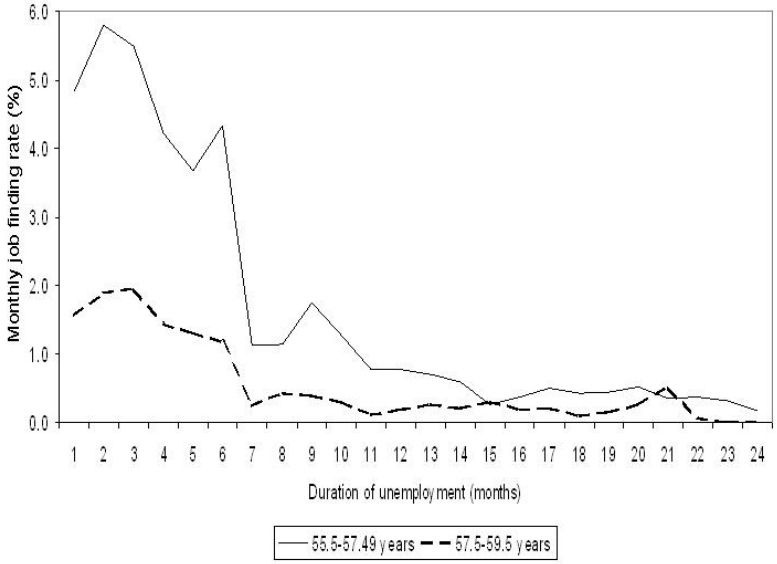



**(a) Men**

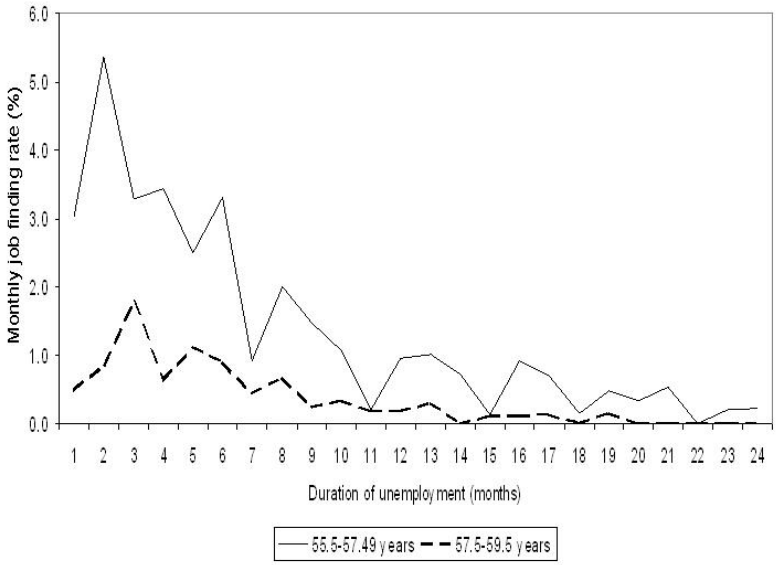



**(b) Women**

**Figure 3: Monthly job finding rates by duration of unemployment**




**(a) Men**




**(b) Women**