Statistics Norway
Research Department

*Tone Ingrid Tysse and Kjell Vaage*



# Unemployment of Older Norwegian Workers:
## A Competing Risk Analysis

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*Tone Ingrid Tysse*[a] *and Kjell Vaage*[b]

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**Abstract:** In this paper we study exit routes out of unemployment for older Norwegian unemployed in the period 1989 to 1993. Based on a proportional hazard model with a flexible baseline we estimate the competing risks of exiting to employment, health related social benefits, and out of the labour force. We find marked spikes in the hazard around the time when unemployment benefits expire. This is in accordance with several US analyses, but at odds with numerous Scandinavian studies based on unemployed from all age groups. We believe the main explanation to be that older unemployed persons rarely are offered training programs or relief jobs; offers which may distort the incentives from fixed benefit periods in the Scandinavian countries. The cut in benefits, however, does not only increase the hazard to employment; it also triggers exits to health related social benefits and increases the risk of leaving the labour force. Furthermore, we find a distinct response to the extended length of entitlement for the oldest cohort of our sample, in that this group to a much larger extent utilises unemployment as a pathway to early retirement.

**JEL codes:** J64, C41

**Keywords:** Unemployment Duration, Competing Risk Model

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[a] Division for Social and Demographic Research, Statistics Norway, Pb 8131 Dep, N-0033 Oslo, NORWAY. Phone: + 47 22 00 44 74. Fax: + 47 22 86 49 88. E-mail: tone.ingrid.tysse@ssb.no

[b] Department of Economics, University of Bergen, Fosswinckelsgate 6, N-5007 Bergen, NORWAY. Phone: + 47 55 58 92 00. Fax: + 47 55 58 92 10. E-mail: kjell.vaage@econ.uib.no

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## 1. INTRODUCTION

There has been a growing body of economic research on the elderly over the past ten to twenty years. One obvious reason is the demographic change that is taking place in the Western economies, with an increasing share of elderly in the population and a correspondingly decreasing share of the young, working age population. This development has put pressure on the welfare state, in as much as larger obligations — pensions, social security benefits, etc.— have to be financed from an increasingly smaller tax base. Moreover, the pressure is heightened by the tendency of older workers to retire from the labour force at an increasingly earlier stage.

An ageing population combined with earlier retirement represents an uncertainty for all age groups, but probably most of all for the elderly. They have impaired mobility and fewer remaining years to spread gains and losses. In addition, they experience more serious problems in returning to work, either from retirement or from unemployment.

Retirement behaviour has received considerable attention from economists.[1] Most models of retirement behaviour assume that any worker's decision to retire is based on a trade-off between leisure and forgone labour earnings. Workers may, however, be dismissed from their jobs. If that is the case, their job opportunities are limited, and they can no longer alter their labour supply according to their (past) earnings levels. In the present paper we move the focus from early retirement to a much more specific problem, namely the behaviour of the unemployed elderly.

A substantial amount of the literature on individual unemployment behaviour falls within the framework of duration analysis. Typically, the point of departure is the specification of a reduced form hazard function. Based on search theory researchers include unemployment benefit levels, length of entitlement, and a vector of individual and labour market characteristics as covariates (modified by data availability). In most studies of which we are aware, the samples have been drawn from the entire labour force. For statistical inferences to be valid, then, certain assumptions of homogeneity have to be made. If the covariates influence the exit rates differently for young, compared to old unemployed individuals, estimates of the total, average effect may be of limited interest. One way of handling this problem is to perform separate analyses of sufficiently homogeneous subgroups. In that spirit, several analyses of young unemployed people have recently been carried out.[2] Separate studies of the older unemployed are, on the other hand, almost absent[3], even though it can be argued that this group diverges from the average unemployed in many respects:

In most Western countries, including Norway, the share of unemployed people among the older members of the labour force is higher than average. In periods of recession and increasing unemployment figures this group has been exposed to a higher risk of dismissal, as well as longer spells of unemployment. Moreover, in periods when the economies has been booming and the number of unemployed has been significantly reduced, re-employment has happened least among the oldest part of the labour force. Hence, it appears that the flow as well as the stock of older unemployed behave differently compared to the average unemployed at the top, as well as at the bottom, of the business cycle.

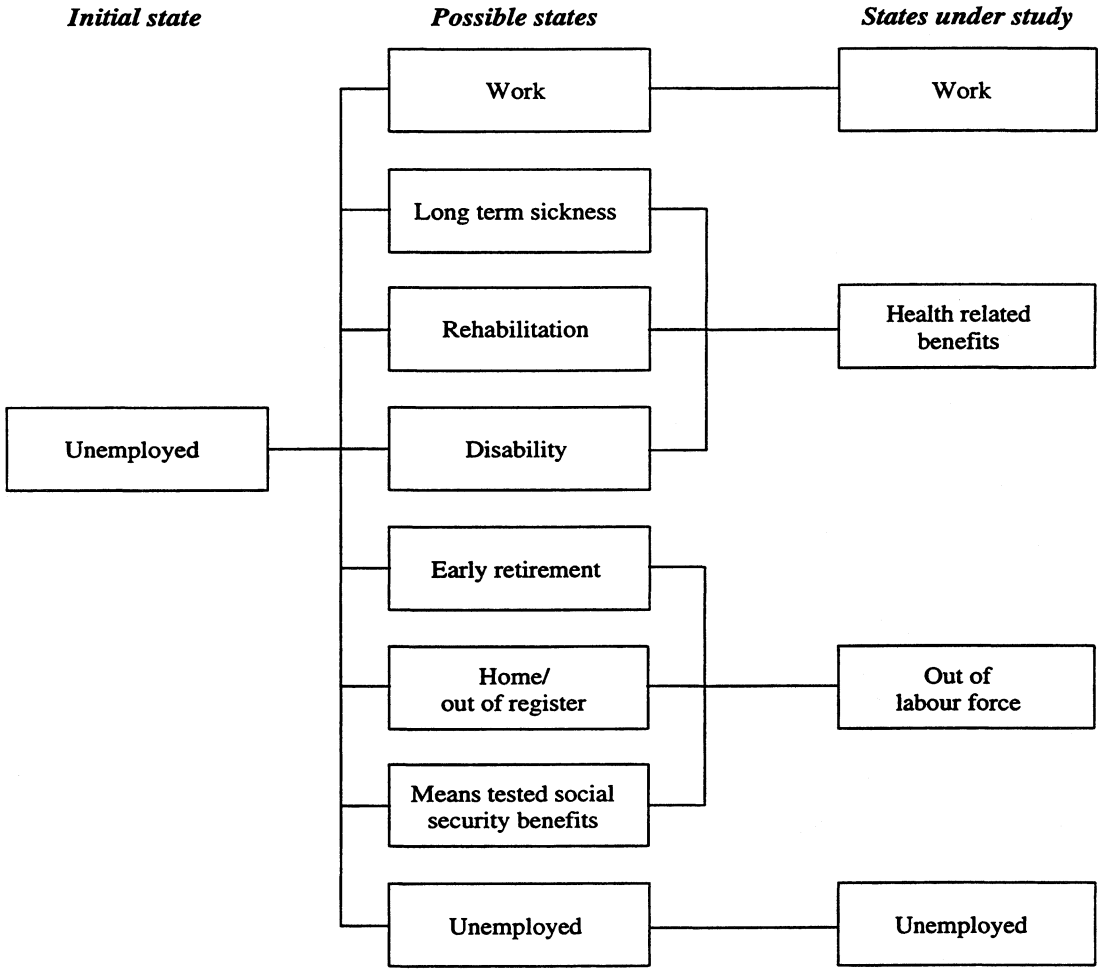
Furthermore, the effects of individual characteristics on unemployment duration may differ from estimates based on the total stock of unemployed. For example, recent education is probably worth more than the education of former generations. A larger share of the households in this group are organised with the husband as the main breadwinner; hence,

[1] Some references are Aaron and Burtless (1984), Wise (1985) and Johnson and Zimmermann (1993).
[2] See e.g. Hernæs and Raaum (1996) and Korpi (1995).
[3] There are, however, some important contributions, notably Diamond and Hausman (1984).

compared to younger households, gender might play a different role in their labour market behaviour. The degree of and causes of bad health differ from the average population, which influences the probability of employment as well as the probability of becoming a recipient of social security.

Finally, as far as exit routes out of unemployment are concerned, the older unemployed differ from the younger ones. Young unemployed persons usually end up with a new job. Older workers have another option: they can retire. "Retirement" is then to be interpreted in a broad sense, including all arrangements that leave an individual out of work until old age pension applies. Some employees are entitled to private and/or firm specific early retirement schemes. Furthermore, the elderlies' reduced probability of re-employment increases the incentives to enter some form of (long term) health-related social security benefits. Also leaving the labour force permanently to stay at home, possibly supported by the spouse, is likely to become an increasingly tempting alternative with increasing age. Lastly, the oldest unemployed are favoured with separate rules which extend the entitlement period of unemployment benefits, thus making unemployment itself a permanent exit route out of the labour force.

Figure 1.1 sums up the transition possibilities faced by an unemployed Norwegian.



Not all states in the second column are available in our database, neither will all available states be treated as separate exit routes in our analysis. Still, the rightmost column show that we intend to model *competing risks* for leaving unemployment, and, although we focus on transitions to work, also transitions to health-related social security benefits and transitions out of the labour force will be considered.

The next section presents the hazard model. Section 3 contains descriptions of states and covariates, while the results of the analysis are presented and discussed in Section 4. Section 5 offers some concluding remarks.

## 2. THE MODEL

An unemployed's probability of receiving a job offer probably decreases with the length of the unemployment spell. This is explained by deterioration of human capital, stigma, etc. On the other hand, since searching for jobs is time consuming, long duration may contribute positively to the search process. Furthermore, there may be spikes in the hazard out of unemployment, for example near the time of benefit exhaustion. These are some arguments illustrating that duration dependence may be positive or negative, and, in either case, need not be monotonic. It follows that when choosing unemployment duration models, parametric assumptions concerning the hazard's time dependence should be avoided. Accordingly, we specify an unrestricted baseline hazard and estimate the model semi-parametrically along the lines of Meyer (1990), Narendranathan and Stewart (1993), and Carling *et al.* (1995). The following continuous time hazard expresses the conditional probability of leaving unemployment:

$$r_i(t, \mathbf{x}_i) = \exp[(\mathbf{x}_i'\beta) + \ln\gamma(t)]. \tag{2.1}$$

$\mathbf{x}_i$ is a vector of covariates for individual $i$, and $\beta$ is a vector of unknown parameters. $\gamma(t)$ is the baseline hazard, parameterised as a step function with steps of 12 week periods[4].

The likelihood contribution for individual $i$ equals the probability of a transition in period $t_i$ times the probability of surviving in the original state until $t_i$. The probabilities are expressed by the probability function $f_i(t_i)$ and the survivor function $S_i(t_i)$, respectively. The likelihood function for all $N$ individuals is therefore given by:

$$L = \prod_{i=1}^{N} f(t_i)^{d_i} S(t_i)^{1-d_i}. \tag{2.2}$$

[4] The term shows up a disadvantage with the flexible hazard approach, namely that the number of parameters increases with the length of the observation period, which in our case is as much as 3.5 years, or 16 twelve-week periods. However, with a relatively large data set we consider this loss to be less than the gains made from not having to make parametric assumptions concerning time dependence.

$d_i$ is the censoring indicator, which equals unity if there are transitions between spells, and zero otherwise. Since $S = \exp[-\int_0^t r(u)du]$ and $f(t) = r(t)S(t)$, the log likelihood can be expressed as:

$$L = \sum_{i=1}^{N}[d_i \ln r(t_i)] - \int_0^{t_i} r(u)du \tag{2.3}$$

With our step function representation for the base-line hazard, the integral is $\int_0^t r(u)du = \int_0^{t_1} r_1(u)du + \int_{t_1}^{t_2} r_2(u)du + ... + \int_{t_{15}}^{t_{16}} r_{16}(u)du$, i.e., the sum of the integrals for each of the 16 steps.

While the above model handles the single risk of leaving unemployment, we want to model the *competing* risk of exiting unemployment to enter (1) employment or (2) health-related social benefits, or to (3) leave the labour force. Following Narendranathan and Stewart (1993) we assume independence between the three failure types. In that case the likelihood function for all individuals $i = 1,..., N$ and failure types $j = 1,..., J$ becomes:

$$L = \sum_{i=1}^{N}\sum_{j=1}^{J}[d_{ij} \ln r_j(t_i) - \int_0^{t_i}\sum_{j=1}^{J} r_j(u)du]. \tag{2.4}$$

$d_{ij}$ now indicates whether individual $i$ has a transition to state $j$ at time $t_i$. $r_j$ is the exit rate to state $j$.

Note that each sum of terms in (2.4) is a function of the parameters of a single cause-specific hazard only. This results from the assumption of independent risks. Exits to states other than those of interest are simply treated as censored observations, so the single risk proportional hazard formulation also applies to the competing risk model.

The model in (2.4) assumes that heterogeneity between individuals is caused by fluctuations in the observed covariates. In the presence of *unobserved* heterogeneity the estimated duration dependence as well as the estimated effects of the included covariates may be biased. Correcting for unobserved heterogeneity in single risk models is usually done by entering a random variable into the hazard function, which is assumed to be independent of the observed variables, time constant, and a known distribution[5]. Obviously, these are strong assumptions. The extension from single to competing risk models calls for even stronger additional assumptions[6]. Correcting for unobserved heterogeneity in flexible competing risk models is

[5] Some authors that use this procedure in semiparametric models are Meyer (1990), Dalton and van der Klaauw (1995), and Carling *et al.* (1996).

[6] Basically, this concerns assumption of independence of disturbance terms across cause-specific hazards. See Narendranathan and Stewart (1993) for a further discussion.

computationally quite complicated. This, combined with the uncertain gains due to the points mentioned above, has lead us to maintain the formulation in (2.4)[7].

## 3. THE DATA

The data set are drawn from a Norwegian database, KIRUT, which registers labour market and social insurance events for a 10 per cent random sample of the working age population for the period 1989 to 1993[8]. Main providers of data are the Directorate of Labour, the National Insurance Administration and Statistics Norway. We have extracted individuals from age 50 to 62, all of whom at least once reported to their local public unemployment agency as being more than 50 per cent unemployed in the period January 1st 1989 to July 1st 1990. In the database this amounts to a total of 1727 persons. Each individual was observed for a period of 3.5 years, until they made their *first* transition out of unemployment.

Sampling from the unemployment registers may underestimate the number of persons who would actually like to have a job if they could get one, i.e. who are in the labour force but out of work. Another problem when studying unemployment duration on the basis of the register data in KIRUT arises from the observed tendency that many unemployed persons temporarily drop out of the register. They disappear for a number of weeks, or even months, before they appear again. Temporary dropouts create gaps in the registered unemployment history. Such gaps, together with the sample selection problem mentioned above, may be explained by lack of incentives to register. To a large extent individuals to whom unemployment benefits are not authorized have proved to be young persons who recently have started their labour market career. Since our focus here is on the elderly unemployed, one would expect these gaps and the sample selection problem to be less of a problem in our analysis. The number of gaps, however, is fairly high. Of course, this may partly be explained by the lack of incentives to register at employment agencies, but is probably more attributable to errors in the unemployment register. Our way of dealing with this particular problem is to close gaps of up to two months duration, assuming these to be part of the surrounding unemployment period.

The analysis is further complicated by gaps between the ends of periods in the unemployment register and the beginnings of succeeding periods in either the employers' register or in the registers providing information on health-related benefits. These gaps may indicate that individuals actually leave the labour force for a limited period of time, or alternatively, may once again reflect errors in the registers. Once more we make a split at two months. A transition to labour or health-related benefits is accepted as long as it occurs within the first two months after a disappearance from the register, otherwise the individual is assumed to have left the labour force.

In Norway, unemployment insurance is universal for all employees with earnings above a minimum level, and the premium is included in the contribution to the social insurance system. Roughly, the benefit level is 62% of previous earnings[9] up to NOK 240 000 (approx). Today the entitlement period is 80 weeks. If, however, the unemployment agencies fail to offer an individual a new job or a labour market program after 80 weeks, one can receive unemployment benefits for a second 80 week period. Thus it is possible to receive unemployment benefits for a continuous period of 160 weeks. These have been the rules since

[7] Fortunately, several authors, for example Dalton and van der Klaauw (1995) and Carling *et al.* (1996), report that unobserved heterogeneity is less of a problem in semiparametric than parametric models.

[8] The period is now extended to 1995.

[9] Either the calendar year or an average of the three years previous to the time of unemployment.

May 1992. Prior to May 1991, an unemployed person who had received benefits for the full entitlement period had to wait 26 weeks before being entitled to the second 80 week period[10]. From May 1991 until the rules were changed in May 1992, the waiting time between entitlement periods was 13 weeks. The unemployed over the age of 64 can receive unemployment benefits the remaining 3 years before qualifying for an old age pension at 67. Hence, the unemployed in our sample face different entitlements depending on age and the point in time they became unemployed (even though the vast majority are faced with the 2 x 80 weeks rules)[11].

**Destinations**

In the present analysis, we focus exclusively on the duration of the first unemployment spell. We take particular interest in spells which end with transition to employment, but will also comment on transitions to health-related social benefits and transitions out of the labour force. A distribution across destinations, along with the average duration of unemployment for each of the age groups who entered these destinations, are given in Table 3.1. The overall duration of the first spell of unemployment was 8 months, excluding those who were unemployed throughout the observation period. Irrespective of destinations, we note that on average, women stay longer in the unemployment pool.

Table 3.1. Number and duration of unemployment spells with different destinations

| Age | Total number of persons | Percent-age right censored observa-tions | **All destinations** | | **Employment** | | **Health related benefits** | | **Out of the labour force** | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Number of persons | Average duration | Persons in per cent | Average duration | Persons in per cent | Average duration | Persons in per cent | Average duration |
| **Female** | | | | | | | | | | |
| 50-52.5 | 177 | 1.7 | 174 | 8 | 33.9 | 9 | 18.4 | 8 | 47.7 | 7 |
| 52.5-55.5 | 147 | 3.4 | 142 | 8 | 33.8 | 9 | 20.4 | 8 | 45.8 | 7 |
| 55.5-58.5 | 122 | 4.1 | 117 | 8 | 22.2 | 7 | 17.1 | 7 | 60.6 | 8 |
| 58.5-60.5 | 63 | 4.8 | 60 | 11 | 28.3 | 11 | 30.0 | 14 | 41.7 | 10 |
| 60.5-62 | 55 | 14.5 | 47 | 12 | 12.8 | 11 | 34.0 | 13 | 53.2 | 11 |
| **Male** | | | | | | | | | | |
| 50-52.5 | 340 | 2.6 | 331 | 7 | 36.9 | 7 | 10.0 | 6 | 53.1 | 7 |
| 52.5-55.5 | 277 | 5.4 | 262 | 6 | 27.5 | 8 | 17.9 | 7 | 54.6 | 6 |
| 55.5-58.5 | 250 | 4.4 | 239 | 6 | 31.0 | 6 | 19.7 | 9 | 49.4 | 6 |
| 58.5-60.5 | 161 | 6.8 | 150 | 7 | 24.7 | 5 | 26.7 | 8 | 48.7 | 7 |
| 60.5-62 | 135 | 13.3 | 117 | 8 | 28.2 | 7 | 25.6 | 9 | 46.2 | 8 |
| **Total** | 1 727 | 5.1 | 1639 | 7 | 30.1 | 7 | 19.0 | 8 | 50.8 | 7 |

[10] In the absence of other support the unemployed individual then would be offered means tested social benefits.

[11] In our analysis this is controlled for by covariates indicating age group and start of unemployment period. For an elaboration and empirical analyses of the effects of changes in entitlement rules, see Bratberg and Vaage (1996).

A brief description of the end states is given below:
A transition into *employment* is recorded when an individual leaves unemployment and enters the employer's register as a full-time employee[12]. The two destinations are restricted to be mutally exclusive. Table 3.1 shows that less than one third of our total sample leaves the unemployment register because of a new job, which is rather low compared to other Norwegian studies. Hernæs and Raaum (1996) focus on the duration of unemployment among young people, and record entries into employment in approximately 55 % of their cases. Since our definitions of end states are reasonably similar to theirs[13] and since we also take advantage of more or less the same registers, deviation must be due to age differences between samples in the two data sets[14].

The unemployed may transit from unemployment benefits to *health-related benefits*, i.e., benefits based on long term illness, rehabilitation, or disability. Sickpay is limited to a maximum period of one year, and is therefore not to be considered a permanent way out of unemployment. In a number of cases, however, long term illness leads to rehabilitation benefits and a disability pension. Rehabilitation benefits are not temporarily limited, and will most usually end in the state of disability. Even though KIRUT allows us to identify each of these states, we add all three in the aggregate "Health related benefits". This is done partly because the number of transitions to some of the states is too small to achieve reliable estimates of the hazard rates. Furthermore, the inherent dependence between health-related states as outlined above, calls for the application of models that are beyond the scope of the present paper.

Descriptives reported in Table 3.1 indicate that as much as 51 per cent of all unemployment spells end in *withdrawal from the labour force* rather than employment. The destination «Out of the Labour Force» comprises individuals who disappear from the unemployment register for two months or more and neither get a job, nor start receiving other benefits within this period of time. Some individuals in this age group, for example, can choose some form of early retirement scheme. In addition, some employers offer an early retirement arrangement to older unemployed. Unfortunately, KIRUT does not contain information on private or firm specific early retirement schemes. Another exit route is simply to withdraw from the labour market. In most cases this means relying on spousal support. Due to data limitations we are unable to distinguish between early retirement schemes and other forms of labour market withdrawals. Therefore we operate with the category "Out of the Labour Force" as an aggregate of unemployed people who leave the unemployment register, but fail to reappear in any other of the registers referred to above[15].

The final possible state is that the individuals remain unemployed. Note that we define people on labour market programs as still being unemployed. A considerable fraction of the younger unemployed is offered some sort of program and/or relief job. In particular, as people approach the end of the entitlement period, the probability of entering a program is relatively high. Carling *et al.* (1996) discuss the possible disincentives stemming from the use of labour market programs. Since such programs are offered to the older unemployed to a considerably lesser degree than to the young, our data may shed some light on the alleged disincentive effects mentioned above.

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[12] The data at hand are not sufficient for modelling part-time employment.

[13] In both analyses, program participation and temporary dropouts are included in the spell.

[14] Of course, some individuals may actually receive a job within the observation period, but more than two months after leaving the unemployment register. Such events are impossible to analyse properly within the framework of a single spell model.

[15] Individuals who leave unemployment to become self-employed will also be placed in this category.

**Explanatory Variables**

The vector of covariates includes personal characteristics such as gender, age, current marital status, education, previous income and spouse income. Age was measured at the time of unemployment, whereas the income variables were those reported prior to the year of unemployment. The remaining characteristics were measured on January 1st 1989. Education is expressed as the number of years at school. As will become clear in the next section, the weight of our discussion is on variables which most closely relate to the labour market, such as previous work experience, access to unemployment benefits, access to relief jobs and labour market programs, local unemployment rate, and, finally, dummy variables to identify the start of the unemployment spell (in calendar time). Most of the labour market variables were known to us at the beginning of each spell. One exception was the local unemployment rate which is calculated as a spell average. The large number of covariates related to labour market conditions probably makes our model better suited to explain the effects of a transition to employment rather than an entry to health-related benefits. Still, we expect the latter destination together with the state *out of the labour force* will be considered interesting complements.

Table 3.2 describes how individual characteristics were distributed across destinations. Only minor differences between end states were revealed. On average, a person entering employment is slightly younger with slightly more education and a higher previous income

Table 3.2. Sample characteristics

| | Total | Employment | Health related benefits | Out of the labour force |
|---|---|---|---|---|
| Sample size | 1 727 | 510 | 327 | 890 |
| Male (per cent) | 67.3 | 68.3 | 64.8 | 67.5 |
| Age | 55.3 | 54.8 | 56.3 | 55.3 |
| Years of education | 9.1 | 9.2 | 9.0 | 9.1 |
| Marital status (per cent) | | | | |
| Unmarried | 10.0 | 11.8 | 9.8 | 9.0 |
| Married | 72.7 | 74.3 | 70.0 | 72.7 |
| Has been married | 17.3 | 13.9 | 20.2 | 18.3 |
| Income previous year[1] | 61 747 | 67 435 | 59 363 | 59 364 |
| Spouse income[1] | 37 662 | 38 143 | 34 503 | 38 546 |
| Years of work experience | 18.5 | 19.0 | 18.5 | 18.2 |
| Local unemployment rate[2] (per cent) | 3.4 | 3.4 | 3.4 | 3.4 |
| Declining unemployment rate (per cent) | 60.3 | 53.5 | 55.7 | 66.0 |
| Unemployment benefit receivers (per cent) | 64.1 | 69.0 | 63.6 | 61.5 |
| Relief job and training program participants (per cent) | 22.0 | 29.4 | 15.9 | 19.9 |

[1] 1979 NOK

[2] Average over spell duration

compared to the equivalent averages at other end states. As expected for the cohorts under study, the percentage of married persons was high, irrespective of destinations. Spouse income when exiting to employment level with spouse income when leaving the labour force and was slightly higher compared with the exits into health-related benefits.

As mentioned earlier, several variables are included in order to reveal how labour market conditions affect duration of unemployment. Table 3.2 shows that, irrespective of end states, approximately 64 per cent of our sample was entitled to unemployment benefits. The percentage is somewhat higher when the individuals become employed afterwards (69 per cent). In terms of the identification of those being offered training programs or relief jobs, a pronounced difference between our end states occurs. In close to 30 per cent of the cases individuals with access to relief jobs and training programs returned to work. 16 per cent went from unemployment to health-related benefits, while nearly 20 per cent left the labour force. It is worth noticing that barely 22 per cent of our total sample were offered some kind of program.

The local unemployment rate is known to us on a monthly basis throughout the observation period. In our time-constant version, we identify the local rate for the first and the last month of each spell, and then calculate the average over the spell. The overall average shown in Table 3.2 seems low considering that the national unemployment rate increased rapidly throughout 1989 and the best part of 1990, and remained high over the years. This is probably due to regional differences. The indicator variable *Declining rate*, which reveals whether or not the local unemployment rate is declining, takes the value 1 if the local mean rate at the end of the spell is lower than at the beginning of the same spell. Six out of ten in our sample have experienced a decreasing local rate of unemployment while out of work.

Previous work experience is the result of register information on the number of years each individual has collected/earned pension points in order to improve the earnings-related old age pension. Pension points were introduced when the law of Social Security were enacted in 1966. Therefore, the maximum number of years to collect these points is 23, which in turn explains why the overall average of work experience never exceeds 20 years. If we condition on male workers only, the average increases to 21.2 years.

## 4. RESULTS

Figures 4.1, 4.2, and 4.3 plot the hazard from unemployment to employment, health-related social benefits, and out of the labour force, respectively[16]. The hazards are restricted to be constant within periods of twelve weeks duration. 80 weeks mark the end of the first entitlement period. Due to changes in the benefit rules, the individual waiting time may differ by up to 26 weeks duration. Accordingly, the expiration of any second period of benefits will occur some time between the weeks of 160 and 186, depending on when the individual actually became unemployed.

As can be seen in Figure 4.1, the conditional probability of a transition to employment increases during the first two months immediately following the start of the spell, but very soon tends to fall and stays low a relatively long period. Compared to Norwegian analyses on samples drawn from the whole working age population, i.e., Røed, Raaum and Goldstein (1999) and Bratberg and Vaage (1996), it seems that the decline in the hazard to employment is faster for the elderly.

[16] Coefficients are reported in Table A.1 in the Appendix.

Figure 4.1. Estimated hazard to work

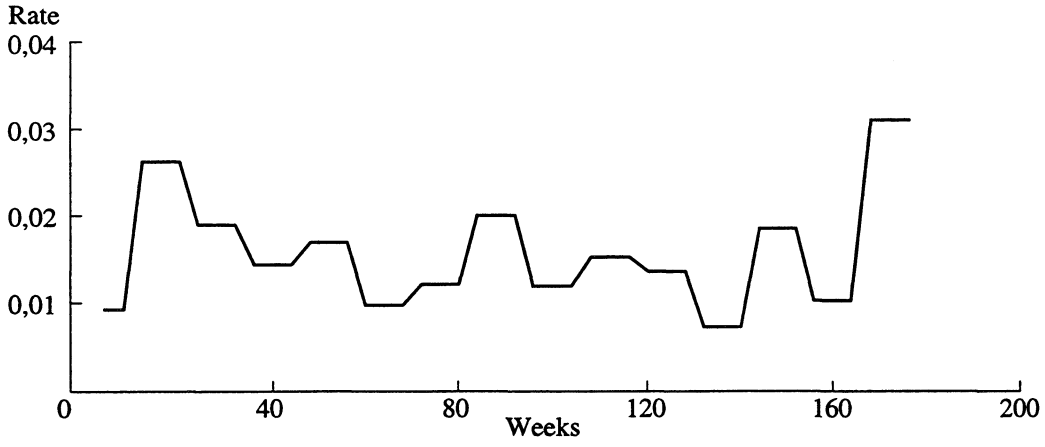



Figure 4.2. Esitmated hazard to health related benefits

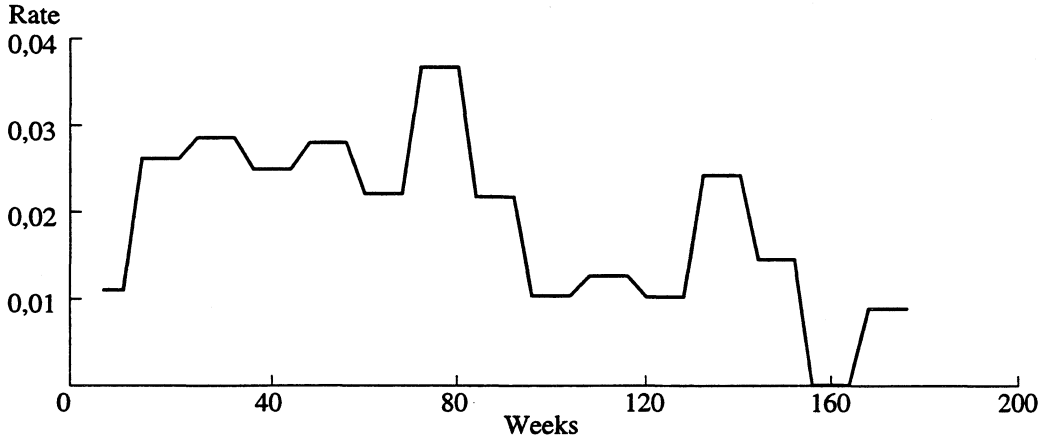
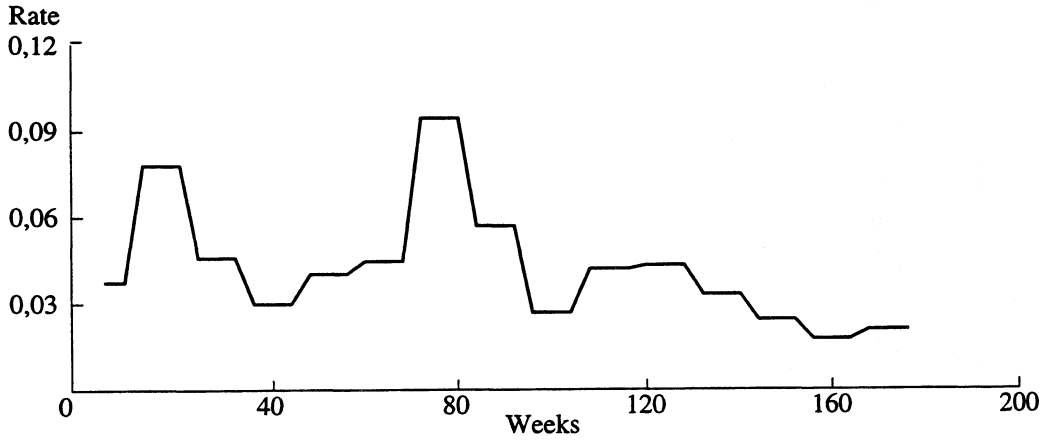



Figure 4.3. Estimated hazard when leaving the labour force



Standard job search theory predicts that if benefits are cut after a fixed period, as is the case in Norway, the reservation wage is expected to decrease and the exit rate out of unemployment to increase as the expiration approaches. Empirical literature on this topic is relatively scarce, and the results somewhat ambiguous. US studies, e.g. Meyer (1990) and Katz and Meyer (1990) typically find spike in the hazard out of unemployment as the unemployed individual approaches the end of benefits. In European studies, on the other hand, e.g. Carling *et al.* (1996), using Swedish data, Vaage and Bratberg (1996), using Norwegian data, and Korpi (1995), studying youth unemployment in Sweden, there is practically no such effect. When we test the hypothesis on older unemployed, however, a rise in the hazard near the time of exhaustion seems to be verified. Some authors argue that training programs and relief jobs distort the incentives from a fixed benefit period. The lack of such offers to the older unemployed may partly explain the distinct change in their behaviour around the time of benefit exhaustion.

Our data allow us to observe the unemployed over *two* 80-week benefit periods (the full entitlement period in the normal case). The picture is somewhat mixed in the above figure, but for the 12-week periods before and after the final expiration (160 weeks) we estimated a sizeable increase in the hazard into employment. Even if there is an intermediate period with lower hazard, we find it fair to conclude that the average hazard peak is quite pronounced when the second unemployment insurance period is about to expire. This is what we would expect according to the benefit rules in force. Today it is fairly easy for an unemployed individual to get entitlement to a second 80-week period (see Section 3 for details). Even before the liberalisation of the rules in 1991 and 1992, a second period would be offered after a waiting period of 26 weeks in 1991 and 13 weeks in 1992. After the end of the second period, on the other hand, means tested social benefits are all that is offered. Even though there is some local variation, the social benefits are generally considerably lower than the unemployment benefits. Hence, the hypothesis of increased hazard out of unemployment due to benefit exhaustion is, *ceteris paribus,* more accurately tested by analysing the behaviour around *160* weeks of unemployment, which appears to be confirmed in the reported hazard.

The hazards from unemployment to health-related social benefits and out of the labour force are pictured in Figures 4.2 and 4.3, respectively. Once again the hazards seem to be influenced by the expiration date of the unemployment benefits. The probability of transiting to either state increases as the time of expiry of the first entitlement period approaches.

We now turn to the effects from the covariates included in the model. Results are reported in Table 4.1.

The dummy variables indicating age groups reveal an interesting pattern. As expected, high age is associated with a reduced probability of re-employment. Note, however, the marked decrease for the oldest group (60.5-62 years). As explained in Chapter 3, an individual that is registered unemployed at the age of 64 will be entitled to unemployment benefits for the remaining three years before the old age pension applies. For individuals above the age of 60.5 years, unemployment thus becomes a means to finance early retirement.[17] This employment disincentive appears to be clearly verified in our sample. Furthermore, it suggests an explanation of the manner in which age affects the other two transitions. As expected, the hazard to health-related benefits increases with increasing age, but then decreases sharply for the oldest cohort. Of course there is no reason to believe that health improves as one reaches the highest age group; rather, the coefficients might reflect that these individuals utilise their

[17] After two full periods plus intermediate waiting time he/she will have turned 64. The reason why we restrict the oldest cohort to be 62 years of age (by January 1, 1989) is that we want to exclude individuals that became old age pensioners during our period of investigation.

Table 4.1. Hazard estimates and asymptotic standard errors

| Covariates | Employment | | Health related benefits | | Out of the labour force | |
|---|---|---|---|---|---|---|
| | Coeffi-cients | Standard errors | Coeffi-cients | Standard errors | Coeffi-cients | Standard errors |
| Age: | | | | | | |
| 52.5 - 55.5 | * **- 0,3938** | 0,1199 | 0,2551 | 0,1712 | - 0,1030 | 0,0943 |
| 55.5 - 58.5 | ** **- 0,3012** | 0,1271 | 0,3104 | 0,1772 | - 0,1048 | 0,0975 |
| 58.5 - 60.5 | * **- 0,6692** | 0,1608 | ** **0,4278** | 0,1866 | * **- 0,3853** | 0,1216 |
| 60.5 – 62 | * **- 1,1629** | 0,1843 | 0,0580 | 0,2009 | * **- 0,6634** | 0,1324 |
| Gender (male equals 1) | - 0,2204 | 0,1509 | - 0,0682 | 0,1740 | * **0,3899** | 0,1176 |
| Marital status: | | | | | | |
| Unmarried | 0,0237 | 0,1597 | - 0,1999 | 0,2151 | ** **- 0,3309** | 0,1386 |
| Has been married | ** **- 0,2991** | 0,1454 | 0,0705 | 0,1669 | 0,0718 | 0,1029 |
| Income: | | | | | | |
| Previous income | * **0,0082** | 0,0017 | - 0,0002 | 0,0022 | - 0,0002 | 0,0013 |
| Spouse income | 0,0003 | 0,0014 | - 0,0021 | 0,0018 | 0,0018 | 0,0011 |
| Education | - 0,0268 | 0,0222 | - 0,0213 | 0,0280 | - 0,0086 | 0,0171 |
| Work experience | * **0,0380** | 0,0131 | 0,0266 | 0,0145 | 0,0075 | 0,0095 |
| UB receiver | ** **0,2019** | 0,1040 | - 0,1782 | 0,1265 | * **- 0,2075** | 0,0760 |
| Access to relief jobs and labour market programs | ** **0,2217** | 0,1064 | * **- 0,5840** | 0,1639 | * **- 0,4477** | 0,0916 |
| Labour Market Characteristics: | | | | | | |
| Local unemployment rate | - 0,0147 | 0,0444 | ** **- 0,1142** | 0,0581 | - 0,0431 | 0,0329 |
| Declining unemployment rate | 0,1360 | 0,0925 | ** **0,2269** | 0,1162 | * **0,7244** | 0,0754 |
| Start of unemployment spell: | | | | | | |
| April – June 1989 | 0,1635 | 0,1259 | 0,0487 | 0,1628 | 0,0341 | 0,0901 |
| July – Semptember 1989 | 0,0456 | 0,1385 | ** **0,3226** | 0,1661 | - 0,1326 | 0,1020 |
| October - December 1989 | 0,0609 | 0,1374 | 0,0934 | 0,1803 | * **- 0,4112** | 0,1146 |
| January - March 1990 | 0,1507 | 0,2212 | 0,3531 | 0,2596 | * **- 0,5331** | 0,2037 |
| April – June 1990 | ** **0,4908** | 0,2517 | 0,1427 | 0,3052 | - 0,2044 | 0,2167 |

**Notes:**
Age; reference group is 50-52.5 years, i.e. 52.5 year olds are included whereas the category "52.5 - 55.5" include individuals older than 52.5 only. The remaining age categories are split accordingly.
Marital status; reference group is married.
Income; per 1000 NOK.
Start of unemployment spell; reference group is January - March 1989.
*: Significant at the 1% level
**: Significant at the 5% level

extended entitlement to unemployment benefits. In the literature on early retirement there has been argued whether health-related benefits, notably the disability pension, serve as a substitute for unemployment benefits and, hence, that high unemployment figures are cautiously being hidden behind social insurance statistics[18]. Our data suggest that for the oldest cohort the opposite might also be the case. Finally, the distinct drop in the probability of leaving the labour force for the cohort above 60.5 years might at first seem promising. But once again the most probable explanation is to be found in the unemployment benefit rules.

[18] See, e.g., Riphahn (1997) and Woittiez et al. (1994).

These individuals do not leave the labour force, but they do not re-appear in the employers' register, either—most likely they continue to draw unemployment benefits and simply use unemployment as a pathway to early retirement.

In the remaining covariates, we find that gender does not play any measurable role in transitions from unemployment to employment or health-related social benefits. The probability of leaving the labour force is, however, significantly higher for males than for females. Being divorced or separated reduces the probability of transition to employment, while marital status has no sizeable effect on the other two transition possibilities. Level of previous earnings, interpreted as the opportunity cost of rejecting a job offer, acts as a significant determinant to entering employment with the expected positive sign. Spouse earnings, on the other hand, appear to have no significant effect on either of the hazards.

Education was completed many years ago for the vast majority of our sample, and therefore is expected to be of less importance than is the case for younger cohorts. This seems to be confirmed in our study. While other research typically finds that education has a positive effect on the employment prospects for the population as a whole, we find no sizeable effect on either of the transition possibilities. Apparently, work experience contributes more to the human capital of the elderly, since this variable significantly improves their chances of moving from unemployment to employment.

According to standard job search theory we would expect the receipt of unemployment benefits to have a negative effect on the exit to employment[19]. We are not able to support this hypothesis. On the contrary, the effect is positive and significant at the 5 % level. The reported negative effect on the probability of leaving the labour force is, however, as expected.

Compared to younger cohorts, the older unemployed have a very low probability of being offered a relief job or a training program. For those who receive an offer, however, program participation appears to have a positive impact on their chances of entering the state of employment. At the same time such participation significantly reduces the probability of transiting to social benefits or out of the labour force. Hernæs and Raaum (1996), focusing on younger persons, report quite the opposite result. One explanation of this alleged divergence may be that young people with little or no employment experience are offered training programs mainly in order to improve their job qualifications, while the majority of older workers are selected into some kind of relief jobs with the purpose of maintaining already acquired skills. Although in principle all program participants are free to accept any job offer, young people apparently finish their courses before they resume job searching. The elderly, on the other hand, can more easily terminate their temporary engagements and transit into employment if an opportunity occurs.

The positive effect may of course also be due to self-selection, as well as to the selection process executed by the authorities. Since we offer no correction for the possible selection process, the alleged positive program effect should be interpreted with care. Our estimates might very well reflect the "gross" effect of the most highly motivated individuals in the unemployment pool completing programs, not the net effect of any program itself.

To correct for local variation in labour demand, we use the local unemployment rate as a covariat. Somewhat surprisingly, we are not able to measure any sizeable effects on the transition from unemployment to employment, or from unemployment to out of the labour force. Moreover, its effect on transitions to health-related benefits is negative, a result we believe is counter-intuitive. We suspect that the level of aggregation is the problem; *average*

[19] This seems to be confirmed by Norwegian research, i.e. Bratberg and Vaage (1996), Hernæs and Raaum (1996) and Røed, Raaum and Goldstein (1999), as well as in the international literature, i.e. Fallick (1991) and Narendranathan and Stewart (1993).

unemployment figures might be too crude a measure to reflect demand conditions for the oldest cohorts.

The variable *Declining rate* is an indicator of individuals experiencing a decrease in the local unemployment rate during their unemployment spells. This rate has the expected positive, albeit not significant, effect on transition to employment. On the other hand, its positive and significant contribution to the other two transitions seems somewhat dubious. We therefore conclude that our attempt to introduce dynamics in the labour demand was only partially successful.

Finally, since our sample experienced huge fluctuations in the business cycle, it is crucial to control for the (calendar) time at which unemployment occurred. *Ceteris paribus,* it appears that the probability of leaving the labour force is significantly reduced for those who entered unemployment late in 1989 or early in 1990, and that the employment prospects are best for the most recently recruited unemployed. This result is consistent with the fact that the Norwegian recession reached its lowest point by the end of 1989.

We believe the most consequential of our findings to be the way the entitlement to unemployment benefits affects the hazards out of unemployment—firstly, by increasing the exit rates around the time of expiration and, secondly, by decreasing the exit rates for the cohort with extended length of entitlement. Our data set contains individuals with and without benefits entitlement (65% and 35%, respectively). Obviously, we do not expect to find any of the two effects in the sample consisting of non-receiving unemployed. To test this hypothesis, we run separate regressions on the two subsamples. The resulting hazards are plotted in Figures 4.4, 4.5 and 4.6, respectively.[20]

For unemployed with benefits the picture is somewhat more mixed compared to Figure 4.1. The main pattern remains, however. The falling trend in the hazard to work in most of the first 80-weeks period is confirmed. More importantly, though, the spikes around the time of expiration are still easy to detect.[21] For non-receivers, the estimated hazard is dramatically different.

On average (over the 3.5 years), the probability of transition from unemployment to work is higher for individuals with benefits compared to the ones without. The explanation might be the latter group's relatively less attachment to the labour market.[22]

Turning to the hazard to health related benefits (Figure 4.5), the result for the receivers of unemployment benefits very much resembles the picture in Figure 4.2. Once again, the corresponding hazard for individuals without unemployment benefits is more or less flat, with no indication of behaviour that can be related to the entitlement periods. As was the case with the hazard to work, the low average probability of transiting from unemployment to health related benefits most likely must be explained by the relationship to the labour market: Sickness benefits are not achievable for unemployed without unemployment benefits. Also the states of rehabilitation and disability are easier to enter with an active labour market history.

The average probability of leaving the labour force is, as expected, higher for non-receivers. For receivers, Figure 4.6 reveals only minor deviations compared to Figure 4.3. At first glance, it appears to be a spike in the non-receivers' hazard around 80 weeks. However, a Wald-test indicates that the size of the hazard is far from being significantly different from the estimated baseline hazard in the previous period (p-value of 0.62). For receivers, on the other hand, the corresponding p-value is 0.916.

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[20] Coefficients are reported in Table A.2 in the Appendix.

[21] For the spike around 120 weeks, as for the one around one year, we have no explanation to offer.

[22] An indication in that direction is the very fact that their earnings are insufficient to be entitled to unemployment benefits.

Figure 4.4. Estimated hazard to work

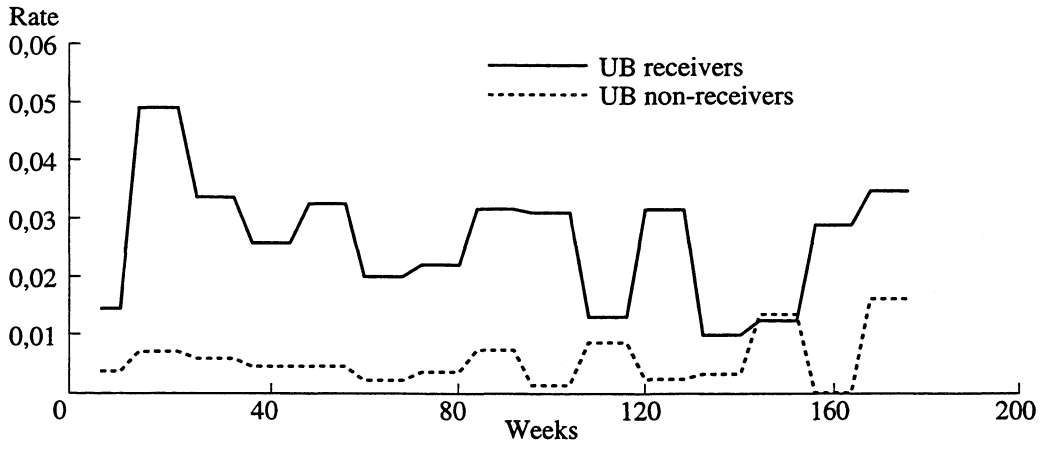


Figure 4.5. Estimated hazard to health related benefits

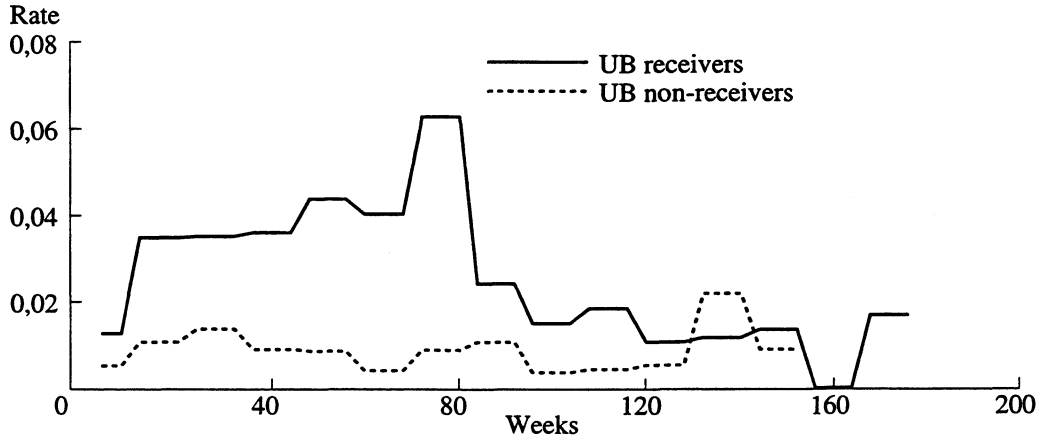


Figure 4.6. Estimated hazard when leaving the labour force

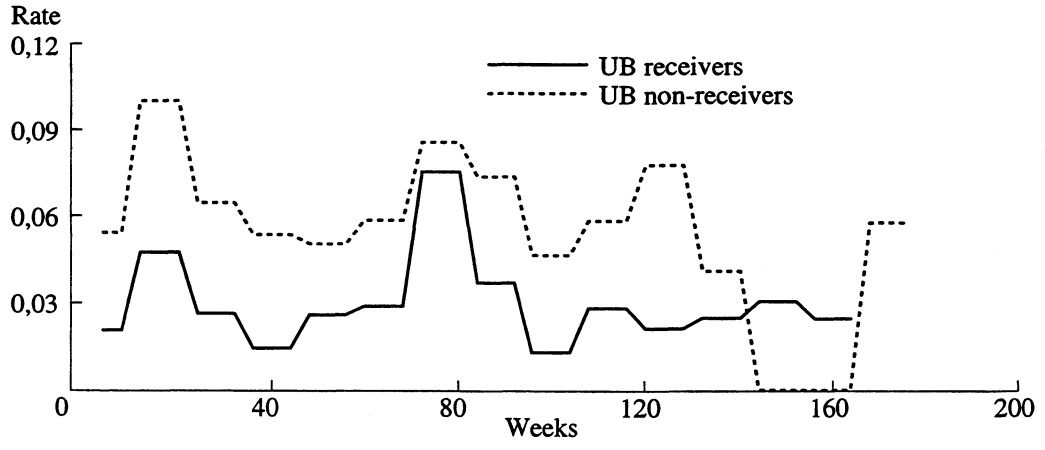

Table 4.2. Unemployment benefit receivers and non-receivers. Hazard estimates and asymptotic standard errors.

| Covariates | Employment | | | | Health related benefits | | | | Out of the labour force | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UB receivers | | UB non-receivers | | UB receivers | | UB non-receivers | | UB receivers | | UB non-receivers | |
| | Coeffi-cients | Standard errors | Coeffi-cients | Standard errors | Coeffi-cients | Standard errors | Coeffi-cients | Standard errors | Coeffi-cients | Standard errors | Coeffi-cients | Standard errors |
| Age: | | | | | | | | | | | | |
| 52.5 - 55.5 | * **- 0,5433** | 0,1488 | - 0,1679 | 0,2090 | 0,2363 | 0,2179 | 0,2217 | 0,2850 | - 0,1730 | 0,1216 | - 0,0124 | 0,1536 |
| 55.5 - 58.5 | ** **- 0,2886** | 0,1480 | - 0,4319 | 0,2589 | 0,1365 | 0,2288 | 0,4535 | 0,2877 | - 0,1795 | 0,1251 | 0,0387 | 0,1589 |
| 58.5 - 60.5 | * **- 0,7638** | 0,1981 | ** **- 0,6656** | 0,2883 | 0,2701 | 0,2430 | ** **0,7329** | 0,3052 | ** **- 0,3637** | 0,1506 | * **- 0,5453** | 0,2206 |
| 60.5 – 62 | * **- 1,3334** | 0,2285 | * **- 0,8160** | 0,3217 | 0,0027 | 0,2508 | 0,0524 | 0,3629 | * **- 1,1217** | 0,1977 | - 0,1767 | 0,1902 |

**Notes:**
Reference group is 50-52.5 years, i.e. 52.5 year olds are included, whereas the category "52.5 - 55.5" include individuals older than 52.5 only. The remaining age categories are split accordingly.
*: Significant at the 1% level
**: Significant at the 5% level

Table 4.2 reports the effects of the age-dummies on the two subsamples.[23]

The (dis-)incentives induced by extended entitlements for the 60.5-62 cohort generally seem to be confirmed. While for receivers we experience a distinct drop moving from cohort (59-60.5) to cohort (60.5-62), the coefficient decreases relatively monotonically for non-receivers. The drop in the probability of leaving the labour force for the cohort above 60.5 is reinforced for the receivers (compared to the pooled sample), while it, as expected, has vanished for non-receivers. The effect on the probability of transition to health related benefits is, however, not completely in accordance with our previous interpretation, since the decreased hazard for the oldest cohort is more pronounced for unemployed without benefits than for benefits receivers.

## 5. CONCLUDING REMARKS

By focusing on the oldest cohorts of unemployed we have obtained a sample which is more homogenous with respect to benefit entitlements, preferences, background characteristics, etc., and, thus, have removed some of the noise that is inherent in samples drawn from the complete working age population. There are several lessons to be learned.

As in several US analyses, but opposed to other Scandinavian studies, our findings indicate that there *is* a response to the exhaustion of unemployment benefits, as suggested by standard search theory. We detect spikes in the hazard from unemployment to employment around 80 as well as 160 weeks, which coincide with the length of the first and second entitlement period, respectively. The lack of training programs and relief jobs to older unemployed might be the explanation, since such offers are believed to distort the incentives from a fixed benefit period.

The policy implication of this finding is ambiguous, though. Imagine if a reform, put into effect by the authorities, were to reduce the length of the entitlement periods. On the one hand this should bring about a decline in the reservation wage at an earlier stage of the unemployment spell, which in turn should increase the probability of accepting a job offer and correspondingly reduce the problems caused by human capital deterioration and/or decreased job offer probability. On the other hand, our competing risk framework emphasises that benefit expiration also triggers transitions to health related social benefits as well as transitions out of the labour force, destinations into which more than 2/3 of our sample transit. If a reduction of the entitlement periods uniformly shifts *all* the hazard peaks, the increase in the hazard to employment must be contrasted to earlier exits to health related benefits and/or out of the labour force. The latter two are known to be absorbing states for the vast majority of the unemployed in the age group under study, and it is likely that practically all search activity cease once a person enters any of them. The net effect of a cut in the periods of benefits entitlement is, therefore, highly uncertain.

A fraction of the unemployed in our sample, namely the ones above 60.5 years of age, are faced with separate incentives, in that they may use the extended entitlement period as (financed) early retirement. Once again the old unemployed appear to be sensitive to incentives, since our model produces a marked reduction in the estimated probability of transition from unemployment to employment for the cohort in question. Of course, the finding may partly be due to depreciation of human capital and reduction in job offer probability, which also correlates with high age. But in that case we would expect increased

[23] The complete set of coefficients—for all the covariates—are reported in Table A.3 in the Appendix.

risk of leaving to social benefits or leaving the labour force. In stead, our competing risk model indicates that these transitions are less likely to take place for the oldest cohort compared to the preceding one. Hence, it is likely that unemployment functions as a pathway to early retirement for the oldest cohort and, moreover, that it becomes a substitute to other attainable pathways.

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## Appendix

Table A.1. Baseline hazard estimates ($\gamma_t$). Coefficients and asymptotic standard errors

| Period | In weeks | Employment | | Health related benefits | | Out of the labour force | |
|---|---|---|---|---|---|---|---|
| | | Coeffi-cients | Standard errors | Coeffi-cients | Standard errors | Coeffi-cients | Standard errors |
| 1 | 1- 12 | * **- 4,6847** | 0,3545 | * **- 4,5075** | 0,4281 | * **- 3,2926** | 0,2588 |
| 2 | 13- 24 | * **- 3,6428** | 0,3482 | * **- 3,6448** | 0,4230 | * **- 2,5496** | 0,2576 |
| 3 | 25- 36 | * **- 3,9679** | 0,3571 | * **- 3,5531** | 0,4280 | * **- 3,0845** | 0,2688 |
| 4 | 37- 48 | * **- 4,2386** | 0,3703 | * **- 3,6947** | 0,4386 | * **- 3,5204** | 0,2874 |
| 5 | 49- 60 | * **- 4,0802** | 0,3745 | * **- 3,5744** | 0,4435 | * **- 3,2152** | 0,2859 |
| 6 | 61- 72 | * **- 4,6321** | 0,4187 | * **- 3,8124** | 0,4666 | * **- 3,1101** | 0,2922 |
| 7 | 73- 84 | * **- 4,4178** | 0,4292 | * **- 3,3039** | 0,4564 | * **- 2,3598** | 0,2774 |
| 8 | 85- 96 | * **- 3,9121** | 0,4261 | * **- 3,8318** | 0,5359 | * **- 2,8708** | 0,3252 |
| 9 | 97-108 | * **- 4,4296** | 0,5071 | * **- 4,5804** | 0,7038 | * **- 3,6225** | 0,4299 |
| 10 | 109-120 | * **- 4,1882** | 0,5089 | * **- 4,3757** | 0,7051 | * **- 3,1782** | 0,3999 |
| 11 | 121-132 | * **- 4,2970** | 0,5640 | * **- 4,5890** | 0,8161 | * **- 3,1475** | 0,4311 |
| 12 | 133-144 | * **- 4,9371** | 0,7833 | * **- 3,7207** | 0,6435 | * **- 3,4102** | 0,5099 |
| 13 | 145-156 | * **- 3,9883** | 0,6027 | * **- 4,2365** | 0,8163 | * **- 3,7233** | 0,6278 |
| 14 | 157-168 | * **- 4,5853** | 0,7827 | - 13,7590 | 0,6435 | * **- 4,0455** | 0,7484 |
| 15 | 169-180 | * **- 3,4746** | 0,5578 | * **- 4,7346** | 0,8163 | * **- 3,8837** | 0,7484 |
| 16 | 181-192 | - 13,5876 | 46,7977 | - 13,7904 | 85,5478 | - 12,5695 | 34,9735 |

* : Significant at the 1 % level

Table A.2. Unemployment benefit receivers and non-receivers. Baseline hazard estimates ($\gamma_t$). Coefficients and asymptotic standard errors

| Period | In weeks | Employment | | | | Health related benefits | | | | Out of the labour force | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | UB receivers | | UB non-receivers | | UB receivers | | UB non-receivers | | UB receivers | | UB non-receivers | |
| | | Coeffi-cients | Standard errors | Coeffi-cients | Standard errors | Coeffi-cients | Standard errors | Coeffi-cients | Standard errors | Coeffi-cients | Standard errors | Coeffi-cients | Standard errors |
| 1 | 1- 12 | * **- 4,2418** | 0,4132 | * **- 5,6304** | 0,6675 | * **- 4,3668** | 0,5245 | * **- 5,2670** | 0,7350 | * **- 3,8834** | 0,3288 | * **- 2,9106** | 0,4009 |
| 2 | 13- 24 | * **- 3,0153** | 0,4018 | * **- 4,9622** | 0,6601 | * **- 3,3595** | 0,5106 | * **- 4,5337** | 0,7318 | * **- 3,0481** | 0,3256 | * **- 2,3027** | 0,4015 |
| 3 | 25- 36 | * **- 3,3920** | 0,4143 | * **- 5,1432** | 0,6708 | * **- 3,3505** | 0,5212 | * **- 4,2890** | 0,7307 | * **- 3,6343** | 0,3416 | * **- 2,7390** | 0,4171 |
| 4 | 37- 48 | * **- 3,6611** | 0,4309 | * **- 5,4127** | 0,6940 | * **- 3,3259** | 0,5304 | * **- 4,7114** | 0,7569 | * **- 4,2405** | 0,3758 | * **- 2,9271** | 0,4338 |
| 5 | 49- 60 | * **- 3,4297** | 0,4342 | * **- 5,4247** | 0,7092 | * **- 3,1310** | 0,5345 | * **- 4,7668** | 0,7766 | * **- 3,6544** | 0,3629 | * **- 2,9850** | 0,4474 |
| 6 | 61- 72 | * **- 3,9110** | 0,4840 | * **- 6,1424** | 0,8070 | * **- 3,2151** | 0,5525 | * **- 5,5302** | 0,8982 | * **- 3,5456** | 0,3725 | * **- 2,8365** | 0,4547 |
| 7 | 73- 84 | * **- 3,8185** | 0,5130 | * **- 5,6420** | 0,7732 | * **- 2,7729** | 0,5419 | * **- 4,7386** | 0,8182 | * **- 2,5841** | 0,3482 | * **- 2,4561** | 0,4486 |
| 8 | 85- 96 | * **- 3,4554** | 0,5303 | * **- 4,9208** | 0,7319 | * **- 3,7239** | 0,7035 | * **- 4,5257** | 0,8460 | * **- 3,2951** | 0,4274 | * **- 2,6071** | 0,4901 |
| 9 | 97-108 | * **- 3,4734** | 0,5684 | * **- 6,6575** | 1,1780 | * **- 4,2009** | 0,8633 | * **- 5,6391** | 1,2093 | * **- 4,3530** | 0,6570 | * **- 3,0660** | 0,5835 |
| 10 | 109-120 | * **- 4,3436** | 0,8124 | * **- 4,7584** | 0,7684 | * **- 3,9951** | 0,8684 | * **- 5,4394** | 1,2079 | * **- 3,5638** | 0,5470 | * **- 2,8424** | 0,5819 |
| 11 | 121-132 | * **- 3,4613** | 0,6424 | * **- 6,0888** | 1,1819 | * **- 4,5338** | 1,1221 | * **- 5,2449** | 1,2085 | * **- 3,8538** | 0,6598 | * **- 2,5525** | 0,5816 |
| 12 | 133-144 | * **- 4,6200** | 1,0756 | * **- 5,7387** | 1,1778 | * **- 4,4457** | 1,1210 | * **- 3,8233** | 0,8813 | * **- 3,7025** | 0,6581 | * **- 3,1937** | 0,7988 |
| 13 | 145-156 | * **- 4,3907** | 1,0746 | * **- 4,3101** | 0,8524 | * **- 4,3000** | 1,1212 | * **- 4,6957** | 1,2091 | * **- 3,4834** | 0,6577 | - 13,6064 | 141,7110 |
| 14 | 157-168 | * **- 3,5485** | 0,8098 | - 16,0194 | 201,4079 | -15,5137 | 286,2040 | - 15,6262 | 236,3377 | * **- 3,7033** | 0,7742 | - 13,6064 | 141,7110 |
| 15 | 169-180 | * **- 3,3615** | 0,8094 | * **- 4,1268** | 0,8513 | * **- 4,0780** | 1,1204 | - 15,6562 | 255,5391 | - 14,6255 | 184,2642 | * **- 2,8508** | 0,8052 |
| 16 | 181-192 | - 14,9108 | 143,3294 | - 15,8036 | 151,0194 | -15,5516 | 191,5787 | - 15,8286 | 181,4773 | - 14,5885 | 115,0491 | - 13,7590 | 109,4099 |

* : Significant at the 1 % level

Table A.3. Unemployment benefit receivers and non-receivers. Hazard estimates and asymptotic standard errors.

| Covariates | Employment | | | | Health related benefits | | | | Out of the labour force | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UB receivers | | UB non-receivers | | UB receivers | | UB non-receivers | | UB receivers | | UB non-receivers | |
| | Coeffi-cients | Standard errors | Coeffi-cients | Standard errors | Coeffi-cients | Standard errors | Coeffi-cients | Standard errors | Coeffi-cients | Standard errors | Coeffi-cients | Standard errors |
| Age: | | | | | | | | | | | | |
| 52.5 – 55.5 | * **- 0,5433** | 0,1488 | - 0,1679 | 0,2090 | 0,2363 | 0,2179 | 0,2217 | 0,2850 | - 0,1730 | 0,1216 | - 0,0124 | 0,1536 |
| 55.5 – 58.5 | ** **- 0,2886** | 0,1480 | - 0,4319 | 0,2589 | 0,1365 | 0,2288 | 0,4535 | 0,2877 | - 0,1795 | 0,1251 | 0,0387 | 0,1589 |
| 58.5 – 60.5 | * **- 0,7638** | 0,1981 | ** **- 0,6656** | 0,2883 | 0,2701 | 0,2430 | ** **0,7329** | 0,3052 | ** **- 0,3637** | 0,1506 | * **- 0,5453** | 0,2206 |
| 60.5 – 62 | * **- 1,3334** | 0,2285 | * **- 0,8160** | 0,3217 | 0,0027 | 0,2508 | 0,0524 | 0,3629 | * **- 1,1217** | 0,1977 | - 0,1767 | 0,1902 |
| Gender | - 0,3176 | 0,1912 | - 0,1373 | 0,2525 | - 0,2246 | 0,2268 | 0,1905 | 0,2780 | 0,0992 | 0,1612 | * **0,5502** | 0,1726 |
| Marital status: | | | | | | | | | | | | |
| Unmarried | - 0,0380 | 0,1976 | 0,1368 | 0,2848 | - 0,3536 | 0,2809 | 0,1268 | 0,3508 | - 0,3323 | 0,1855 | - 0,3703 | 0,2152 |
| Has been married | - 0,2774 | 0,1757 | - 0,4207 | 0,2693 | - 0,1554 | 0,2199 | ** **0,6292** | 0,2835 | 0,1182 | 0,1314 | - 0,0563 | 0,1753 |
| Income: | | | | | | | | | | | | |
| Previous income | * **0,0082** | 0,0022 | * **0,0076** | 0,0027 | - 0,0006 | 0,0032 | 0,0026 | 0,0032 | 0,0011 | 0,0019 | - 0,0018 | 0,0020 |
| Spouse income | - 0,0003 | 0,0017 | 0,0022 | 0,0026 | -0,0032 | 0,0022 | 0,0015 | 0,0033 | 0,0025 | 0,0014 | - 0,0001 | 0,0019 |
| Education | ** **- 0,0584** | 0,0273 | 0,0509 | 0,0386 | - 0,0540 | 0,0368 | - 0,0126 | 0,0439 | - 0,0203 | 0,0220 | 0,0169 | 0,0273 |
| Work experience | * **0,0400** | 0,0160 | ** **0,0528** | 0,0240 | 0,0211 | 0,0178 | 0,0418 | 0,0260 | * **0,0409** | 0,0133 | - 0,0266 | 0,0139 |
| Access to relief jobs and labour market programs | 0,0397 | 0,1476 | * **0,5072** | 0,1705 | - 0,4168 | 0,2498 | * **- 0,7258** | 0,2167 | * **- 0,3863** | 0,1398 | * **- 0,4668** | 0,1218 |
| Labour Market Characteristics: | | | | | | | | | | | | |
| Local unemployment rate | - 0,0040 | 0,0548 | - 0,0371 | 0,0805 | - 0,0462 | 0,0752 | - 0,1658 | 0,0969 | - 0,0724 | 0,0443 | - 0,0233 | 0,0508 |
| Declining unemployment rate | ** **0,2326** | 0,1128 | - 0,0232 | 0,1709 | 0,1588 | 0,1474 | ** **0,4755** | 0,2069 | * **0,8105** | 0,0971 | * **0,5841** | 0,1241 |
| Start of unemployment spell: | | | | | | | | | | | | |
| April - June 1989 | 0,1549 | 0,1515 | 0,2305 | 0,2329 | 0,2489 | 0,2003 | - 0,5308 | 0,3021 | - 0,0628 | 0,1182 | 0,2264 | 0,1432 |
| July – Semptember 1989 | - 0,0512 | 0,1758 | 0,0927 | 0,2343 | 0,0900 | 0,2301 | ** **0,5588** | 0,2497 | - 0,0707 | 0,1308 | - 0,1836 | 0,1685 |
| October - December 1989 | 0,0572 | 0,1596 | 0,0774 | 0,2818 | 0,0491 | 0,2219 | 0,1015 | 0,3194 | * **- 0,5643** | 0,1453 | - 0,0154 | 0,1909 |
| January - March 1990 | 0,0931 | 0,2574 | 0,2955 | 0,4481 | 0,4202 | 0,3043 | 0,2985 | 0,5416 | ** **- 0,5519** | 0,2414 | - 0,6011 | 0,3980 |
| April - June 1990 | 0,4112 | 0,3056 | 0,5007 | 0,4573 | 0,2240 | 0,3758 | 0,2009 | 0,5497 | - 0,0517 | 0,2438 | - 0,7654 | 0,5165 |

**Notes:**
Age; reference group is 50-52.5 years, i.e. 52.5 year olds are included, whereas the category "52.5 - 55.5" include individuals older than 52.5 only. The remaining age categories are split accordingly.
Gender; reference group is male.
Marital status; reference group is married.
Income; per 1000 NOK.
Start of unemployment spell; reference group is January - March 1989.
*: Significant at the 1% level
**: Significant at the 5% level

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**B** *Returadresse:*
Statistisk sentralbyrå
Postboks 8131 Dep.
N-0033 Oslo

Statistics Norway
P.O.B. 8131 Dep.
N-0033 Oslo

Tel: +47-22 86 45 00
Fax: +47-22 86 49 73

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