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INCREASING INCENTIVES FOR REEMPLOYMENT*

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ABSTRACT: This paper studies the incentives of unemployed workers for reemployment using search models and semi-parametric econometric methods with applications for individual data on unemployment durations. It is shown that the reemployment probability can be increased substantially by offering reemployment bonuses to the unemployed workers. Other means of encouraging the workers are to remove the protective rules regarding labour mobility of the Finnish Unemployment Insurance Act and to reduce the benefits after a fixed period of unemployment. Politically this may be difficult, but on the other hand the welfare of all the unemployed persons can be increased by removing the waiting period of benefits,

1. Introduction

This paper analyses the effect of unemployment benefits, reemployment bonuses and features of the Finnish UI system using search theoretical models and econometric models of unemployment duration. It is well known that the unemployment benefits has a disincentive effect on the reemployment [see Lippman and McCall (1976a,b, 1979), Mortensen (1977) and Kiefer and Neumann (1989)]. From the stand-point of the functioning of labour markets it is evident that the level of benefits is not necessarily the only policy question. It is shown that the conditions of paying the benefits are extremely important. The reemployment probability can be increased substantially by offering reemployment bonuses to unemployed persons.

The effects of the waiting period, mobility rules and reductions of benefits are discussed. The waiting period for the eligibility of benefits is usually one week. For the persons who have entered the labour force or persons who have quit their previous jobs the waiting period is six weeks. Unemployed persons who are reluctant to relocate when offered a job elsewhere or persons who are reluctant to change their occupations may lose their UI benefits after the first three months of unemployment. Non-members of UI funds are eligible for the basic unemployment allowance, which is not limited with respect of the duration of unemployment. Unemployed workers who are members of UI funds are eligible for earnings-related unemployment allowances, which amount is the basic unemployment allowance plus the earnings related part. In 1985-87 the earnings related unemployment benefits were reduced by 20 percent at the 100*th* day of of unemployment. In 1987-89 the reductions were 12.5 % at the 200*th* day of unemployment.

Based on search theoretical foundations it is evident that the waiting period of unemployent benefits has only a slight positive effect on the reemployment probability. On the other hand the risk of losing benefits after the first three months and reductions of benefits have a considerable large positive effect on the reemployment probability.

Using semi-parametric models of unemployment duration it is found that unemployment benefits have a disincentive effect during the first three months. After that period the effect of benefits on the reemployment probability turns positive. The results of econometric models show that the risk of losing benefits has a very strong effect on the reemployment probability. Furthermore the results indicate that the reductions are very effective in increasing the reemployment probability. Just after the reduction the probability is about twice as high as it would otherwise be.

The remainder of this study is set out as follows. The search theoretical results are presented in section 2. The empirical evidence is presented in section 3 and section 4 concludes the study.

2. Search Theoretical Results

2.1. The Effects of Benefits and Reemployment Bonuses

This section emphasizes the contrary effects of unemployment benefits and reemployment bonuses. These effects are analyzed in the search theoretical framework. Job offers made by the employers are assumed to be unknown for the unemployed job searchers. All the offers that are at least the reservation utility u^* are accepted. Thus the endogenous variable u^* determines the selectivity of the person with respect of jobs. In the basic search model the unemployed persons are assumed to be eligible for UI benefits b and to pay searching cost c in each period of search. On these assumptions the consumption $C = b - c$. Another endogenous variable is the search intensity s, which is the fraction of the leisure spend on search. Then the leisure $L = 1 - s$.

In the search models the arrival rate of job offers is assumed to follow a Poisson process with intensity $\Sigma\Sigma a_{ij}(s(t)) = a(s(t))$, where the subscripts i and j are for the area and occupation of the offers. It is assumed that $a(0) = 0$, $\partial a/\partial s > 0$ and $\partial^2 a/\partial s \partial s \leq 0$.

Often people wonder why there is an excess demand for labour while (in the other parts of the country or occupations) there are high unemployment rates. One explanation for the rigid labour markets is that there are high reemployment costs c_e, which decrease the incentives for moving or changing occupations. These costs have been discussed in the search theoretical context for example by Hey and McKenna (1979), Loikkanen (1982) and Burgess (1988). A way of reducing these reemployment costs is to offer reemployment bonuses b_e to the persons who find acceptable job offers. In Finland the state is offering on rather strict conditions small benefits for the persons who move to a new area of residence to get a job. Unfortunately we do not have any data on these payments. Neither we have any data on the reemployment costs.

Workers maximize the expected present value of their utility. In an infinite horizon case the value function can be written as (cf. Mortensen, 1986)

$$(1) \qquad V(t) = u_0(b - c,\ 1 - s(t))/r + a(s(t)) \int_{u^*(t)}^{\bar{u}} [u/r - c_e + b_e - V(t)]dF(u)/r.$$

The first term of the value function on the right-hand side describes the discounted instantaneous utility during the unemployment. The second term is related to employment and it is the discounted expected utility of an offer. The expectation is taken with respect of the distribution function of utility F(u). The parameter $\bar{u}$ is the maximum attainable utility and $u^*(t)$ is the reservation utility at time t. The offers that are at least $u^*(t)$ are accepted.

Setting $\partial V/\partial u^* = 0$ gives the optimal reservation utility $u^*(t) = r[(c_e - b_e) + V(t)]$, which can be rewritten as

$$(2) \qquad u^*(t) = u_0(b - c,\ 1 - s(t)) + r(c_e - b_e) + a(s(t)) \int_{u^*(t)}^{\bar{u}} (u - u^*)dF(u)/r.$$

It is easily found that $\partial u^*/\partial b = \partial u_0/\partial C > 0$ and $\partial u^*/\partial b_e = - r < 0$. The effects of b and b_e on the reservation utility are found to have opposite signs.

Another decision variable of the model is the search intensity. An unemployed person's objective is to maximize the discounted expected utility by choosing search intensity relative to the acceptance rule of job offers. The necessary condition for the optimal search intensity is obtained by differentiating V(t) with respect of the search intensity s

$$(3) \qquad \frac{\partial V(t)}{\partial s} = - \frac{\partial u_0}{\partial L} + \frac{\partial a}{\partial s} \int_{u^*(t)}^{\bar{u}} [u/r - c_e + b_e - V(t)]dF(u) = 0.$$

It can be seen that the marginal utility of leisure is equated to the expected marginal utility gain from the search. By implicit differentiation $\partial s/\partial b = -(\partial^2 V/\partial s\partial b)/(\partial^2 V/\partial s\partial s)$, where $\partial^2 V/\partial s\partial s < 0$ by the second order condition of the search intensity. Therefore it is necessary to consider the signs of $\partial^2 V/\partial s\partial b = -\partial^2 u_0/\partial L\partial C < 0$ and $\partial^2 V/\partial s\partial b_e = (\partial a/\partial s)[1 - F(u^*)] > 0$. The effects are again found to have opposite signs.

The conditional reemployment probability, i.e. hazard function, is a product of the arrival rate and probability that an offer is acceptable

(4) $$h(t) = a(s(t))[1 - F(u^*(t))].$$

The reemployment probability is affected by two endogenous variables; the reservation utility and search intensity. Both of them have to be taken into account when examining the effects of exogenous variables. The UI benefits b increase the reservation utility and decrease the search intensity. Hence their effect on the reemployment probability is negative. On the other hand, the reemployment bonus b_e has the desired properties of decreasing the reservation utility and increasing the search intensity. Therefore their effect on the reemployment probability is clearly positive.

According to experimental evidence from the U.S., the reemployment bonuses appear to have had positive and substantial effects on the reemployment. In Australia bonuses have been used for the long-term unemployed since 1989 (see Woodbury and Spiegelman, 1987). Lump-sum reemployment bonuses may, however, have undesirable effects. Firstly, the inflow to unemployment could be expected to increase, since workers intending to change jobs would have an incentive to register as unemployed in between jobs. Secondly, the bonus programme would provide an incentive for temporary layoffs. Thirdly, if the bonuses are offered to persons having been unemployed for a certain length of time, then they are expected to have a disincentive effect on the reemployment during the qualifying waiting period (see Meyer, 1988). A way of avoiding these problems is to offer a bonus, which is proportional to the duration of unemployment.

In practice an effective means of engouraging unemployed persons to become employed is to turn a proportion of the unemployment benefits into bonuses. It could be done by collecting for example the earnings related part of the benefits to the UI funds and pay the cumulative benefits as reemployment bonus when the person has found a job. Turning benefits into bonuses would have a double effect, since it would have the effect of cutting benefits and paying reemployment bonuses.

2.2. The Effects of the Waiting Period, Rule of Labour Mobility and Reduction of Benefits

In this section the effects of the waiting period, rule of labour mobility and reduction of benefits are priefly discussed. An extensive search theoretical analysis of these features of the system is found in Kettunen (1992).

Usually unemployed workers are informed about the waiting period when they register with the employment office. Normally the waiting period is one week, but if the person has entered the labour force or if he has quit his previous job the waiting period is six weeks. When the person knows in advance that he will be eligible for benefits, he will discount the benefits to the present day. Having a relatively short waiting period the discout factor is near to one. Therefore it can be concluded that a short waiting period has a relatively slight effect on the reservation utility, search intensity and reemployment probability.

According to the Finnish UI Act the unemployed persons do not have to accept offers from other areas or occupations during the first three months. After that they may lose their benefits if they are reluctant to relocate or change their occupations. The risk of losing UI benefits decreases the value of a search. Assuming that the unemployed persons are fully aware about the rules of the system they will take the risk in advance into account. The risk is realized with a probability, which is the product of an arrival rate of offers and probability that the offer is less than the lowest acceptable offer, i.e. the distrubution function of offers at the reservation utility. It is obvious that the risk of losing benefits decreases the selectivity and increases the search intensity and reemployment probability. If the persons know the risk of losing benefits in advance they will discount the expected value of the loss to the present day. If they are told just after the three first three months by the unemployment offices that they have to accept the offers the selectivity will jump down and search activity and reemployment probability will jump up. In pactice this happens quite often.

The persons who are eligible for the earnigs related unemployment allowance had during 1985-89 reductions in their benefits. It is obvious that the reductions will decrease the selectivity and increase the search intensity and reemployment probability. If the persons know the reductions in advance they will discount them to the present day. In practice at least some of the persons learn the rules when they obtain the reduced benefit. In that case the selectivity will jump down and search activity and reemployment probability will jump up. These effects will be studied in the next chapter using semi-parametric models and data on unemployment durations.

3. Semi-Parametric Inference

3.1. Models of Unemployment Duration and Labour Mobility

For the econometric analysis of reemployment a sample of 2077 unemployed workers was drawn from the administrative data of the Ministry of Labour. Every hundredth individual was selected to be included in the sample from the flow into unemployment during 1985. The persons were followed until the end of their spells of unemployment or until to the end of 1986, whichever came first. Therefore the data set includes censored observations, which are rather common in econometric studies of unemployment duration. The data on unemployed persons' annual income and taxable assets was compiled from the tax register. The data on the basic unemployment allowance and the earnings-related unemployment allowance during the unemployment period was compiled from the unemployment allowance register of the Social Insurance Institution and the bank Postipankki, respectively. The data are fairly rich in individual characteristics and labour market specific variables (see Kettunen, 1991a). Furthermore, the full pattern of benefits over the unemployment durations is observed. This is the first set of Finnish microeconomic data where the levels on unemployment benefits are available. A description of the variables used in the study is found in the appendix.

Studies using parametric models of unemployment duration (Kettunen 1990, 1991b,c) have shown that the benefits have a negative effect on the reemployment probability and labour mobility. However, using parametric models the specification of duration distribution and duration dependence may be difficult. The Finnish unemployment insurance system is such that the rules concerning the eligibility of benefits vary over the duration of unemployment. Therefore the interest of this study lies in the semi-parametric models and duration-dependent effects of the UI system on reemployment and the regional and occupational mobility of unemployed workers.

The proportional hazards model presented by Cox (1972) studies the effects of explanatory variables on the hazard rate without specifying the form of duration-dependence. The estimation of Cox's model leads to the partial conditional likelihood function, where the time-dependent part of the likelihood function is cancelled out, because it is identical for the individuals leaving unemployment and individuals in the risk set.

Concerning any period of unemployment the individuals experience two events, the entry τ^0 and exit τ^1, measured in calendar time. The duration of unemployment is then $t = \tau^1 - \tau^0$. The hazard function of the proportional hazards model presented by Cox (1972) can be written as

$$(5) \qquad h(t,x) = h_0(t)h_1(x;\beta),$$

where the first factor $h_0(t)$ is the unknown baseline hazard. These kinds of models are called semi-parametric, since one does not have to define the baseline hazard. The second factor, which is known up to a finite dimensional parameter vector β, usually takes the log-linear form $h_1(x;\beta) = \exp(x\beta)$.

Let $t_1, t_2, \ldots, t_n$ denote the ordered durations of n individuals and let I^* be the set of indices identifying observed times of becoming employed. The partial likelihood function can be written as (see Cox, 1972, 1975)

$$(6) \qquad \ell(\beta) = \prod_{i \in I^*} \frac{\exp(x_i\beta)}{\sum_{j \in R(t_i)} \exp(x_j\beta)},$$

where $R(t_i)$ denotes the risk set, i.e. the observations with $t \geq t_i$. Multiplying the numerator and denominator by $h_0(t)dt$, it can be seen that the contribution of an observation i is just the probability that the duration ends in $[t_i, t_i+dt)$ given that some duration in the risk set ends in that interval.

The values of explanatory variables may change over the duration of unemployment for the individuals. The inclusion of such variables in the semi-parametric proportional hazards model is considered below. Models with duration-dependent replacement ratios of unemployment benefits are estimated using different kinds of model specifications. With duration-dependent covariates the hazard function of the proportional hazards model can be written as

$$(7) \qquad h(t,x,z) = h_0(t)e^{x\beta + z(t)\beta_z},$$

where x includes the covariates, which are constant over time and z(t) includes the duration-dependent covariates.

Models with duration-dependent replacement ratios of unemployment benefits are estimated and the results are presented in Table 1. For comparison the first column of Table 1 includes the model where the benefit replacement ratio is fixed at an average value over the unemployment spell. The second column includes a model where the duration-dependent unemployment benefits were used in the two intervals $(t_0, t_1]$ and $(t_1, t_2]$, where $t_0 = 0$, $t_1 = 3$ and $t_2 = 24$ months. The results show that the effect of unemployment benefits is lower with duration-dependent replacement ratios. The third possibility is to assume that the effects of duration-dependent variables vary over time, remaining constant within predefined intervals. The reason for this kind of specification is that the replacement ratios may have different effects on the reemployment probability at different points in time. With duration-dependent effects in the intervals $t_{j-1} < t \leq t_j$, $j = 1, 2$, the hazard function can be written

$$(8) \qquad h_j(t,x) = h_0(t)e^{x\beta + z(t)(\beta_z + \mu_j)}.$$

To avoid singularity μ_1 is set equal to zero. This approach has been also followed by Moreau, O'Quigley and Mesbach (1985), Moreau, O'Quigley and Lellouch (1986) and O'Quigley and Pessione (1989).

The parameter estimates of the model (8) with duration-dependent replacement ratios are in the third column of Table 1. It can be seen that the unemployment benefits have a negative effect on the reemployment probability during the first three months, but after that period the effect turns positive. An obvious reason is that the eligibility rules of benefits become stricter. As mentioned above the unemployed persons have a risk of losing benefits after the first three months if they do not move to another region or change their occupations. Furthermore, after the 100*th* day of unemployment the earnings-related unemployment allowances decrease by 20 percent. Because of these rules the incentive for reemployment is higher for the persons with higher benefits. These findings are confirmed by Table 2, which shows that the negative effect of benefits is higher for the non-members of labour unions even though their benefits are lower.

Since the rules concerning labour mobility change during the unemployment, it is reasonable to study the probabilities of moving and changing occupations. The semi-parametric models of labour mobility are presented in Table 3. In the case of regional mobility the set of indices identifying complete spells of unemployment includes the persons who have become employed by moving to another area of residence. In the case of occupational mobility the interesting set of indices includes the persons who have changed their occupations.

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Table 1.

Table 2.

Table 3.

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3.2. Baseline Hazard Functions

The estimated values of the parameters can be used to construct an estimator for the integrated baseline hazard, which has been proposed for Cox's model by Breslow (1972, 1974). The integrated baseline hazard can be written

$$(9) \qquad \hat{I}_0(t_i) = \sum_{t_j \le t_i} \frac{c_j}{\sum_{k \in R(t_j)} \exp(x_k \hat{\beta})},$$

where c_j is an indicator for a noncensored observation. The corresponding Breslow's estimate for the baseline hazard is based on the subdivisions of the time scale at those points where the event occurs

$$(10) \qquad \hat{h}_0(t_i) = \frac{c_i}{(t_i - t_{i-1}) \sum_{k \in R(t_i)} \exp(x_k \hat{\beta})}.$$

For a graphical presentation of the baseline hazard it is more natural to assume that $h_0(t)$ is a slowly varying function of t. If the estimates of the integrated baseline hazards are available, an estimate for the baseline hazard for each distinct duration can be rewritten as a difference quotient of the integrated baseline hazards

$$(11) \qquad \hat{h}_0(t_i) = \frac{\hat{I}_0(t_i) - \hat{I}_0(t_{i-v})}{t_i - t_{i-v}},$$

where $\nu = 1$. Then it can be seen that (11) is essentially equal to (10) for noncensored observations. It is suggested here that the smoother estimates of the baseline hazard function are obtained by choosing ν for each t_i such that $\min(t_i - t_{i-\nu})$ is larger than a predefined constant ε. In this application ε was set equal to 5 weeks and the estimates of the baseline hazard function were centred at the midpoint of the intervals $(t_i, t_{i-\nu})$. An advantage of this kind of simple smoothing is that the baseline hazard can not get negative values, which is possible using the method suggested by Anderson and Senthilselvan (1980).

The estimates of the baseline hazard function for a cohort of unemployed workers are presented in Figure 1. Reluctant movers have a risk of losing benefits after the first three months. Figure 1 shows that the risk increases the reemployment probability. The elasticity of the hazard function with respect of the replacement ratio is the product of the replacement ratio and its parameter estimate. Therefore the effect of this risk is larger for the members of labour unions, who are usually eligible for higher benefits.

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Figure 1.

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Members of labour unions face a 20 percent reduction in their benefits after the 20*th* week of unemployment. The reduction has a strong positive effect on the reemployment probability. The hazard is approximately 100 percent higher just after the reduction than it would otherwise be indicating that in the case of decreasing benefits the elasticity of the hazard with respect to the replacement ratio is about -5. These findings are confirmed by Table 2, which shows that the negative effect of benefits is higher for the non-members of labour unions even though their benefits are lower.

The employment office has to offer a job to a person who has been unemployed for a year. Therefore the baseline hazard functions are increasing at the end of a year of unemployment. The low estimates of the baseline hazard function for the durations just less than a year are rather low. This is probably affected by the rules and practice of the employment office.

The baseline hazard functions of labour mobility are presented in Figure 1. The unemployed persons seem to be prone to move at the beginning of their unemployment spell and just after the three months of unemployment. However, one can not draw very strong conclusions about the regional mobility, since it is a rather rare phenomenon.

Occupational mobility is measured on the most accurate 5-digit level, which includes 1320 occupations. Unemployed persons change their occupations most often at the beginning of their unemployment spells and just after the three first months of unemployment.

4. Concluding Remarks

The aim of this study has been to investigate the process of reemployment of unemployed Finnish workers using both the search theoretical and econometric approaches. According to the comparative static results the UI benefits have a disincentive effect on the reemployment probability. This is a well-known result, but from the policy point of view it is interesting to note that the reemployment probability of unemployed workers can be increased by offering reemployment bonuses.

According to experimental evidence from the U.S. and Australia reemployment bonuses appear to have positive and substantial effects on the reemployment. Instead of paying generous benefits it would be worthwhile to consider paying scarce benefits and generous reemployment bonuses. An effective means is to turn a proportion of the unemployment benefits into bonuses. It could be done by collecting for example the earnings related part of the benefits to the UI funds and pay these cumulative benefits as a reemployment bonus when the person has found a job.

According to the search models the qualifying waiting period has a slight positive effect on the reemployment probability. On the contrary the treat of removing benefits from persons who are reluctant to move or change their occupations and reductions of benefits increase substantially the reemployment probability.

The econometric part of this paper studied the time-dependent effects of the UI system using semi-parametric models of unemployment duration. Models with duration-dependent replacement ratios of unemployment benefits were estimated. The model with a duration-dependent replacement ratio gives a substantially lower parameter estimate of the replacement ratio than the model where the benefit replacement ratio is fixed at an average value over the unemployment spell. Studying more carefully the duration-dependent effects, it was noted that the benefits have a negative effect on the reemployment probability during the the first three months of unemployment, but after that period the effect turns positive. One reason is that the unemployed persons may lose their benefits after the first three months if they do not move or change occupations. Another reason is that the reduction of benefits by 20 percent after the 100*th* day of unemployment doubles the reemployment probability just after the reduction. Because of these rules the incentive for reemployment is higher for the persons with high benefits. Using graphs of the baseline hazard functions it was shown that these features of the UI system are of a great importance when looking at the probabilities of reemployment and regional and occupational mobility.

There are several factors which will increase the duration of unemployment. Elderly persons are more apt to incur problems in finding acceptable offers. They are less prone to move and change occupations than younger persons. The persons who came from housework have longer durations than other persons. Education and skills were found to help substantially the reemployment. The greatest cause for concern is that persons with high unemployment benefits tend to have longer unemployment spells.

The incentive for the reemployment can be effectively increased by removing the protective rules of regional and occupational mobility and reducing benefits after a fixed period. It can also be argued that the basic unemployment allowance should have a limited period of eligibility. These kinds of changes in the UI system would promote shorter durations of unemployment. However, these kinds of changes are politically difficult, but on the other hand the welfare of unemployed persons can be increased by removing the waiting period of unemployment benefits, since the waiting period does not substantially increase the reemployment probability.

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Data appendix: *Variables of the data*

Duration of unemployment is calculated in weeks and it is the difference between the date of entry into unemployment and the date of returning to work. The data includes also other forms of exit than becoming employed. These are called censored observations. Mean = 15.06.

Number of children is the number of unemployed person's children who are younger than 18 years. Mean = 0.23.

Married is a dummy variable, 1 = yes. Mean = 0.37.

Sex is a dummy variable, 1 = male. Mean = 0.54.

Age is measured in years. Mean = 31.2.

Level of education is a dummy variable, 1 = at least 12 years of education. The level of education is based on the education code of the Central Statistical Office of Finland. Mean = 0.45.

Training for employment is a dummy variable, 1 = The person has got training for further employment. Training for employment is course participation, which have been occurred before the unemployment, but not necessarily immediately before it. Mean = 0.15.

Member of UI fund is a dummy variable, 1 = yes.

Mean = 0.42.

Came from schooling is a dummy variable, 1 = The person has come from schooling or from the army. Mean = 0.13.

Came from house work is a dummy variable, 1 = The person has come from house work or elsewhere outside the labour force. Mean = 0.07.

Regional demand describes the regional rate of jobs available. It is the number of vacancies divided by the number of job seekers in the area. Mean = 0.10.

Occupational demand describes the occupational rate of jobs available in the whole country. It is the number of vacancies divided by the number of job seekers in the occupation group. Mean = 0.12.

Taxable assets has been compiled from the tax register and it is measured in millions of marks. Mean = 0.011.

Replacement ratios in the intervals, 1-3 and 3-24 months are unemployed person's average replacement ratios after tax in those intervals. Average weekly unemployment benefits after tax have been divided by the average weekly income in 1985 after tax. Means: 0.15 and 0.25.

The corresponding means of the replacement ratios are 0.29 and 0.55 for the persons receiving earnings-related unemployment allowance and 0.26 and 0.41 for the persons receiving the basic unemployment allowance. The average replacement ratios are lower during the first three months, since no benefits are paid during the qualifying waiting period of benefits. Also reductions and disqualifications of benefits decrease the average replacement ratios. Some persons do not even apply for the benefits.

Table 1. Semi-parametric models of unemployment spells duration-dependent replacement ratios

Std.errors in parentheses

Number of children	-0.002	-0.097	-0.086
	(0.048)	(0.049)	(0.049)
Married	0.143	0.171	0.159
	(0.067)	(0.070)	(0.069)
Sex	-0.014	-0.054	-0.056
	(0.063)	(0.061)	(0.061)
Age	-0.039	-0.037	-0.036
	(0.004)	(0.003)	(0.003)
Level of education	0.045	0.081	0.102
	(0.067)	(0.064)	(0.064)
Training for employment	0.183	0.206	0.202
	(0.074)	(0.079)	(0.079)
Member of UI fund	0.209	0.216	0.205
	(0.063)	(0.065)	(0.065)
Came from schooling	0.283	0.300	0.280
	(0.090)	(0.083)	(0.084)
Came from housework	-0.648	-0.655	-0.671
	(0.140)	(0.137)	(0.137)
Regional demand	0.114	0.248	0.131
	(0.256)	(0.252)	(0.252)
Occupational demand	0.551	0.656	0.547
	(0.586)	(0.622)	(0.590)
Taxable assets	0.783	0.770	0.682
	(0.994)	(1.112)	(1.112)
Replacement ratio, β_z	-1.232	-0.325	-1.375
	(0.132)	(0.138)	(0.205)
Replacement ratio, μ_2			2.127
			(0.271)
Log likelihood	-8415.6	-8453.6	-8422.1
Number of observations	2077	2077	2077

Table 2. Semi-parametric models of unemployment duration for the non-members and members of labour unions

a Non-members
b Members

Std.errors in parentheses

	a	b
Number of children	-0.019	-0.016
	(0.069)	(0.073)
Married	0.048	0.235
	(0.106)	(0.095)
Sex	-0.021	-0.047
	(0.083)	(0.096)
Age	-0.032	-0.048
	(0.005)	(0.005)
Level of education	0.154	-0.154
	(0.085)	(0.103)
Training for employment	0.181	0.179
	(0.119)	(0.108)
Came from schooling	0.300	0.200
	(0.097)	(0.188)
Came from housework	-0.729	-0.548
	(0.191)	(0.201)
Regional demand	-0.061	0.410
	(0.327)	(0.411)
Occupational demand	-0.387	1.276
	(0.925)	(0.886)
Taxable assets	0.120	1.494
	(2.015)	(1.193)
Replacement ratio	-1.725	-0.851
	(0.219)	(0.221)
Log likelihood	-4178.7	-3362.2
Mean $x\beta$	-1.122	-1.598
Number of observations	1212	865

Table 3. Semi-parametric models of labour mobility

a Regional mobility b Occupational mobility	a	b
	Std.errors in parentheses	
Age	-0.053	-0.035
	(0.022)	(0.010)
Level of education		0.305
		(0.182)
Training for employment		0.340
		(0.194)
Member of UI fund	-1.382	0.376
	(0.467)	(0.156)
Came from schooling		-0.034
		(0.248)
Came from housework		0.084
		(0.254)
Regional demand	-2.036	1.223
	(1.433)	(0.597)
Occupational demand	2.836	-3.544
	(3.179)	(1.637)
Taxable assets		-3.918
		(3.264)
Replacement ratio	-5.116	-0.446
	(1.005)	(0.334)
Log likelihood	-321.8	-1364.3
Mean $x\beta$	-2.934	-1.176
Number of observations	2077	2077

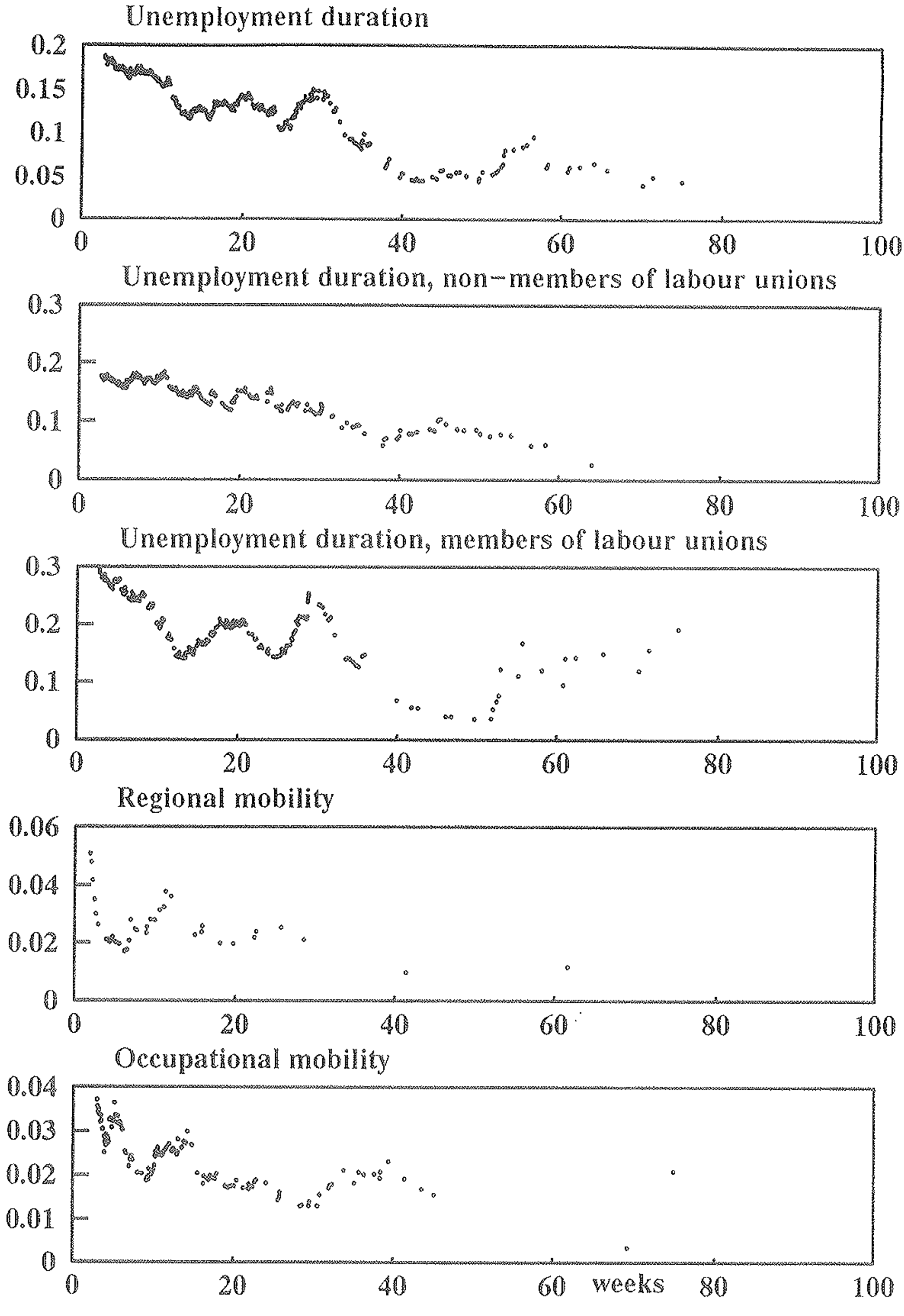

Figure 1. Baseline hazard functions of unemployment duration and labour mobility

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