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BUSINESS CYCLE, UNEMPLOYMENT TRAP AND EFFECTS OF ECONOMIC INCENTIVES ON JOB FINDING PROBABILITY

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Abstract: This paper considers the sensitivity of the household's disposable income with respect to the labour market states and the labour market transitions of unemployed workers. The paper analyses the following questions: (i) which are the determinants of starting wages? (ii) how many unemployed are in the unemployment trap? (iii) how do economic incentives affect the conditional probability of finding a job? (iv) how sensitive are answers to above questions with respect to business cycle? The empirical analysis is based on the individual panel data covering the years 1987-1993, when the unemployment rate rose from about 4 % to 18 %. We have estimated the starting wage equation to calculate the effects of hypothetical re-employment on the household's disposable income and to evaluate the frequency of the unemployment trap. To analyse factors affecting the transition out of unemployment to employment in open labour market, we estimate unemployment duration using a semi-parametric proportional risk model. The paper shows that the impact of the economic incentives, measured by the hypothetical change in household's disposable income, on re-employment is more important in the recession than in the boom.

Key words: Business cycle, unemployment trap, job finding probability

Tiivistelmä: Tutkimuksessa tarkastellaan kotitalouden käytettävissä olevien tulojen riippuvaisuutta yksilön työmarkkinatiloista ja työttömien työmarkkinasiirtymiä. Tutkimuksessa analysoidaan seuraavia kysymyksiä: (i) Miten määräytyvät uusien työsuhteiden alkupalkat? (ii) Kuinka moni työttömistä on työttömyysloukussa? (iii) Kuinka taloudelliset kannustimet vaikuttavat työttömien työllistymistodennäköisyyksiin? (iv) Mikä on kansantalouden suhdannevaihteluiden vaikutus? Empiirisessä analyysissa hyödynnetään vuodet 1987-1993 kattavaa yksilötason paneeliaineistoa, joka sisältää yksityiskohtaiset tiedot kotitalouden tulonmuodostuksesta. Empiirisen alkupalkkamallin avulla arvioidaan yksilön työllistymisen vaikutuksia kotitalouden käytettävissä oleviin tuloihin. Laskemalla jokaiselle otosyksilölle työllistymisen taloudellinen hyöty voidaan arvioida sitä, kuinka moni työtön on työttömyysloukussa. Työllistymisyhtälön avulla arvioidaan taloudellisten kannustimien vaikutuksia työttömän työllistymistodennäköisyyteen. Tutkimuksessa osoitetaan, että taloudellisten kannustimien merkitys korostuu taloudellisissa taantumissa, jolloin on kova kilpailu vähistä työpaikoista.

Asiasanat: Suhdannevaihtelut, työttömyysloukku, työllistymistodennäköisyys

Contents

1. Introduction

The unemployment rate in Europe and particularly in Finland has remained at the high level in spite of the rapid economic growth during the recent years. Gloomy progress in unemployment reduction has stimulated public discussion on different incentive traps faced by unemployed workers (the OECD Job Study, 1994). Usually the term "unemployment trap" refers to a situation where an unemployed worker is unable to increase substantially his/her household's disposable income through re-employment. The unemployment trap may follow from the combination of the high unemployment benefits, the low wage offers, the progressive taxation, the transfer payments, and/or the day-care fees. The unemployment trap has been argued to increase the rigidity of the labour market and to slow down the process of re-employment. This is because an unemployed worker is likely to be unwilling to search actively for a new job if the expected financial gain of re-employment is insignificant.

This paper considers the sensitivity of the household's disposable income with respect to the labour market states and the labour market transitions of unemployed workers. Since the post-unemployment wage rate or the starting wage may differ from the general wage rate, we firstly analyse the determination of the post-unemployment wages in order to construct estimates for the expected wage offers available for unemployed workers. By using the expected starting wages we can assess the effect of hypothetical re-employment on the household's disposable income. Secondly, we estimate conditional probabilities of finding a job by using semi-parametric proportional risks model (see Narendranathan and Steward, 1993) to get an estimate in which extent the process of re-employment is attributed to the expected change in the disposable income. More precisely, the paper aims to answer the following questions: (i) which are the determinants of post-unemployment wages? (ii) how many unemployed are in the unemployment trap? (iii) how do economic incentives affect the conditional probability of finding a job? (iv) how sensitive are answers to above questions with respect to business cycle?

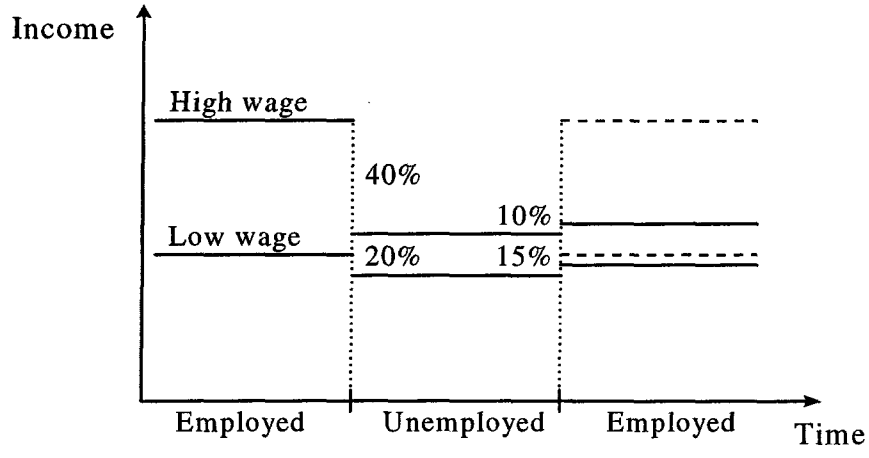
Our data, which is very rich comparing to previous studies (see e.g. Atkinson and Micklewright, 1991), consists of several thousands of observations on workers with a terminated spell of unemployment in 1988, 1990 or 1992. Background information covering the period 1987-1993 for each observation was collected by combining the registers of several authorities. An interesting feature of the data is that it includes the detailed income statistics not only for sample members but also for their spouses. Since information, though limited, on the transfer payments to the households is available as well, the data provides an opportunity to consider changes in the households disposable income that result from the labour market transitions.

As is well known, in the late of the 1980's the Finnish economy was overheated and it collapsed in the early 1990's. The unemployment rate was about 4 per cent in 1990 and about 18 per cent in 1992. If the persons participating in different manpower programs were included the unemployment rate would be well above 20 per cent in the early 1990's. To check the effects of business cycle on the determinants of individual unemployment duration we follow the study of Arulampalam and Stewart (1995).

In order to analyse the unemployment trap, we need information on the households' disposable income during the different labour market states. Income statistics for unemployment periods are available for all the households, whereas post-unemployment wage is observed actually only for those sample members who have found a new job during the concerned year. It is obvious that we cannot omit those who have not found a job without damaging our analysis. The reason is that their failure in job search may be attributed to weak economic incentives to re-employment, i.e., they might be in the unemployment trap. Therefore we estimate a self-selection corrected wage equation for job finders to obtain estimates for the expected post-unemployment wage rates. We apply the expected post-unemployment wage rates for the jobfinders and non-jobfinders.

It is important to define whether we like to focus on the short-run or the long-run unemployment trap, i.e. the economic incentives to job search. Figure 1 shows how the economic incentives to find a job depend on the post-unemployment wage rates. According to the OECD estimates (The OECD Job study, 1994) the lower the pre-unemployment wage rate the higher replacement rate. In our example, the replacement rate of a high wage earner (a low wage earner) is assumed to be 60 per cent (80 per cent). If the post-unemployment wage were about the same as the pre-unemployment wage (see the dashed lines) we would measure the incentives to find a job by the replacement rates. In our example, the inverse of the replacement rate of a high wage earner (a low wage earner) is assumed to be 1.67 (1.25). A high wage earner (a low wage earner) would increase his/her income by 67 per cent (25 per cent) through re-employment. If, in turn, the post-unemployment wages are lower than the pre-unemployment wages (see the solid lines), due to e.g. the seniority rules in the wage formation, the inverse of the replacement rates would overestimate the incentives to find a job, at least, in the short-run. In our example, a high wage earner (a low wage earner) would increase his/her income by 10 per cent (15 per cent) through re-employment.

Figure 1. *Replacement rate and incentives to search for a job*



The difference between the post-unemployment wages and the pre-unemployment wages may change the ranging about whether the high wage earners have higher incentives for job search than the low wage earners have. When the incentives are measured by the replacement rate the high wage earners have better incentives than the low wage earners. When the incentives are calculated by using the (hypothetical) post-unemployment wages, the low wage earners may have better incentives for job search than the high wage earners. This may happen, if the seniority rules are more important in high wage jobs than in low wage jobs. If this is the case, then the unemployment trap may be bigger problem among the high wage earners than the low wage earners. In public debate (see e.g. OECD 1994), the unemployment trap is thought to be the problem only among the low wage earners.

In this analysis, we have concentrated into the short-run incentives and therefore estimated the starting wage equation, using the wage rate offers accepted by re-employed workers. In the long-run, when re-employed workers have learned their jobs and have risen up in hierarchy, the relevant wage rate is obtained by analysing the general wage distribution.

In the earlier literature, Narendranathan and Steward (1993) have estimated the expected post-unemployment earnings by using more simple method. The expected post-unemployment earnings for each individual is defined as the mean wages of the vacancy-wage distribution (adjusted for educational level and age) faced by the individual. This was measured by the fitted values from the relevant earnings regression for each segment (they are defined by five broad occupational groups) of labour market. It was assumed in their analysis that each individual

concentrates his job searching efforts in one particular segment of the labour market.

We have used a different method and analysed the starting wage distribution, focusing on the short-run incentives. Our estimation results for the starting wage-equation suggest that the education and the pre-unemployment work experience are the most essential factors affecting the post-unemployment wage rate. According to our comparison, the post-unemployment wages are much lower on average than the wages in general. In addition, the starting wage distribution is much narrower than the general wage distribution. This suggests that job seekers' incentives, at least short-run, calculated from the general wage distribution differ from their incentives calculated from the starting wage distribution. Use of the general wage rate may therefore overestimate the incentives for job search and potentially underestimate the effects of the incentives on the job finding probabilities in the duration model.

We then assess the frequency of the unemployment trap by estimating how much household's disposable income would increase if the unemployed member found a job with her or his expected starting wage rate. If the unemployment trap is defined so that an unemployed worker is in the trap when she or he is unable to increase the household's disposable income more than 10 % through re-employment, about 15 % of the unemployed in Finland were in the unemployment trap in the early 1990's. Almost all of them who were in the unemployment trap received the earnings related unemployment benefits. Their household's disposable income was much higher than that of those unemployed who received the basic unemployment assistance.

To analyse factors affecting the transition out of unemployment to employment in open labour market, we estimate unemployment duration using a semi-parametric proportional risk model. The duration models, which include the expected gain of re-employment as one of the regressors, are estimated separately for years 1988, 1990 and 1992. Estimation results suggest that an increase of 10 % in the expected gain of re-employment, measured by the ratio of the expected household's disposable income after re-employment to the actual household's disposable income during unemployment, increases the conditional probability of leaving unemployment by 5 %, 7 % and 9 % in 1988, 1990 and 1992, respectively. Thus, taking the business cycle in the period into account, it seems that the impact of economic incentives on re-employment is higher in the recession than in the boom.

2. Data

The empirical analysis is based on two micro-level data sets constructed by Statistics Finland. The first one (named UP) consists of a sample from persons who have been unemployed in recent years. It is used when analyzing labour market transitions and the determinants of post-unemployment wages. The second one (named DLF) consists of a sample from the labour force and forms a comparable source that helps us to compare the general wage distribution and the post-unemployment wage (the starting wage) distribution.

To be included in the UP, persons must have a terminated spell of unemployment either in 1988, 1990 or 1992. Our samples are thus drawn from the outflow cohorts leaving unemployment registers at very different points in time. In many studies on unemployment duration the sample is drawn from the inflow to the unemployment registers (see e.g. Carling et al, 1996). It is well-known that the method to draw a sample may affect the results (see Chesher and Lancaster, 1983). In the stationary state, however, the inflow and the outflow sample makes no difference. To compare the inflow and the outflow sample in our case it should be remembered that an unemployment spell can terminate for several reasons: an unemployed worker can find a new job in the open labour market, she/he can participate in manpower programs, or she/he can leave the labour force. The outflow sample, thus, contains persons whose unemployment interrupted only temporarily as a result of participation in manpower programs, persons who left the labour force and persons who succeeded in job search. Since the level of different manpower programs was very high implying a large number of terminated unemployment spells, since many unemployed left the labour force and since the long-term unemployment rate was very low, the outflow sample does not underestimate significantly the share of the long-term unemployed compared to the inflow sample (see appendix 1).

Our sampling criteria, of course, imply that those who have been unemployed continuously the whole year concerned are excluded from the population from which the sample is drawn. If job seekers with a long unemployment spell were more passive to participate in the manpower programs, the sample design may affect the duration analysis. Unemployment spells in Finland, however, are regularly terminated in temporary employment by the labour administrative measures targeted usually to the long-term unemployed. Consequently, the unemployment spells longer than one year are quite rare in practice. Therefore, the data available is likely to serve as a good representation of reality faced by the unemployed.

The UP data set contains detailed information on the periods of unemployment, periods in manpower programs, and the personal characteristics of job applicants

gathered by employment authorities. The data was further complemented by access to the Tax Register Data and to the Longitudinal Worker Database of Statistics Finland. These data sets include the variables for the socio-economic background and the gross and net income, among others. The data collected covers the period 1987-1993, and contained initially about 5000 observations in each three sub-samples.

Another data set, the DLF was drawn from the entire Finnish population between ages of 13 and 67 in 1990. The same set of variables as the UP includes was collected for the period 1987-1993. Sample size is 5000 observations.

An exceptional feature of both data sets is that they include detailed income statistics, not only for the actually sampled individuals, but also for their spouses. Income and tax statistics for spouses are unfortunately available only for the period 1990-1993. Moreover, since the data contains also information on transfer payments to the households, the UP provides an opportunity to consider changes in disposable income of the households caused by labour market transitions with an accuracy that is exceptional in empirical analysis. For the period 1987-1990 we have information about individual gross and after tax earnings.

The income statistics were collected from the Tax Register Data containing income information on the annual basis. In order to construct monthly wages, we have divided annual salaries by the number of working months. This, of course, produces some measurement errors in the wage variables. In addition, calculating monthly wages from the annual income statistics induces some further problems. In the context of post-unemployment wages, we had difficulties to separate two distinct wage rates when a re-employed person was employed by the labour administrative measure during the same year or his pre-unemployment job was terminated in the same year. This is because the annual income statistics provide information only on the earnings accumulated during a particular year.

When we observed two (or more) different jobs during one year we tried to solve two (or more) different wage rates in the first place by utilizing the longitudinal nature of the data set. This suggests to use income information relating to the consecutive years to separate different wage rates. If this procedure failed and if a re-employed person was employed by the labour training during the same year, we used the mean salaries of the local government workers as a wage rate for a temporary job of the labour administrative measure.[1] The reason for this is that a major part of the temporary jobs of the labour administrative measures is placed in the local governments.

[1] Mean salaries of local government workers across different levels of education for both sexes are used.

3. Unemployment Trap

When estimating the starting wage equation[2] (see appendix 2) and when analyzing the unemployment trap the samples 1988, 1990 and 1992 in the UP data are combined into one data set which is treated like a pooled cross-section consisting of cohorts 1988, 1990 and 1992. Since we will concentrate on the short-run unemployment trap the hypothetical household's disposable income while employed is measured by the post-unemployment wage rate.

We firstly compare how the starting wage distribution and the general wage distribution differ. In the analysis, all wages are expressed in 1992 money by using the Earnings Index, computed by Statistics Finland, as a deflator.

Figure 2 shows that the general wage distribution is close to log-normal, whereas the starting wages are concentrated on the low rates producing skewness on the left of the distribution. This may be a result of an important role of the job tenature in the determination of the wage profile in the long run. Furthermore, thickness of the righ-hand tail of the distribution of the post-unemployment wages indicates that a number of the re-employed have received rather high wages right after re-employment.[3]

It is clear that the starting wages are much lower on average than the general wages. This implies that if the post-unemployment household's disposable income was calculated from the wage model estimated by using the general wage distribution, one would over-estimate the economic incentives of unemployed persons for job search in general. To get more accurate estimates we use the starting wage model to estimate the post-unemployment wage. The estimation results of the starting wage equation are presented in appendix 2.

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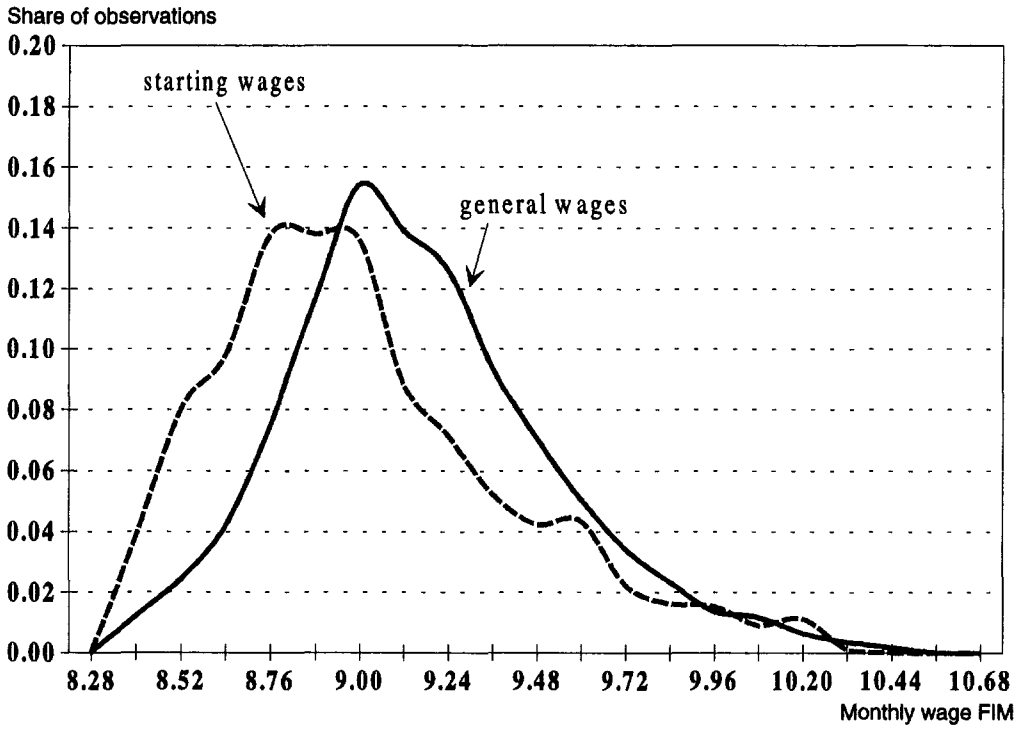
[2] Although we have the panel data set the different years are pooled together (using the earnings index) when estimating the starting wage equation. The reason is that we want to concentrate on short-run incentives and not on the dynamic development of the post-unemployment wages over duration of the re-employment spells.

[3] However, this is partly due to measurement errors in post-unemployment wages because we knew the duration of a new job only with an accuracy of one month when annual earnings were divided into the monthly wages. In addition, some workers are likely to have worked overtime or to have been paid on a piecework basis during the year concerned resulting upward bias in the estimates of regular wage rates.

Figure 2. *The starting wage distribution and the general wage distribution; logarithmic scale*



With the starting wage equation we can estimate the expected post-unemployment wages for each job seeker. We then calculate the household's disposable income as follows. Firstly, by taking into account taxation and the tax rules, the expected post-unemployment net earnings were obtained. After adding the spouse's net income and the household's transfers from the central and the local governments and the charges for child's day care,[4] we get the household's expected post-unemployment disposable income. We take into account, in addition, that the household's transfers and the charges for child's day care are usually means-tested, i.e. we take into account the determination rules. In the same way we can calculate the household's disposable income when a person is unemployed. In this case the starting wage rate is, of course, replaced by unemployment benefits.[5]

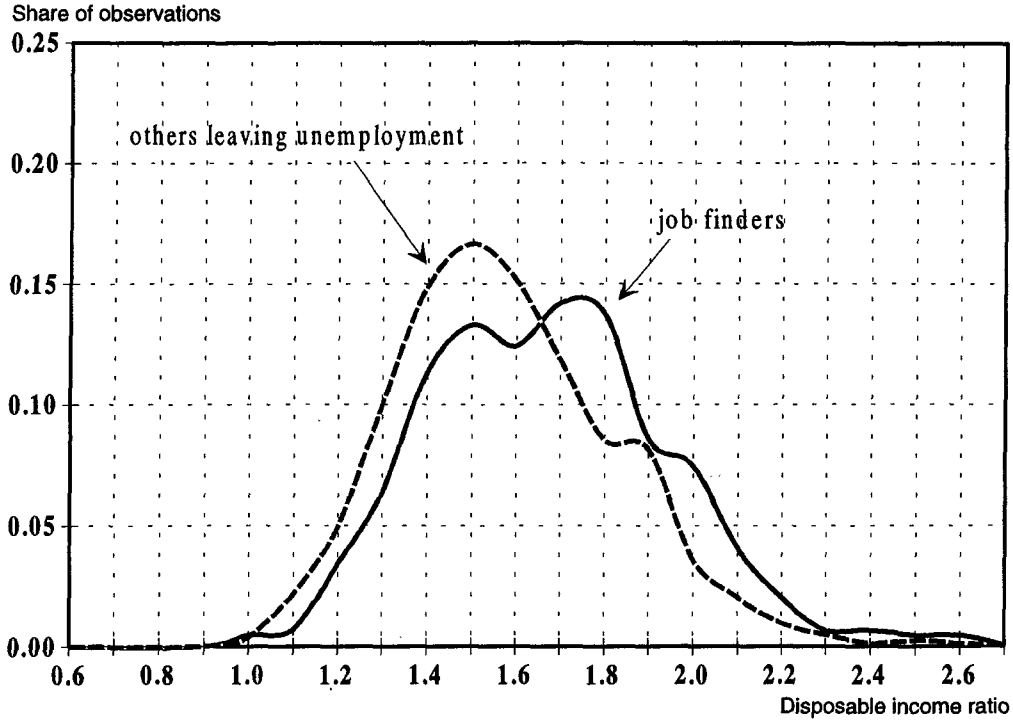
The economic incentives for job search are measured by the disposable income ratio which is calculated by dividing the expected post-unemployment

[4] In Finland, charges for child's day care are mean-tested causing very high effective marginal tax rates to the household with small children.

[5] If the household's calculated disposable income is less than the minimum norm level provided by the law, we have used the norm level. We, thus, assume that the household has received a full amount of the income transfers.

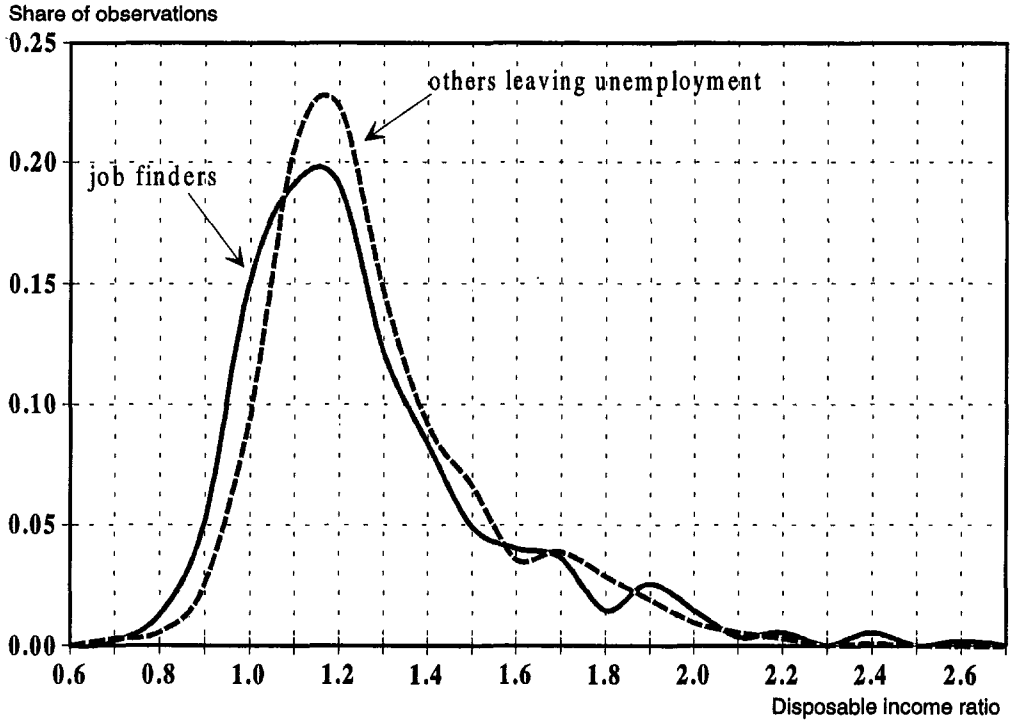
household's disposable income by the prevailing household's disposable income when a person is unemployed, i.e. the economic incentives are measured by "the inverse of replacement rate" in which the wage rate is the expected post-unemployment (or starting) wage rate. The distributions of the estimated household's disposable income ratio are presented in figures 3 and 4 (see Kyyrä (1998) for details). Figure 3 considers the non-receivers of unemployment insurance whereas figure 4 shows the picture for the receivers of unemployment insurance.

Figure 3. *Distribution of the estimated household disposable income ratio; the non-receivers of the unemployment insurance*



The non-receivers of the unemployment insurance could increase their household's disposable income about 50-70 per cent, on average, if they were able to find a job at their expected starting wage. The economic incentives of those who have found a job in the open labour market have been better than the economic incentives of those who have ended unemployment through other canals.

Figure 4. *Distribution of the estimated household disposable income ratio; the receivers of the unemployment insurance*



The receivers of the unemployment insurance, in turn, could increase their household's disposable income about 10-30 per cent, on average, if they were able to find a job. The economic incentives of the re-employed and the others are about the same.

The comparison of the receivers' incentives and the non-receivers' incentives reveals that the higher the benefit level during unemployment the lower the incentives for job search. This result is consistent with our reasoning in introduction (see figure 1).

An unemployed person who has small children and whose spouse is employed has much lower economic incentives to re-employ than an average job searcher. Another group with low incentives is single-parent households with young children.[6]

How common phenomenon is the unemployment trap? This, of course, depends on the definition. If the unemployment trap refers to a situation where an unemployed job searcher is unable to increase at all his/her household's disposable income through re-employment, about 20 to 30 per cent (only a few

[6] Detailed results available on request.

per cent) of the receivers of unemployment benefits (of the non-receivers of unemployment benefits) are in the unemployment trap. If the unemployment trap refers to a situation where an unemployed job searcher is able to increase his/her household's disposable income less than 10 per cent, above figures are about 20 per cent and about 5 per cent, respectively.

In next section, we turn to analyze how the economic incentives affect the job finding probabilities of unemployed job searchers.

4. Duration Model

To analyze the factors affecting the transition out of unemployment to employment in the open labour market, we estimate a semi-parametric competing risks model. The focus of attention in modelling unemployment durations is on the conditional probability of leaving unemployment to employment, known as the hazard function. The statistical model adopted for this study is the Cox's proportional hazard model (Cox, 1972).

In the model, the continuous hazard $h_i(t|\mathbf{x}_i)$ is defined as

$$(1)\ h_i(t|\mathbf{x}_i) = h_0(t)\exp[(\mathbf{x}_i(t)'\beta],$$

where $h_0(t)$ is the continuous unrestricted baseline hazard at time t, capturing the duration dependence of the hazard, $\mathbf{x}_i(t)$ is the vector of (possibly time-dependent) explanatory variables for individual i, t is the realisation of a random variable T measuring unemployment duration and β is the vector of parameters.

Define next the discrete or grouped hazard, $\lambda(t|\mathbf{x}_i)$, as the probability of a transition into employment taking place in the interval [t-1, t), conditional on being unemployed until t-1. Using the well known relation between the hazard and the survivor function, it follows that

$$(2)\ \lambda(t|\mathbf{x}_i) = P(\ T_i<t|T_i \geq t-1,\mathbf{x}_i) = 1 - \exp\{\ -\exp[(\mathbf{x}_i(t)'\beta + \alpha(t)]\ \},$$

where $\alpha(t) = \ln[-\int_{t-1}^{t} h_0(u)du\ ]$.

The equation (2) is known as the grouped hazard specification proposed by Prentice and Gloeckler (1978). The above specification means that within each time interval the baseline hazard and the covariates are constant, but between the time intervals they can vary freely.

The likelihood contribution of individual i with observed duration m_i is

$$(3)\ L_i = \{\ \lambda_{m_i} \prod_{t=1}^{m_i-1}(1-\lambda_t)\ \}^{d_i}\{\ \prod_{t=1}^{m_i}(1-\lambda_t)\ \}^{1-d_i},$$

where the indicator variable d_i equals unity if the duration is completed and zero otherwise (right censored observations).[7] The log-likelihood is maximised with respect to the vector of parameters (α,β). The model specifies the determinants of a single risk, i.e. the conditional probability of leaving unemployment. Here the aim is to estimate the hazard rate out of unemployment into employment. Under the assumption of independent risks, this can be done by treating all the other exit channels except employment as censored observations.

The above model specification assumes that all individual heterogeneity is due to the observed variables. There may be, however, unobserved source of heterogeneity which may cause biased "negative duration dependency".[8] In this paper the problem is partly circumvented by adopting a semi-parametric approach and using a flexible hazard defined in equation 2. The rich data set also reduces the effect of the unobserved heterogeneity.

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[7] Note that the right censoring is assumed to take place in the end of the interval m. This assumption means that the likelihood can be estimated by using generalized linear model GLM (see e.g. Aitkin, Anderson, Francis and Hide, 1989). In some studies the censoring is assumed to take place in the beginning of the period (see e.g. Arulampalam and Steward, 1995).

[8] The standard way of dealing with neglected heterogeneity is to assume that an unobserved random variable, which is constant over time and independent of the observed covariates, enters the hazard multiplicatively. With an additional assumption regarding the distribution of this unobserved component this kind of model can be estimated (see e.g. Lancaster, 1990). It is not clear, however, how the heterogeneity component improves the analysis (see e.g. Mayer, 1990, and Narendranathan and Steward, 1993, for discussion of the topic).

5. Results

The results of the semi-parametric competing risks model for the three different cohorts are presented in table 1 (see Rantala (1998) for details). Some descriptive statistics for variables in the model are presented in appendix 3. The most interesting variables like the expected household's disposable income ratio (HDIE/HDIU), the actual household's disposable income while unemployed (HDIU)[9], the household's total debt (Debt), the local vacancy-unemployment ratio (V/U) and the share of the number of participants in the manpower programs organised by the local employment offices (MPP/U) are allowed to take different values in each time of the spell.

Table 1. Estimation results of the duration model

	1992		1990		1988	
Regressor	Coeff. [a]	Standard error	Coeff. [a]	Standard error	Coeff. [a]	Standard error
Binary regressors[b]						
Age						
Less than 20 years	-0.010	0.120	0.565***	0.076	0.607***	0.063
20 to 25 years	0.103	0.076	0.274***	0.058	0.341***	0.049
53 to 55 years	-0.110	0.154	-0.128	0.120	-0.322***	0.112
Over 55 years	-0.464***	0.150	-0.919***	0.117	-0.677***	0.116
Female	0.087*	0.061	0.200***	0.049	0.087*	0.043
Reside in countryside	0.051**	0.061	0.006	0.048	0.096**	0.042
Long commute	0.359	0.064	0.218***	0.050	0.242***	0.042
A change in residence	0.086*	0.100	0.134**	0.067	-0.012	0.059
'Profession'						
Unskilled	-0.144**	0.061	-0.128**	0.049	-0.187***	0.042
Nursing	0.622***	0.128	0.173***	0.143	0.350***	0.128
Higher education	0.257*	0.142	-0.399***	0.156	-0.505***	0.134
Pre-unemployment state						
Work→temp. laid-off	1.309***	0.069	0.862***	0.072	0.694***	0.067
Outside the labour force	-0.231***	0.079	-0.182***	0.060	-0.399***	0.054
Employed by LAM [c]	-1.354***	0.195	-0.236***	0.118	-0.532***	0.107
In training course	-1.062**	0.445	0.026	0.200	0.349***	0.113
First LAM employment [c]	0.499**	0.256	-0.120	0.154	-0.094	0.113
First training course [c]	0.881*	0.472	0.074	0.244	-	-

[9] In the starting wage equation the three cohorts were pooled into one data set. In our duration model, however, the expected starting wages are calculated using the parameter estimates of the starting wage equation such that the wages are lower in 1988 than in 1990 and in 1992 and that wages in 1990 are lower than in 1992. We have, thus, used the Earnings Index backwards. In the wage estimation all wages are expressed in 1992 money.

	1992		1990		1988	
Regressor	Coeff. [a]	Standard error	Coeff. [a]	Standard error	Coeff. [a]	Standard error
LAM empl. terminated [c]	0.400	0.308	-0.330	0.215	0.024	0.200
Reduced ability to work	-0.286*	0.159	-0.754***	0.105	-0.466***	0.091
>2 unemployment spells	0.179***	0.070	0.127***	0.050	-	-
Continuous regressors						
ln(HDIE/HDIU) [d]	0.931***	0.165	0.730***	0.132	0.458***	0.116
ln(HDIU) [d]	0.193***	0.057	0.174***	0.050	0.239***	0.069
ln(Debt) [d]	0.014***	0.005	0.012***	0.004	-	-
ln(V/U) [e]	-1.22***	0.054	-0.102***	0.032	0.293***	0.024
ln(MPP/U) [e]	-0.03	0.068	-0.364***	0.067	-0.092***	0.011
Time-dep. regressors [f]						
D9	0.051	0.359	0.254	0.493	-0.016	0.308
D10	-0.118	0.361	-0.424	0.668	-0.407	0.297
D11	-1.147***	0.424	-0.140	0.708	-0.016	0.343
D12	-1.013**	0.493	-0.403	0.910	-0.276	0.427
D13	-0.669	0.914	0.604	0.921	0.434	0.616
N4	-0.630***	0.303	-1.226	0.294	-0.423	0.272
N5	-0.074	0.315	-0.617	0.462	0.095	0.255
N6	-0.169	0.304	-0.088	0.401	0.153	0.286
N7	0.008	0.342	0.731*	0.414	0.293	0.361
Estimates for α_i						
1. month	-3.378***	0.535	-1.514***	0.442	-3.700***	0.565
2. month	-3.456***	0.534	-1.279***	0.442	-3.488***	0.565
3. month	-3.410***	0.534	-1.349***	0.443	-3.602***	0.566
4. month	-3.378***	0.536	-1.401***	0.445	-3.683***	0.567
5. month	-3.771***	0.541	-1.588***	0.450	-3.654***	0.569
6. month	-3.445***	0.539	-1.426***	0.453	-3.533***	0.570
7. month	-3.640***	0.544	-1.581***	0.462	-3.611***	0.574
8. month	-3.497***	0.543	-1.594***	0.470	-3.862***	0.576
9. month	-4.028***	0.614	-2.125***	0.579	-3.998***	0.606
10. month	-3.891***	0.613	-2.161***	0.624	-3.478***	0.597
11. month	-3.641***	0.612	-2.127***	0.664	-3.653***	0.618
12. month	-3.729***	0.656	-1.960***	0.723	-3.609***	0.637
13. month	-4.622***	0.886	-2.053***	0.845	-4.399***	0.753
14. month	-4.601***	0.689	-1.911***	0.723	-4.666***	0.694
Log likelihood	8745		9538		12710	

a) (*) denotes a parameter significant at the 10% level, (**) at the 5% level, and (***) at the 1% level.

b) The reference group is the unemployed males between ages of 26 and 52, living at town, whose "future" job will be found in the place of residence, who have no changes in residence, who have a vocational level of technical education, who were in work before unemployment, who have normal ability to work, who haven't terminated LAM employment periods, who have at most two spells of unemployment (1987 forward). See reference groups for the interaction terms also.

c) *LAM* = labour administrative measures. The reference group for the interaction terms *First LAM employment* and *First training course* is unemployed workers who were either employed by labour administrative measures or in a training course before the unemployment spell. The reference group for the term of *LAM employment terminated* consists of those who were in LAM before the unemployment spell.
d) *HDIE* = Household's disposable monthly income while hypothetically employed with the estimated post-unemployment wage rate. *HDIU* = Household's disposable monthly income while unemployed. *Debt* is the sum of the debts of household members. However, all incomes in 1988 are expressed in terms of individual income.
e) *V*, *U* and *MPP* are the number of open vacancies at the employment offices, the number of registered unemployed job applicants (not including those who are temporarily laid-off) and the number of people in the manpower programs, respectively.
f) D_j=1, j=9, ... ,13, if the unemployed worker is supposed to receive UI benefits and if his or her unemployment spell has persisted j months. N_k=1, k=4, ... ,7, is defined similarly but restricted to cover the 25 years old and younger unemployed workers only.

When comparing the estimation results of the three different cohorts, two aspects are forth to point out. Firstly, in the period of the economic boom the age structure seems to affect the conditional probability to find a job in the open labour market more heavily than in the economic recession. Secondly, in the recession the effects of the job search increase. A much stronger effect of the expected household's disposable income while employed is found in the 1992 cohort than in the 1990 or in the 1988 cohorts.[10] The weakest effect of the expected household's disposable income is found in the 1988 cohort. We obtain, thus, totally opposite results to those of Arulampalam and Stewart (1995). This is, maybe, due to the fact that in Arulampalam and Stewart, the measure of the expected earnings in the market in which the individual is searching is constructed from the earnings regression by broad occupational group (see also Narendranathan et al. 1985 and Narendranathan and Stewart 1993). We have, in turn, estimated the individual starting wage equation using the micro data with the relevant set of control variables.

To be more precise, according to the estimation results, a 10 % increase in the expected household's disposable income while employed increases the conditional monthly probability of finding a job by about 9 %, 7 % and 5 % in the cohorts 1992, 1990 and 1988, respectively. A likelihood ratio statistic of the income ratio restriction that the effects of the actual household's disposable income while unemployed and the expected household's disposable income while employed are equal and opposite sign is rejected for all cohorts. The household's

[10] It should be noted that in the cohort 1988 we have no data on the household's disposable income. Therefore, we have used the individual after tax income. We have repeated the analysis by using the individual after tax income instead of the household's disposable income in the cohorts 1990 and 1992. The results are almost the same (detailed results available on request).

total debt increases the conditional monthly probability of finding a job as well. A 10 % increase in debt increases the probability by more than 1 %.

The 'local' vacancy-unemployment ratio seems to have a negative effect on the conditional probability of finding a job during recession and a positive effect in 1988. This may be due to the fact that we have not properly specified regional variable in the data set.[11] It should be realised that this is not an unusual result (see e.g. Lilja (1993) and Meyer (1990)). This result is, however, against the evidence of Arulampalam and Stewart (1995). They found that in the period of high unemployment, the constraint on individual exit from unemployment to employment imposed by the lack of job offers was found to have increased in importance relative to the period of low unemployment.

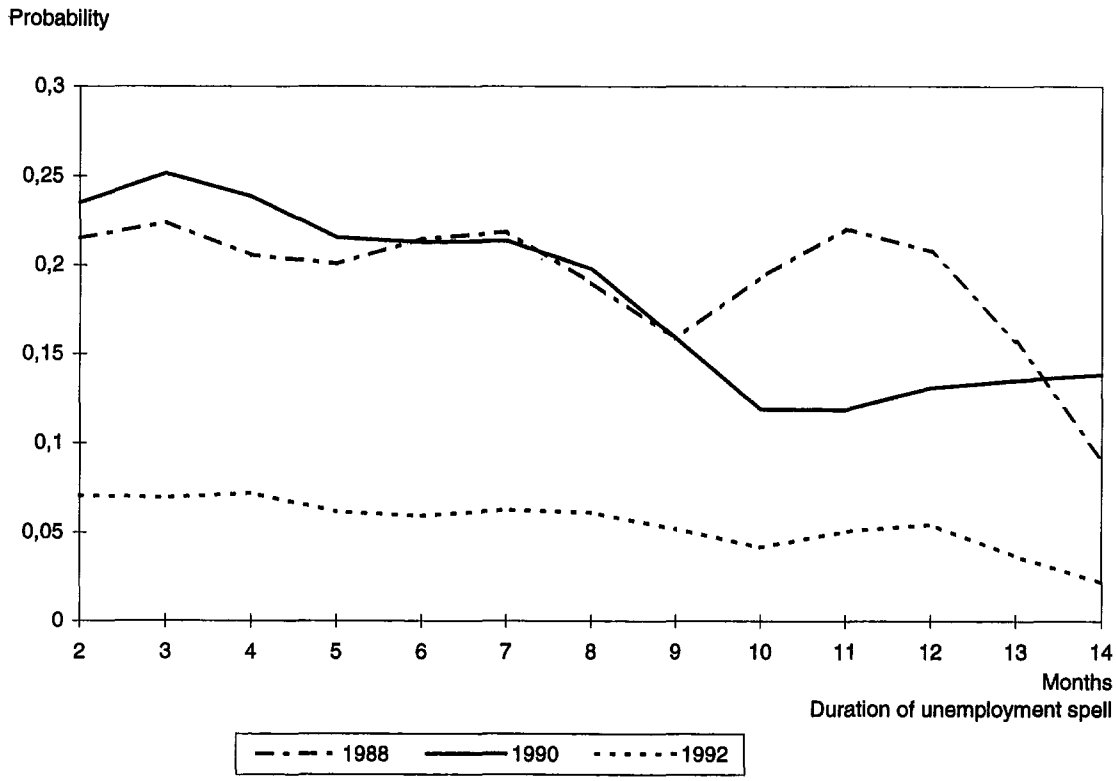
The scaled[12] and smoothed (2 point moving average) baseline monthly hazards for the semi-parametric competing risks model in the three different cohorts (Table 1 columns 1, 2 and 3) are plotted in Figure 5. Since the models used are of the proportional hazard type, the set of the characteristics (of a reference group) chosen acts merely to fix the scale on vertical axis and does not alter the shapes of the three hazards. We have tried to fix a reference group such that we could, with caution, compare the scale of the three cohorts as well.

It is not surprising that the hazard function has dropped during the severe recession in 1992 when the unemployment rate was about 14 per cent and still rapidly increasing. According to the statistical tests the hypothesis that the hazard functions are horizontal lines cannot be rejected although the job finding probabilities seem to be decreasing over unemployment spell.

[11] Our regional variable consists of five regions. This is not enough to control the demand side of the local labour market.

[12] A reference group is defined in the text under the table 1.

Figure 5. *The estimated conditional probability of finding a job (i.e. the scaled and smoothed monthly hazard)*



6. Conclusions

The empirical analysis is based on the individual panel data constructed by Statistics Finland. To be included the data, every individuals must have a terminated spell of unemployment either in 1988, 1990 or 1992. Our samples are thus drawn from the outflow cohorts leaving unemployment registers at very different points in time. Our sampling criteria, of course, implies that those who have been unemployed continuously the whole year concerned are excluded from the population from which the sample is drawn. If job seekers with a long unemployment spell were more passive to participate in the manpower programs, the sample design may affect the duration analysis. Unemployment spells in Finland, however, are regularly terminated in temporary employment by the labour administrative measures targeted usually to the long-term unemployed. Consequently, the unemployment spells longer than one year are quite rare in practice. Therefore, the data available is likely to serve as a good representation of reality faced by the unemployed.

The data set contains detailed information on the periods of unemployment, periods in manpower programs, and the personal characteristics of job applicants gathered by employment authorities. An exceptional feature of the data is that it includes detailed income statistics, not only for the actually sampled individuals, but also for their spouses. Moreover, since the data contains also information on transfer payments to the households, it provides an opportunity to consider changes in disposable income of the households caused by labour market transitions with an accuracy that is exceptional in empirical analysis.

We have focused on the short-run incentives of the job search. The starting wage equation, is, thus, estimated to obtain the expected post-unemployment wage rate for the unemployed job searchers. The frequency of the unemployment trap is assessed by estimating how much household's disposable income would increase if the unemployed member found a job with her or his expected starting wage rate. If the unemployment trap is defined so that an unemployed worker is in the trap when she or he is unable to increase the household's disposable income more than 10 % through employment, about 15 % of the unemployed in Finland were in the unemployment trap in the early 1990's.

To analyse factors affecting the transition out of unemployment to employment in open labour market, we estimate unemployment duration using a semi-parametric proportional risk model. The duration models, which include the expected gain of re-employment as one of the regressors, are estimated separately for years 1988, 1990 and 1992. Estimation results suggest that an increase of 10 % in the expected gain of re-employment, measured by the ratio of the expected household's disposable income after re-employment to the actual household's

disposable income during unemployment, increases the conditional probability of leaving unemployment by 5 %, 7 % and 9 % in 1988, 1990 and 1992, respectively. Thus, taking the business cycle in the period into account, it seems that the impact of economic incentives on re-employment is higher in the recession than in the boom.

This kind of rich data set gives opportunity to further work. It would be interesting to compare whether the short-run economic incentives are more important in the job search than the long-run incentives.

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Appendix 1: The number of unemployed in different categories of unemployment spell duration (figure A1) and the comparison of the inflow into the unemployment and the outflow from the unemployment (figure A2) in Finland

Figure A1.

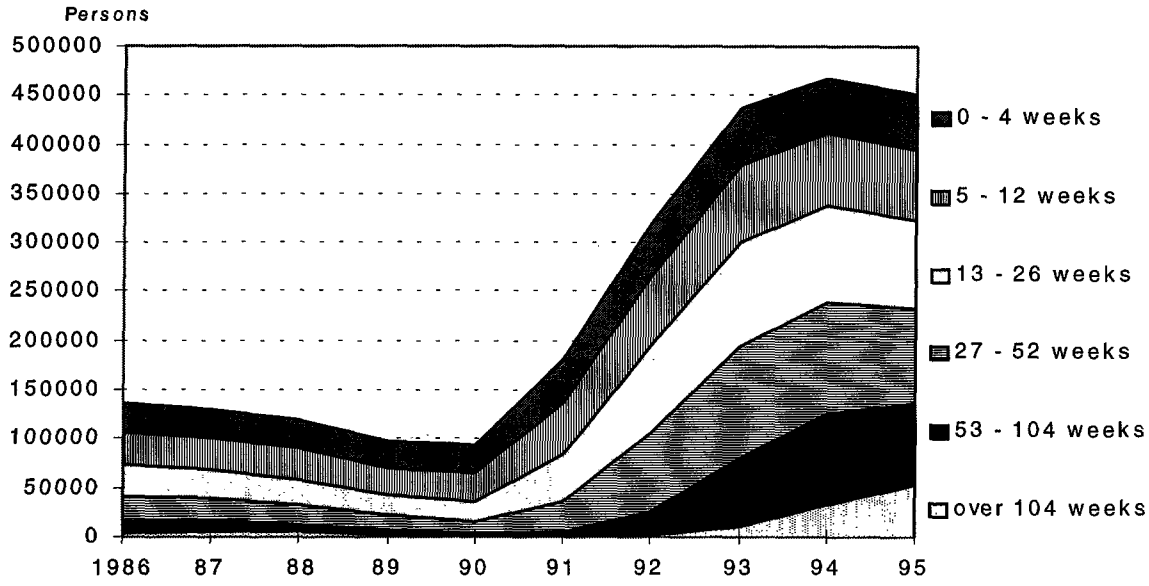

Figure A2.

Appendix 2: Estimation results of the starting wage equation obtained by using the Heckman's two-step method with the probit selection rate (e.g. Maddala 1983).

SELECTION EQUATION			WAGE EQUATION		
Regressor	Coeff.[a]	P-value	Regressor	Coeff.[b]	P-value
Intercept	0.34783	0.16731	Intercept	8.72300	0.00001
Age	0.04620	0.00144	Lower vocational educ.	0.09839	0.00102
$(Age/10)^2$	-0.06890	0.00047	Upper vocational educ.	0.14826	0.00003
log Regional unempl. rate	-0.44093	0.00001	Lower higher education	0.34407	0.00001
log Industry unempl. rate	-0.16788	0.00007	Upper higher education	0.47286	0.00001
sqrt Unempl benefits	-0.14514	0.00001	Nursing × Vocat. educ.	0.14736	0.01573
sqrt Unempl. Months	-0.18927	0.00001	Work experience	0.02729	0.00001
sqrt Spouse's income	0.10790	0.00001	$(Experience/10)^2$	-0.04573	0.00006
Lower vocational educ.	0.17008	0.00157	Female × experience	-0.02186	0.00026
Upper vocational educ.	0.45117	0.00001	Female $\times(experience/10)^2$	0.04216	0.01225
Lower higher education	0.59916	0.00001	Female	-0.00806	0.82943
Upper higher education	0.48370	0.00285	Married	0.07236	0.00402
Nursing × Vocat. educ.	0.66388	0.00003	Capital area	0.03862	0.16985
Female	-0.02184	0.65747	Reduced ability to work	-0.06591	0.20381
Reduced ability to work	-0.47710	0.00001	Agriculture	-0.16959	0.02688
Child under school-age	-0.00373	0.95354	Food industry	-0.15164	0.03733
			Mechanical engineering	-0.10692	0.07964
			Other industry	-0.17482	0.00325
			Trade	-0.15448	0.00589
			Real estate	-0.11805	0.08420
			Inverse of Mill's ratio, λ	0.06297	0.04530
			Standard error, σ	0.35763	
			Correlation, ρ	0.17609	
Log-Likelihood	-2124.329		R^2 (Adj. R^2)	0.18245	(.15895)
Number of observations	4213		Number of observations	1182	

[a] ML estimates for the probit model.
[b] Estimates of Heckman's two-step method. Dependent variable is the log post-unemployment wage (FIM/month).
Notes: Unemployment benefits are monthly averages. Spouse's income is the annual income in 10,000 FIM. Unemployment months is the number of months registered as an unmployed job applicant in the previous year. Work experience = age - 7 - years of schooling.. Reference industry is public administration. All industry indicators with an insignificant parameter estimate are excluded from the table.

Appendix 3: Some descriptive statistics in the duration model by exit channel out of unemployment

	1988			1990			1992		
	Employ-ment	Man-power pro-gramme	With-drawal from the labour force	Employ-ment	Man-power pro-gramme	With-drawal from the labour force	Employ-ment	Man-power pro-gramme	With-drawal from the labour force
Observations	3015	364	469	2325	396	375	1549	973	574
Age									
Less than 20 years	12.4	17.9	29.9	12.6	11.4	30.7	6.3	15.0	31.4
20-25 years	23.6	27.2	19.8	21.6	17.9	16.3	19.7	18.1	23.7
26-52 years	58.3	52.2	33.5	58.9	63.1	33.3	68.1	61.2	31.5
53-55 years	3.0	1.9	4.2	3.2	4.0	4.0	2.9	27.7	2.8
Over 55 years	2.7	0.8	12.6	3.7	3.5	15.7	3.0	3.0	10.6
Women	42.9	50.5	51.4	44.7	47.7	51.5	39.2	43.7	50.2
Place of residence									
Countryside	31.3	40.4	32.8	30.5	36.6	32.3	28.5	28.7	27.4
Population centre	15.8	14.8	14.1	14.2	16.9	12.3	15.3	16.2	16.9
Town	52.9	44.8	53.1	55.3	46.5	55.5	56.2	55.1	55.7
'Long' way to work	31.8	18.7	10.2	25.2	11.1	8.3	23.8	8.2	3.8
A change in residence	11.7	11.8	6.8	11.7	7.6	9.9	7.5	7.5	5.7
'Profession'									
Unskilled	46.5	59.3	60.0	45.8	65.4	58.1	35.6	49.6	47.4
Nursing	2.0	0.2	1.1	2.5	0.2	1.3	5.3	1.1	1.9
Higher education	2.0	2.0	2.0	2.0	1.5	1.9	3.8	2.6	1.9
Entry channel to unemployment									
Employed (not laid-off)	39.1	31.6	29.2	44.2	40.4	40.6	42.3	41.9	34.2
Employed (laid-off) [a]	9.9	-	-	11.4	-	-	23.1	-	-
A job replacement programme	17.5	26.1	25.6	7.5	17.4	14.1	4.1	20.6	14.0
A training course	2.9	2.2	1.5	3.3	4.3	3.7	2.6	4.9	4.3
Outside the labour force	18.3	29.4	36.7	19.4	21.0	34.4	15.8	20.1	38.9
Unemployed	12.3	10.7	7.0	14.2	16.9	7.2	12.1	12.5	8.6
First LAM employment spell [b]	80.0	59.0	68.4	48.6	41.9	51.1	51.2	38.2	41.0
First training course [b]	-	-	-	66.7	53.5	73.0	88.4	63.3	88.1
LAM employment spell was interrupted [b]	5.1	13.7	9.8	14.7	10.3	14.9	22.0	17.6	15.1
Disability to work	4.4	11.3	10.2	4.2	17.9	11.7	2.7	7.0	6.1
Over 2 unemployment spells	-	-	-	25.8	26.0	16.5	17.6	20.2	13.4
Income variables									
ln(HDIU) [c]	-	-	-	8.53	8.52	8.42	8.74	8.64	8.50
ln(IDIU) [d]	7.91	7.91	7.88	8.05	8.06	8.03	8.18	8.18	8.13
ln(Debt) [e]	-	-	-	11.24	10.90	10.69	11.44	11.06	10.89

Individuals whose exit channel out of unemployment is not known are excluded. LAM = labour administrative measures.
a) Not including individuals who left for other destinations than employment.
b) A proportion out of those who have participated in a job replacement programme/ training course prior to the unemployment spell.
c) The log of the household's estimated disposable monthly income while unemployed.
d) The log of the individual's estimated disposable monthly income while unemployed.
e) The log of the household's annual debt.