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THE DETERMINANTS  
OF UNEMPLOYMENT  
DURATION BY  
GENDER IN FINLAND

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**Abstract:** This paper models unemployment durations for men and women in Finland using a nationally representative data set from 1997. We begin with a baseline model where durations are modelled using a single risk discrete time hazard model. These estimations are extended to a piecewise constant hazard model and to a competing risks model. The results indicate that young children as well as foreign citizenship have a prolonging effect on female unemployment periods. Education appears as a highly positive factor in reducing the duration of unemployment, particularly for women. The results also reveal the implications of regional labour market policy, as the propensity to exit unemployment is greatest in rural areas, but mostly explained by exits to active labour market programmes.

**Key words:** gender differences, employment, unemployment duration, labour market transitions, duration models

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**Tiivistelmä:** Tutkimuksessa mallinnetaan naisten ja miesten työttömyyden kestoa Suomessa. Empiirinen analyysi perustuu kattavaan yksilötason paneelidataseen, josta otokseen valitaan vuoden 1997 aikana työttömäksi tulleet. Osohenkilöiden työttömyysjaksoja tarkastellaan vuoden 1999 loppuun saakka. Estimoinnit suoritetaan ryhmiteltyä proportionaalisen riskin mallia käyttäen laajentaen tarkastelua myös kilpailevien riskien kehikoon, jossa voidaan huomioida työttömyyden eri päättymissyöt. Tulosten perusteella erityisesti pienet lapset ja ulkomaan kansalaisuus pidentävät naisten työttömyyden kestoa. Koulutus lyhentää huomattavasti työttömyysjaksoja ja tämä vaikutus korostuu erityisen voimakkaana naisilla. Tuloksista ilmenee myös Suomessa harjoitetun alueellisen työvoimapolitiikan seuraukset, sillä todennäköisyys poistua työttömyydestä on suurin maaseudulla, mutta valtaosa näistä poistumista suuntautuu aktiivisiin työvoimapolitiittisiin toimenpiteisiin.

**Asiasanat:** sukupuolierot, työllistyminen, työttömyyden kesto, työmarkkinasiirtymät, duraatiomallit



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# 1. Introduction

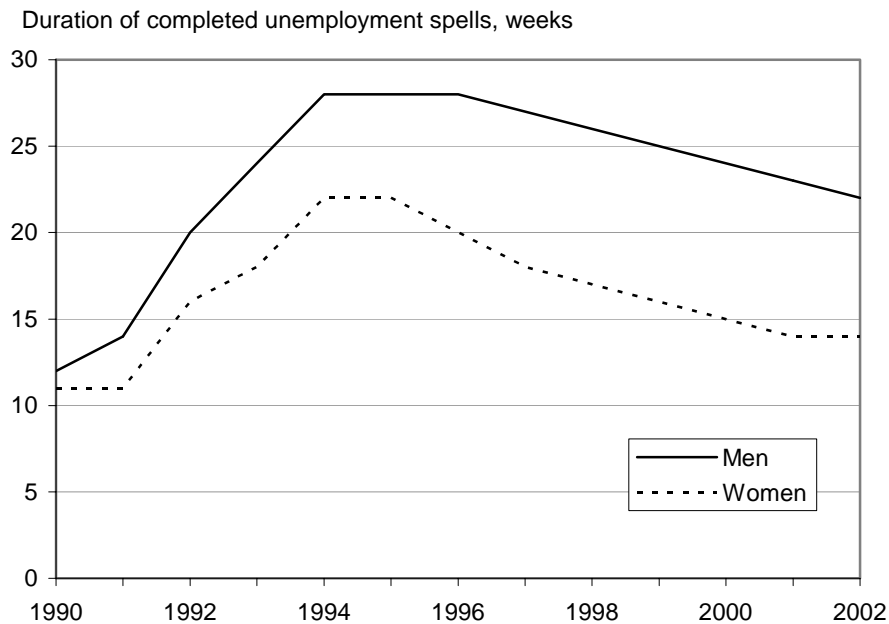
The persistence of high unemployment has recently become a major problem in many European countries. Higher unemployment rate has also induced longer unemployment durations. In Finland the average length of an unemployment period rapidly erupted from under 20 weeks at the beginning of 1990s to over 50 weeks at the beginning of 2000s (Figure 1). Statistics clearly show that on average unemployment periods tend to be longer for men than for women. This difference has expanded towards 2000s and is valid also where completed spells of unemployment are considered (Figure 2).

*Figure 1. Average duration of unemployment for the unemployed jobseekers at the employment service 1999–2002, weeks. Source: Ministry of Labour*



Concern has been expressed that prolonged unemployment periods can reduce economic efficiency by inducing loss of output and increasing social costs from unemployment. Thus, it is of great importance to study the determinants of unemployed individuals, who manage to find secure employment or exit unemployment by alternative routes. This paper presents evidence on the determinants of unemployment duration for men and women in Finland, using a nationally representative data set from 1997. The paper investigates the duration of unemployment spells ending in employment, participation in active labour market programmes and economic inactivity.

Figure 2. *Average duration of the completed spells of unemployment 1999–2002, weeks. Source: Ministry of Labour*



The demand for gender specific examination of unemployment arises from the growing participation rate of women in the European labour market. Within the last few decades women have demonstrated an increasing commitment to the labour market, but still have not achieved occupational equality. The concentration of female employment in specific sectors has not changed and Finland in particular, along with other Nordic countries, UK and Ireland, remains among the most occupationally segregated countries in Europe (Dijkstra, 1997). Thus, it is only natural to expect gender related behaviour also where unemployment is regarded.

Also, the traditional gender roles presumably place some pressure on men to settle for sub-optimal jobs in order to support their families and on women to stay at home or, if they choose to enter the labour force, to accept employment that does not overstress the family responsibilities. Because of these prevailing roles, it is logical to expect marriage and children to have differing effects on male and female behaviour in the labour market and, thus, differing effects on unemployment and unemployment duration.

Gender specific studies of unemployment duration are rare, exceptions being Lynch (1989) focusing on youth unemployment in the United States and Hildreth et al. (1998) focusing on unemployment in Britain. The determinants of unemployment duration in Britain, with consideration to gender, have also been studied e.g. by Böheim – Taylor (2000), who found that female unemployment spells tend to be shorter than male, but most of this is explained by exits to part-



time work and labour market withdrawal. A localized Finnish study focusing on gender differences in exit rates from unemployment in Vasa region finds that gender differences are foremost due to the closer labour market attachment of men, the family responsibilities affecting women and the traditional gender structure of the Finnish labour market (Gonzalo – Saarela, 1996). Other extensive Finnish contributions on unemployment duration, with no particular consideration for gender, are Lilja (1992) and Kettunen (1993). The present paper aims to shed light on gender related differences in unemployment duration in Finland on a national scale.

The paper is organised so that the second section introduces the data and the variables used. The empirical models are presented in the third section. A summary of the statistics and the results of the estimations are presented and interpreted in section four, and concluded in section five.

## 2. Description of the data

### 2.1 Data

This paper is based on data from Statistics Finland. This comprehensive data set consists of 350 000 Finns aged 12–75 and contains information from several official registers, including e.g. tax, pension, education and labour administration registers<sup>1</sup>. The information comprises individual demographic and socio-economic characteristics, details of unemployment and involvement in active labour market programmes etc. Altogether, over 200 variables are available.

The objective of this paper is to study the determinants of unemployment duration in Finland and the potential gender related differences therein. All individuals who registered as unemployed during the year 1997 were chosen for the sample. The size of this sample is 26 747 people. The data at hand cover the period to the end of 1999. Thus the unemployment period can start at any time during 1997, but all observed exits after the end of 1999 are treated as censored, exception being the implementation of the split population model. Individuals who exhibited unemployment beginning and ending on the same day were naturally excluded from the sample due to non-existent unemployment duration. Consequently only factually unemployed persons remain in the sample, which now contains 26 308 individuals. Out of these 25 435 unemployment periods were terminated within the observation period.

### 2.2 Variables

In this study the duration of unemployment is calculated as the difference between the first and last day of unemployment. However, particularly the definition of the expiration date is somewhat problematic. An unemployed person might exit momentarily to employment or active labour market programmes, but return back to unemployment in a matter of days. This behaviour shows up as several consecutive spells of unemployment. In this study we choose to combine two consecutive spells of unemployment if they are separated by less than 20 days. The duration of this combined spell is calculated as the sum of the durations of the single spells and the breaks between the spells. This definition has previously been used in e.g. Kyrrä (1999) and Rantala (1998)<sup>2</sup>.

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<sup>1</sup> The data is a random sample of 350 000 people taken from the entire Finnish population.

<sup>2</sup> When conducting the estimations with the simple definition of unemployment duration, we find only minor differences in the results compared to the specification utilising the “20-day rule”.

This procedure can also be justified as a technical solution for two reasons. First, there are some irregularities in the data as well as recording errors, most of which we can eliminate by using the “20-day rule”. Second, the Finnish labour market policy system is such that the *de facto* indefinite periods of unemployment are often artificially cut off by a brief exit to active labour market programmes. Thus, with this procedure we can correct some of this problem and eliminate the briefest breaks in the duration.

Using this definition we had to eliminate some observations (34 individuals) from the sample due to unemployment periods descending from 1996 by this same 20 day rule. We also distinguish between end-states employment, participation in active labour market programmes and economic inactivity. By the end of the observation period these end states were occupied by 10727, 7854 and 6854 people, respectively.

The independent variables consist of personal variables, such as age, marital status, the existence of young children in the household, education, income and citizenship. All of these variables are implied by Pencavel (1986), Killingsworth – Heckman (1986) and Altonji – Blank (1999) to affect both male and female labour supply. In particular marriage and the existence of young children are expected to create gender differences by increasing male and decreasing female labour supply and thus striving particularly men to seek employment more actively (Pencavel, 1986; Killingsworth – Heckman, 1986). We include some interaction dummies in order to catch the discrimination associated with both gender and age. Along with gender, race is also expected to influence labour market outcomes in a discriminatory manner (Altonji – Blank, 1999). We attempt to control for the effects of race by including a variable for citizenship, but admit that this variable is only a very rough estimate for the latent racial discrimination.

Some labour market related variables such as experience, unemployment history and unemployment benefits were included. The use of these variables is motivated by Hamermesh (1993) and by other empirical studies, e.g. Nilsen et al. (2000) and Hämäläinen (1998). Some occupational variables were also included, though one must be wary in interpreting these coefficients, since the Finnish labour market is extremely highly segregated gender-wise (Kolehmainen, 1999). Personal income was tried out, but excluded, because the variable correlated with several variables in the model. The breakdown of the data and all the independent variables with their mean values are described in Appendices 1 and 2.

### 3. Empirical models

Typically the theoretical framework concerning unemployment duration is the job-search approach (see e.g. Mortensen, 1970; Lancaster, 1990). In short, this approach assumes that the waiting time to re-employment or exiting unemployment by alternative routes is influenced by the probability of receiving a job offer and the individual's probability of accepting the offer, which depends on his/her reservation wage. It can be assumed, further, that either one or both of these attributes differ by gender, i.e. a specific worker might be more attractive to an employer depending on his/her gender and the worker's minimum acceptable wage might be affected by gender related factors. In addition, the gender exploration in this paper is also motivated by e.g. British results of shorter unemployment duration for women resulting from transitions to part-time work and economic inactivity (Böheim – Taylor, 2000).

The central concept in the analysis of duration data is the hazard function, which is the conditional probability of leaving unemployment in the next infinitesimal period given that individual is still unemployed, i.e.

$$h(t) = \lim_{\Delta t \rightarrow 0} \frac{\Pr(t \leq T < t + \Delta t \mid T \geq t)}{\Delta t} = \lim_{\Delta t \rightarrow 0} \frac{F(t + \Delta t) - F(t)}{\Delta t} \frac{1}{1 - F(t)} = \frac{f(t)}{1 - F(t)} = \frac{f(t)}{S(t)},$$

where  $f(t)$  is the probability density function,  $F(t)$  the distribution function and  $S(t)$  the survivor function. The survivor function gives the probability that unemployment spell exceeds  $t$ .

If the hazard rate is not constant over time, there is duration dependence. Positive duration dependence, i.e.  $h(t)/\Delta t > 0$ , means that the hazard increases in the course of time. This can result if the unemployed become increasingly desperate for a job and accept the first job offered. Negative duration dependence, i.e.  $h(t)/\Delta t < 0$ , means that the probability of exiting unemployment decreases with time. This might occur if the employers choose to discriminate against the long-term unemployed or if the individual's search activity decreases as the spell is prolonged.

There is some evidence that the probability of leaving unemployment decreases with the length of the spell (e.g. Lancaster, 1990) but it may not decrease monotonically. Carling et al. (1996) and Hui (1991), among others, show that the escape rate from unemployment increases, as the exhaustion time of benefits gets closer. This can be viewed in two ways. On the one hand the search activity of the unemployed increases and on the other hand the reservation wage decreases

as benefits are about to expire. Thus benefit systems, like the Finnish one, can actually induce this observed duration dependence.

In this paper we begin with a baseline single risk model, where the probability of leaving unemployment is considered but no account is given to the different labour market transitions which may have terminated the unemployment spell. We then adopt a split population survivor model, in which the probability of eventually exiting unemployment may not be equal to one. Finally, the estimations are extended to piecewise specifications of the competing risks model, where we can explicitly account for different destination states.

### 3.1 Single risk model

This paper considers two flexible forms for the baseline hazard. First, the semi-parametric Cox proportional hazard model is estimated, using an unrestricted baseline, along the lines of Meyer (1990) and Narendranathan and Stewart (1993). The explanatory variables will be included in the proportional hazard form, i.e. the hazard function depends on a vector of explanatory variables  $x$  with coefficients  $\beta$  and the baseline hazard  $h_0(t)$

$$h(t) = h_0(t) \exp\{x' \beta\}.$$

Next, to better observe the shape of the baseline we consider another non-parametric specification for the baseline hazard, the piecewise constant hazard function. This approach is viable e.g. when there are multiple tied failures in the data. In this model the time axis, i.e. unemployment duration, is divided into  $K$  intervals, here approximately three months each

$$h_0(t) = \begin{cases} \theta_1 & \text{if } 0 < t < c_1 \\ \theta_2 & \text{if } c_1 < t < c_2 \\ \vdots & \vdots \\ \theta_k & \text{if } c_{k-1} < t < \infty \end{cases}$$

where  $\theta_k$  are constants,  $c_k$  points in time,  $0 < c_1 < c_2 < \dots < c_{k-1} < \infty$ , and the baseline hazard is assumed to be constant within each interval, but can fluctuate freely between intervals.

Using a specification  $\theta_k = \exp(\gamma_k)$  the hazard may now be written as

$$h(t) = \exp(d_K \gamma_K) \exp\{x' \beta\} = \exp(x\beta + d_K \gamma_K),$$

where  $d_K = 1$  when duration falls within  $K^{\text{th}}$  interval, otherwise  $d_K = 0$ .

### 3.2 Split population model

With split population model we can take into account the fact that some fraction of the sample will never exit unemployment, so that the distribution of time until exit is relevant only for the remaining fraction of the sample. Hence we are able to exploit also the data on the individuals with infinite durations. Here the probability of eventual exit is an additional parameter to be estimated, and thus may be less than one<sup>3</sup>.

We introduce the split population framework by redefining the specific survivor function as  $S_m^j = 1 - P_j + P_j S_m$ , where  $P_j$  is the proportion of movers associated with destination  $j$ <sup>4</sup>. Following the computation in (Addison – Portugal, 2003) we obtain the single risk split-specific transition rate

$$h(t_i; x_i, G_i = 1) = \frac{f(t_i; x_i, G_i = 1)}{S(t_i; x_i, G_i = 1)} = \frac{p_i f(t_i; x_i, G_i = 1)}{1 - p_i + p_i S(t_i; x_i, G_i = 1)} = \frac{P(C_i = 1)}{P(C_i = 0)},$$

where  $G_i$  indicates whether individual  $i$  would or would not eventually exit unemployment and  $C_i$  indicates whether or not individual has exited unemployment by the end of the observation period. The standard hazard model is reached if  $P(G_i = 1) = p_i \rightarrow 1$ .

Although the approach that some fraction of unemployment periods last indefinitely is interesting and plausible, some remarks should be made regarding the Finnish unemployment system. The Finnish registry system is such that long periods of unemployment are eventually cut off by some, however brief, exit to active labour market policy. Therefore, we are unable to identify all of the infinite unemployment periods from our data and are not able to utilize the properties of the split population model optimally.

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<sup>3</sup> The split population models originate from the statistical literature dating back to Anscombe (1961) and have been further developed in the current, though not economic, context by e.g. Schmidt and Witte (1989). Recent economic applications have been presented by e.g. Addison – Portugal (2003).

<sup>4</sup> We may have individuals for whom some of the end-states are completely ruled out and thus they will never exit into these states. While this is the case, the exits can not be assumed independent and all exits must be estimated simultaneously.

The split population model performs moderately, but gives little additional information compared to the piecewise constant hazard model. The only additional contribution to the present study we are able to distinguish is the separate estimation of the male and female cure probabilities. Thus, with the split population model we can better observe the gender differences in the duration dependence by examining the baseline hazards given by the model. Other than that, the differences between the results of the two models remain minor. Therefore we choose to continue our study of the determinants of unemployment duration by focusing on the different destinations of unemployment.

### 3.3 Competing risks model

An individual's exit from unemployment can result from many different causes. Since the data allows us to distinguish between different destination states, we now extend the previous piecewise constant hazard model to a competing risks model, where we can explicitly account for different destinations. Both the exogenous variables and their impact on duration as well as the time specific effects are allowed to vary across exit routes. We define three destination states; employment, participation in active labour market programmes and economic inactivity.

Thus, cause-specific hazard function to destination  $j$  is

$$h_j(t) = \lim_{\Delta t \rightarrow 0} \frac{P(t \leq T < t + \Delta t \mid T \geq t, J = j)}{\Delta t}, \quad j = 1, 2, 3.$$

The hazard rate for exiting unemployment can be obtained by the sum of the transition probabilities, one for each destination

$$h(t) = \sum_{j=1}^3 h_j(t).$$

As is customary in the literature (cf. Lilja, 1992; Addison – Portugal, 2003; Carling et al., 1996) the transition probabilities are assumed to be independent, conditional on the explanatory variables. Since we assume independence between exits, maximum likelihood estimations of the durations to each destination state can be made separately.

In this paper we do not control for unobserved heterogeneity since our model has a fully flexible baseline specification. Had we used e.g. gamma-heterogeneity, the interpretation of the baseline would have become more difficult and results

might have been distorted. According to Narendranathan and Stewart (1993) there is no reason for any resulting distortions to be less serious than those caused by ignoring unobserved heterogeneity<sup>5</sup>.

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<sup>5</sup> See also Arulampalam and Stewart, 1995; Böheim and Taylor, 2000.



## 4. Results

The estimated effects of the explanatory variables on unemployment duration are presented in Table 1 and Appendices 3 and 4. The estimations have been run for the joint sample and for women and men separately. All three models give consistent results<sup>6</sup>. Apart from the industry and the income variables most coefficients are statistically significant.

### 4.1 Explanatory variables

The age group coefficients show, as expected, that the younger an individual is, the better his/her prospects are of exiting unemployment and thus, the shorter the unemployment period. However, the results indicate that the youngest age group (16–19 years) is most prone to exits to active labour market programmes and economic inactivity, which here includes also studying. Thus, when exits to employment are considered, the age differences are not as substantial, although the individuals in the 20–29 and 30–39 age groups still are slightly better off. The interaction terms for gender and age groups show, consistently with the gender specific estimations, that particularly women aged 16–19 and 40–54 have shorter durations until exit than similar men.

The end state specific models show that women aged 16–19 experience shorter durations than similar men when exiting to employment and longer durations when exiting to economic inactivity. It seems that women have the highest propensity for exits to employment when aged 16–29. Men, on the other hand, find employment sooner when aged 20–39. Women aged 20–29 exiting to economic inactivity experience shorter durations than their male counterparts.

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<sup>6</sup> The results of the Cox proportional hazard model and the piecewise constant hazard model are virtually identical. Therefore only the piecewise constant hazard model will be reported here. All the results referred to but not shown here are available from the author on request.

Table 1. Estimation results for the competing risks specification

	Employment		Endstate ALMP		Economic inactivity	
	Men	Women	Men	Women	Men	Women
	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.
tp1	-6.611***	-6.570***	-8.884***	-9.245***	-6.075***	-6.329***
tp2	-7.005***	-7.208***	-9.260***	-9.557***	-5.802***	-6.098***
tp3	-7.522***	-7.618***	-9.084***	-9.441***	-5.926***	-6.308***
tp4	-7.966***	-7.682***	-9.047***	-9.254***	-6.232***	-6.393***
tp5	-8.015***	-7.762***	-8.734***	-8.972***	-6.413***	-6.400***
tp6	-8.234***	-8.166***	-8.894***	-9.148***	-6.393***	-6.535***
tp7	-8.685***	-8.096***	-9.212***	-9.265***	-6.532***	-6.868***
tp8	-8.535***	-8.437***	-8.650***	-9.197***	-5.265***	-5.643***
tp9	-8.777***	-8.951***	-9.158***	-9.204***	-6.101***	-6.441***
tp10	-8.823***	-8.210***	-9.016***	-9.805***	-6.063***	-6.207***
Age 16–19	1.359***	1.622***	3.371***	3.626***	1.124***	1.006***
Age 20–29	1.754***	1.609***	2.641***	2.719***	0.636***	0.896***
Age 30–39	1.504***	1.441***	2.333***	2.555***	0.212**	0.392***
Age 40–54	1.313***	1.393***	2.184***	2.486***	-0.103	0.022
Age of youngest child 1–7 years	0.002	-0.351***	-0.012	-0.054	-0.083	-0.540***
Married	0.105**	0.120***	0.114*	-0.040	0.024	0.050
Home owner	0.100***	0.069**	0.016	0.018	0.000	0.019
Post-comprehensive ed.	0.253***	0.349***	0.260***	0.270***	0.103**	0.245***
Higher education	0.392***	0.596***	0.521***	0.330***	0.021	0.144**
Healthcare	-0.179*	0.092*	0.092	0.340***	-0.036	-0.145**
Clerical	-0.302***	-0.227***	0.247**	0.367***	0.072	-0.295***
Commercial	-0.394***	-0.147**	0.228**	0.283***	-0.196*	-0.193**
Agriculture	0.271***	0.061	-0.069	0.035	-0.111	-0.499***
Transportation	0.097	-0.052	-0.157	0.180	-0.071	-0.013
Industrial	0.263***	-0.075	-0.059	0.198**	-0.021	-0.291***
Services	-0.107	0.014	-0.075	0.050	-0.026	-0.249***
Other	-0.420***	-0.544***	0.574***	0.679***	0.220**	0.251***
Partial professional skills	0.012	0.109***	-0.130**	-0.020	-0.077	-0.001
Complete professional skills	-0.011	0.017	-0.127**	-0.060	-0.056	0.035
Disability	-0.832***	-0.743***	-0.131*	-0.122**	0.016	-0.005
Residential area urban	-0.080**	-0.044	-0.420***	-0.313***	-0.016	0.052
Res. area population centre	0.103**	-0.039	-0.164***	-0.218***	-0.008	0.121**
Spouse unemployed > 6 months	-0.192***	-0.282***	-0.236***	-0.145**	-0.368***	-0.144**
Spouse has post-comp. or higher	0.119***	0.090**	0.185***	0.078**	0.043	0.009
Basic UE allowance	-0.380***	-0.382***	-0.258***	-0.139*	-0.725***	-0.715***
Labour market support	-0.838***	-0.879***	0.180***	0.346***	-0.834***	-0.733***
Earnings related UE allowance	-0.333***	-0.419***	0.159***	0.209***	-1.131***	-0.900***
No unemployment 1996	-0.247***	-0.258***	-0.181***	-0.075**	0.063	-0.081*
Unemployed > 6 months 1996	-0.434***	-0.364***	-0.092*	-0.040	-0.283***	-0.280***
Capital income	-3.042**	-1.357	-3.581	-0.441	-0.890	-0.376
Wealth [10 <sup>6</sup> FIM]	0.323**	-0.111	-0.251	0.031	0.226	0.084
Liabilities [10 <sup>6</sup> FIM]	0.595***	0.596***	-0.053	0.329	0.010	0.775***
Spouse's income [10 <sup>6</sup> FIM]	0.931**	-0.181	0.543	0.242	-0.480	-0.056
Spouse's wealth [10 <sup>6</sup> FIM]	0.148	-0.167	0.212	0.023	0.404	0.199
Spouse's liabilities [10 <sup>6</sup> FIM]	0.098	0.116	-0.705	-0.227	-0.197	0.015
Citizenship other than Finnish	-0.592***	-0.812***	0.335***	0.127	0.071	0.074

\* / \*\* / \*\*\* significant at the 10 / 5 / 1 % level

Noteworthy are also the findings regarding the elderly. The coefficients indicate that exits to active labour market programmes are very unlikely for the oldest age group, 55 years and older. Also, the propensity to exit to employment is lowest in this age group. It seems that the only viable option to exit unemployment for individuals older than 55 is retiring from the labour force altogether and ending up in economic inactivity.

As expected, the results indicate that young children are somewhat irrelevant for male unemployment spells but have a significant negative effect on women's propensity to exit unemployment. Young children are negligible in regards to participation in ALMP, but have a strong prolonging effect on the unemployment duration of women exiting to employment and economic inactivity. Marriage has an amending effect for both female and male unemployment periods but the effect is larger for men. Both married women and men transiting to employment experience shorter unemployment durations than the rest of the population. This effect is slightly stronger for women. Education significantly shortens the unemployment periods for both men and women, but for women the effect is even more drastic than for men. Increasing education cuts the spell length in all end states. Education turns out particularly important for women.

Home ownership shortens unemployment spells, particularly the spells resulting in employment. The dummy variables controlling for professional skills turn out scarcely significant and where significant, professional skills shorten the duration until employment but lengthen the duration until ALMP. Another control variable, disability, turns out highly negative everywhere, except for economic inactivity. Thus individuals with a disability experience considerably longer unemployment periods than the rest of the population. Only the duration of unemployment resulting in economic inactivity is unaffected by the disability. Citizenship other than Finnish has also significant prolonging effects on unemployment periods for women, but conflicting effects for men, as foreign citizenship prolongs the period until employment but cuts the period until ALMP for men.

The sector dummies show that women have better prospects in regaining employment in the healthcare sector, while for men the favourable sectors are agriculture and industry. Both men and women in commercial and clerical sectors as well as women in the healthcare sector exit sooner into active labour market programmes. The shorter unemployment duration of individuals with no occupation (occupational sector other) is explained by the composition of the group, very young people with no professional qualifications, and thus by early exits to ALMP and economic inactivity. The somewhat mixed effects of the

sector dummies can be attributed to the particularly strong sex segregation in the Finnish labour market<sup>7</sup>.

In general it seems that individuals have better prospects of leaving unemployment when residing in rural rather than urban areas. Men have somewhat better prospects finding employment in population centres, but the effects of residential area are particularly strong when exits to ALMP are considered. The same finding has been made in Lilja (1992). We, like Lilja, find a potential explanation in the regional labour market policy practised in Finland. Finnish labour market policy has a very strong regional aspect and a higher than average proportion of persons participating in active labour market programmes come from regions with high unemployment to vacancies ratio, i.e. rural, peripheric areas, as a rule.

Spouse's concurrent unemployment (> 6 months) strongly prolongs the unemployment period of the individuals in the sample, regardless of the end-state, and this negative effect is larger for men. On the other hand, an educated spouse shortens the unemployment period, particularly for men, when exits to employment or ALMP are considered. Thus, while educating women has a strong positive effect on their opportunities in the labour market, it might also reinforce their husband's labour market attachment. This outcome might be further reinforced by income effects, since although the income effects from the spouse's side are minor, they indicate that for men the spouse's higher income promotes more rapid employment.

According to the results personal wealth has little significance regarding unemployment duration, whereas liabilities increase the propensity to exit, the effect being particularly strong for exits to employment. Capital income has a surprisingly strong negative effect for men. It seems that unemployed men exiting eventually to employment experience longer unemployment durations if they have high capital income. Thus, for men higher capital income acts as a strong disincentive for employment. This seems to suggest that people with additional income can better afford the extended duration until finding suitable employment.

Some peculiar effects stemming from the data are the strong and significant negative effects of the unemployment allowance dummies. Although this result is striking, it is in accordance with the previous findings of Pääkkönen (1990) and Lilja (1992). The probable cause of these results lies in the composition of the data, i.e. individuals in receipt of these benefits have some unobserved characteristics that weaken their chances of leaving unemployment and that this model is lacking. Part of the explanation might be that those not in receipt of

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<sup>7</sup> See e.g. Kolehmainen (1999).

these benefits includes people with such short unemployment periods that they weren't eligible for allowance. When viewing the end state specific results, we find that individuals on basic unemployment allowance have a lower propensity to participate in ALMP than individuals on labour market support or earnings related unemployment allowance.

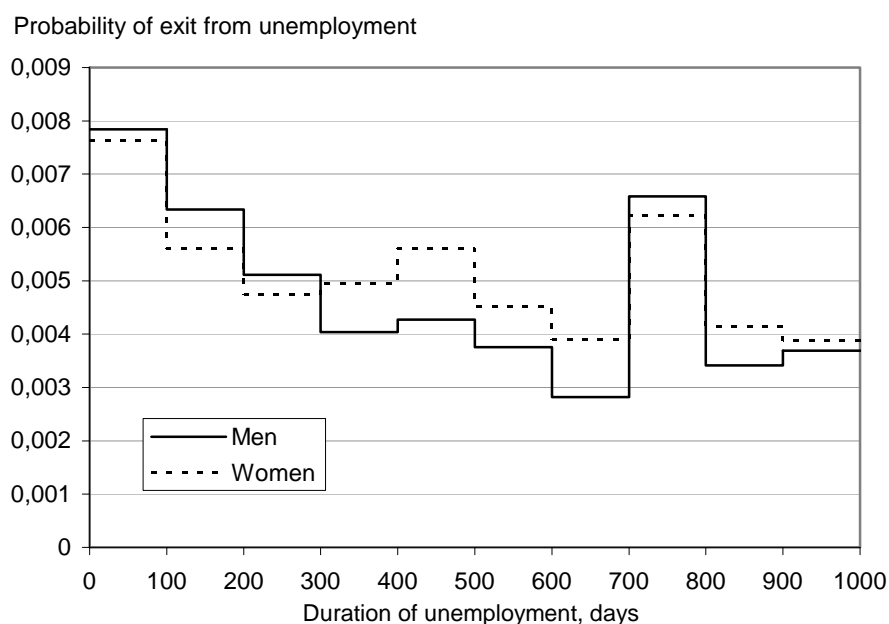
Also, the unemployment history dummies give somewhat confounding results. As can be intuitively expected, previous unemployment ( $> 6$  months in 1996) has a negative effect on future prospects, and thus a prolonging effect on unemployment. However, the fact that nonexistent previous unemployment also has a negative effect is conflicting. This result would mean that the unemployed with underlying unemployment for 1–6 months have the best prospects of leaving unemployment sooner, regardless of the end state. This is a far too simple conclusion and should not be made hastily. The result is not explained by e.g. transitions to ALMP, but is also evident in the transitions to employment. A viable explanation for these peculiar results might be seasonal unemployment experienced in certain occupational sectors, particularly considering that over 25 percent of the individuals with 1–6 months of underlying unemployment work in the industrial sector.

## **4.2 Baseline hazards**

For the piecewise constant hazard specification we divided the continuous unemployment duration into 10 periods, roughly 100 days, i.e. 3 months, each. In the following we focus on the coefficients of these time intervals, and graphically examine the baseline hazard functions of each specification.

The baseline hazards for exiting unemployment disregarding the end state show negative duration dependence (Figure 3). Two peaks appear at duration intervals 400–500 days and 700–800 days. During the first year of unemployment men are clearly more likely to exit than women, but after the duration exceeds 400 days, the gender patterns become fairly similar. In this figure the model specification is such that individuals with infinite unemployment duration are censored from the data.

Figure 3. *The probability of exit by unemployment duration, piecewise constant hazard model*



In figure 4 we can observe the change in the baseline hazard when split population model is imposed and thus, individuals with infinite durations are also included in the modelling process. Here the probability of exit is calculated not only from the time period estimates, but also using the cure probability given by the model. The coefficient of cure probability is estimated separately for each model specification<sup>8</sup>. Thus we obtain different cure coefficients for the whole sample and the single sex specifications.

The split population model emphasizes the gender differences between the specifications. Firstly, we find that the probability of exit is lower, which is expected as a result of the inclusion of individuals with infinite durations. Second, we find that the difference between male and female exit probabilities is larger here than in the piecewise model. Other than the baseline, the split population model gives little additional information compared to the previous model. Thus, we discuss the end state specific baseline hazards based on the competing risks specification of the piecewise constant hazard model.

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<sup>8</sup> Here the coefficient for cure probability is in fact a coefficient for the probability that a person never exits unemployment.

Figure 4. *The probability of exit by unemployment duration, split population model*

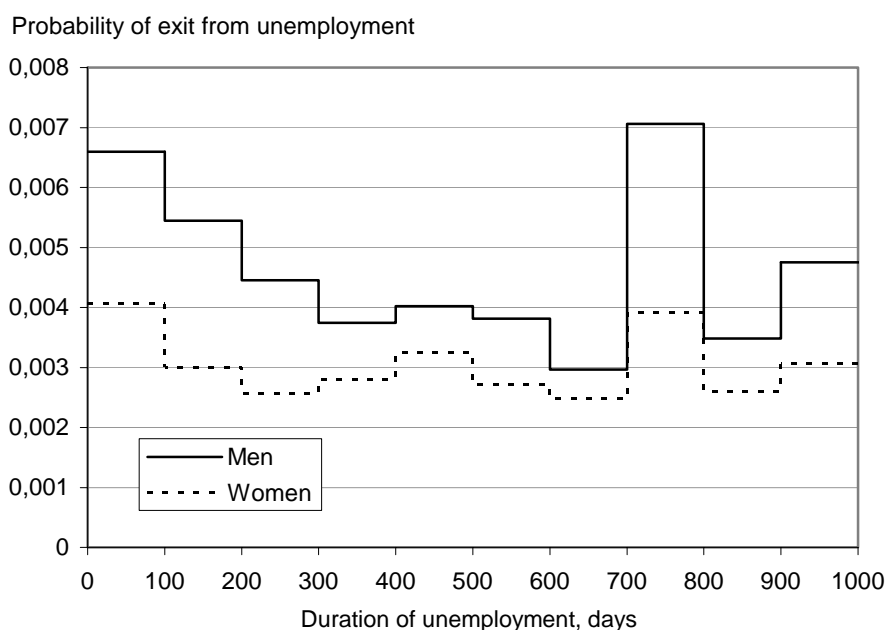
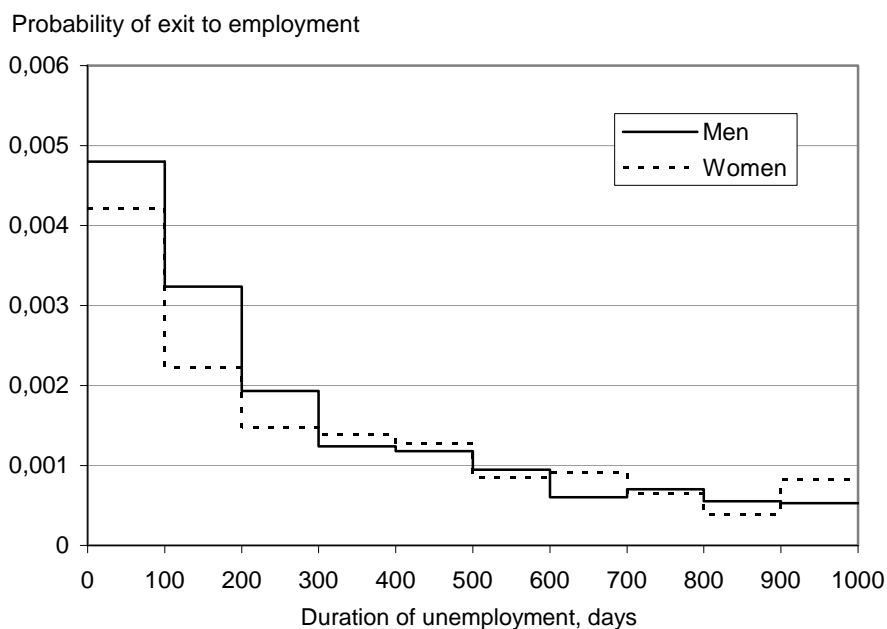


Figure 5. *The probability of exit to employment by unemployment duration, piecewise constant hazard model*

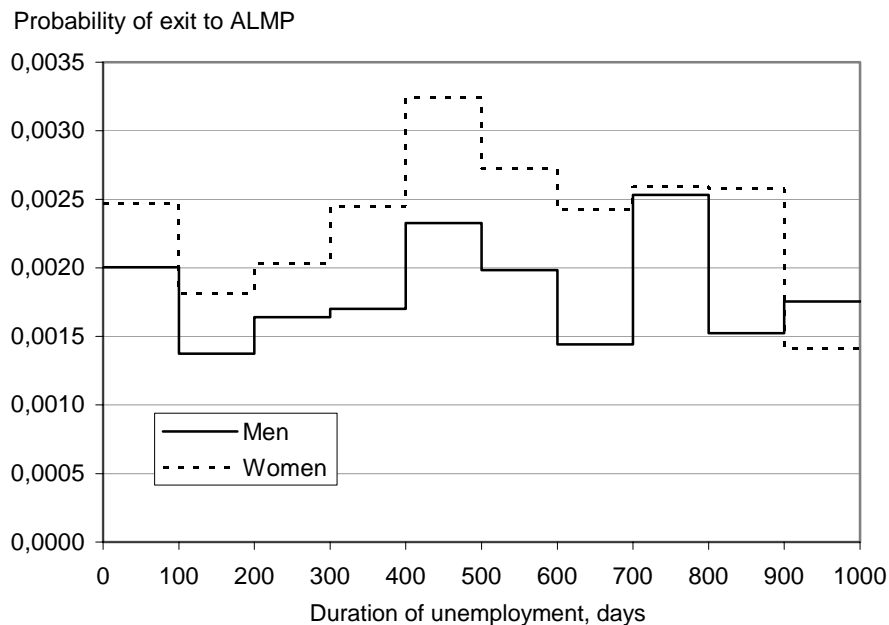


In the piecewise specification the probability of exiting to employment exhibits very strong negative duration dependence (Figure 5). Attaining employment is significantly more unlikely the longer the unemployment period gets. The probability of employment is more than halved by the time the unemployment

period has lasted for 300 days. No gender differences worth mentioning can be found in the baseline hazards for exits to employment. A noteworthy issue, though, is the fact that the probability of exiting to employment shows no upturn around the time of benefit exhaustion. Typically, in previous studies, such upturn has been found (see e.g. Carling et al., 1996). According to our results the benefit exhaustion related exits from unemployment are almost completely directed towards active labour market programmes and economic inactivity.

The probability of exiting to active labour market programs has two distinct peaks, first at around 400–500 days of unemployment for both sexes and second around 700–800 days particularly for men (Figure 6). However, as expected the level of the baseline hazard in transitions to ALMP is low compared to the other end states. Thus, it is not as common for the unemployed to transit into ALMP as it is to transit into secure employment. Some gender differences in the hazard to ALMP are found: women in general have a higher probability of exiting into ALMP than men, regardless of the duration of unemployment. Also, men experience a somewhat striking peak in this probability in the duration interval 700–800 days, which is not observed for women.

*Figure 6. The probability of exit to ALMP by unemployment duration, piecewise constant hazard model*

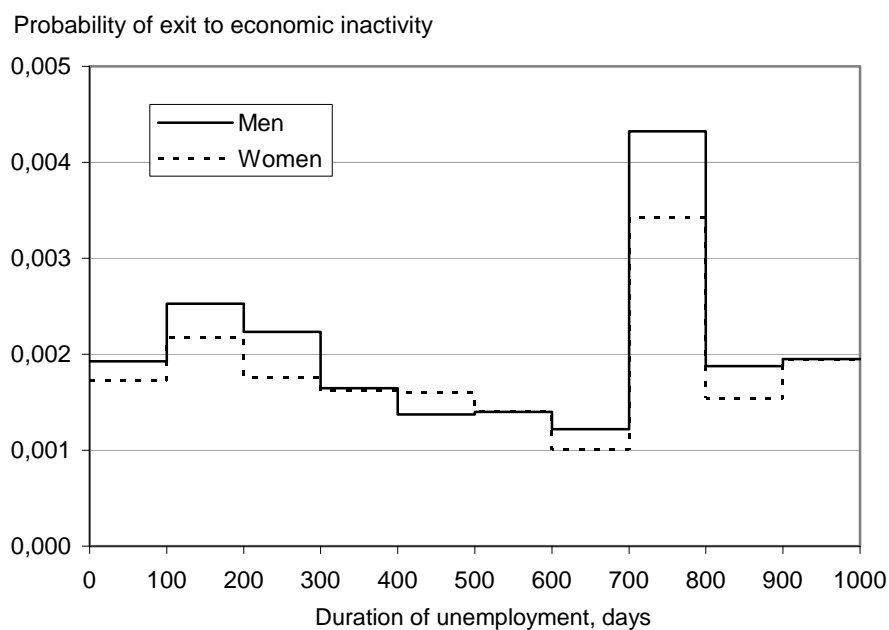


In figures 3 and 4 we observed a clear peak in the probability of exiting unemployment at the duration interval 700–800 days. From figure 7 it becomes evident that most of that peak in exits is accounted by the exits to economic inactivity. At least a part of this peak can be explained by exits from regular unemployment to unemployment pension schemes. Individuals older than 55 are



eligible for the unemployment pension scheme after they have exhausted their standard unemployment benefits, which usually takes some 2 years. The rise in the probability of exits to economic inactivity in the duration interval 100–200 days can at least in part be accounted by students, who register as unemployed between semesters.

*Figure 7. The probability of exit to economic inactivity by unemployment duration, piecewise constant hazard model.*



## 5. Conclusions

The present study analysed the determinants of unemployment duration in Finland during the period 1997–1999, seeking differences in the time that men and women exit from unemployment and the end-states they exit to. The aim was, first, to find out whether the patterns of duration dependence differed between the two genders and, second, to investigate the factors affecting male and female unemployment duration. The data consisted of 25 435 individuals who both registered as unemployed during 1997 and also terminated their unemployment period by the end of 1999.

In the analysis the conventional single risk framework was extended, first, to a piecewise constant hazard model and, second, to a competing risk model. The results of the estimations were in line with previous studies and concluded that young children as well as foreign citizenship have a prolonging effect on female unemployment. Education, on the other hand, appears as a highly positive factor, particularly for women. It was also found that men have a higher hazard of exiting into active labour market programmes than women. Considerable negative duration dependence was found regarding exits to employment for both sexes. In general, receiving unemployment assistance was found to be a highly negative factor. The results also point out the implications of the Finnish regional labour market policy, as the propensity to exit unemployment was found to be greatest in rural areas.

A future extension to the present paper might be the possibility to extend the experimentations with the split population model, since the present study was not able to thoroughly investigate the properties of this model specification. A very useful and perhaps even essential line for future research, particularly where the gender issue is concerned, would be the possibility to divide employment flows into permanent and temporary employment. This is precisely the sector where, in the light of previous studies, gender differences are most likely to be encountered in Finland.

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## Appendix 1. Definitions of the variables

<i>VARIABLE</i>	<i>DEFINITION</i>
Tp1, tp2, tp3...	Dummy-variables designating whether a person's unemployment period has ended in the duration interval. Interval breaks at 0,100, 200, 300, 400, 500, 600, 700, 800, 900 and 1094 days.
Female	1 if a person is female, 0 if male
Age in 1997	Linear age-variable and dummy-variables designating the age of a person at the end of 1997: 16–19, 20–29, 30–39, 40–54, 55 upwards
Children	Dummy-variable designating that a person's youngest child's age is 1–7 years
Marital status	Dummy-variables designating whether a person is married or single (ref.)
Home ownership	1 if a person is a home owner, otherwise 0
Education	Dummy-variables designating whether a person has comprehensive (ref.), post-comprehensive or higher education
Occupational variables	Dummy variables designating whether the unemployed jobseekers occupation is in technical (ref.), healthcare, clerical, commercial, agriculture, transportation, industrial or service sectors or unknown
Professional skills	Dummy-variables designating whether a person has complete, partial or no professional skills (ref.)
Disability	1 if a person is disabled, otherwise 0
Residential area	Dummy-variables designating whether a person's residential area is urban, densely populated or rural (ref.)
Spousal unemployment	1 if a person's spouse has been unemployed at least 6 months in 1997, otherwise 0
Spousal education	Dummy-variable designating that a person's spouse has post-comprehensive or higher education
Unemployment allowance	Dummy-variables designating that a person is receiving basic UE allowance, labour market support and/or earnings related UE allowance
Unemployment history	Dummy variables designating that a person was not unemployed in 1996 or that a person was unemployed for more than 6 months in 1996
Income variables	A person's capital income, wealth and liabilities /1 000 000 FIM
Spousal income	Spouse's income, wealth and liabilities /1 000 000 FIM
Citizenship other than Finnish	Dummy-variable designating that a person's citizenship is other than Finnish

## Appendix 2. Means of the variables

<i>Variable (N. Obs = 26747)</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>Max</i>
Age	32.864	11.604	16.000	65.000
UE duration, days	178.653	228.188	0.000	1094.000
Female	0.542	0.498	0.000	1.000
Age 16–19	0.107	0.309	0.000	1.000
Age 20–29	0.360	0.480	0.000	1.000
Age 30–39	0.236	0.425	0.000	1.000
Age 40–54	0.251	0.434	0.000	1.000
Age 55–	0.045	0.208	0.000	1.000
Age of youngest child 1–7 years	0.180	0.384	0.000	1.000
Married	0.339	0.473	0.000	1.000
Single	0.661	0.473	0.000	1.000
Home owner	0.393	0.488	0.000	1.000
Comprehensive education	0.256	0.436	0.000	1.000
Post-comprehensive education	0.608	0.488	0.000	1.000
Higher education	0.136	0.343	0.000	1.000
Healthcare	0.129	0.335	0.000	1.000
Engineering	0.102	0.303	0.000	1.000
Clerical	0.112	0.315	0.000	1.000
Commercial	0.067	0.249	0.000	1.000
Agriculture	0.032	0.175	0.000	1.000
Transportation	0.028	0.165	0.000	1.000
Industrial	0.243	0.429	0.000	1.000
Services	0.106	0.308	0.000	1.000
Other	0.182	0.386	0.000	1.000
Partial professional skills	0.201	0.401	0.000	1.000
Complete professional skills	0.382	0.486	0.000	1.000
Disability	0.054	0.227	0.000	1.000
Residential area urban	0.611	0.488	0.000	1.000
Residential area population centre	0.164	0.370	0.000	1.000
Residential area rural	0.225	0.418	0.000	1.000
Spouse unemployed > 6 months	0.065	0.247	0.000	1.000
Spouse has post-comp. or higher ed.	0.380	0.485	0.000	1.000
Basic UE allowance	0.068	0.252	0.000	1.000
Labour market support	0.352	0.477	0.000	1.000
Earnings related UE allowance	0.431	0.495	0.000	1.000
No unemployment 1996	0.507	0.500	0.000	1.000
Unemployed > 6 months 1996	0.222	0.416	0.000	1.000
Capital income	0.002	0.017	0.000	1.520
Wealth [ $10^6$ FIM]	0.027	0.127	0.000	15.275
Liabilities [ $10^6$ FIM]	0.034	0.074	0.000	2.042
Spouse's income [ $10^6$ FIM]	0.053	0.074	0.000	2.022
Spouse's wealth [ $10^6$ FIM]	0.034	0.095	0.000	4.643
Spouse's liabilities [ $10^6$ FIM]	0.025	0.111	0.000	9.415
Citizenship other than Finnish	0.028	0.166	0.000	1.000

## Appendix 3/1

<i>Piecewise-model</i>						
<i>Interactions, all</i>	<i>All</i>		<i>Men</i>		<i>Women</i>	
	<i>Coeff.</i>	<i>s.e.</i>	<i>Coeff.</i>	<i>s.e.</i>	<i>Coeff.</i>	<i>s.e.</i>
tp1	-5.734***	(0.063)	-5.687***	(0.08)	-5.921***	(0.076)
tp2	-6.01***	(0.064)	-5.901***	(0.081)	-6.231***	(0.077)
tp3	-6.204***	(0.066)	-6.116***	(0.084)	-6.397***	(0.079)
tp4	-6.28***	(0.068)	-6.353***	(0.088)	-6.355***	(0.081)
tp5	-6.189***	(0.069)	-6.295***	(0.092)	-6.229***	(0.083)
tp6	-6.376***	(0.074)	-6.425***	(0.098)	-6.446***	(0.091)
tp7	-6.589***	(0.08)	-6.713***	(0.11)	-6.592***	(0.099)
tp8	-5.939***	(0.076)	-5.862***	(0.097)	-6.124***	(0.097)
tp9	-6.475***	(0.099)	-6.521***	(0.137)	-6.531***	(0.127)
tp10	-6.472***	(0.109)	-6.444***	(0.147)	-6.6***	(0.147)
Female	-0.107	(0.068)				
Age 16–19	1.707***	(0.06)	1.744***	(0.068)	1.857***	(0.065)
Age 20–29	1.395***	(0.054)	1.443***	(0.061)	1.462***	(0.058)
Age 30–39	1.164***	(0.053)	1.159***	(0.058)	1.224***	(0.056)
Age 40–54	0.926***	(0.052)	0.935***	(0.053)	1.101***	(0.053)
Female x Age 16–19	0.159**	(0.078)				
Female x Age 20–29	0.063	(0.071)				
Female x Age 30–39	0.021	(0.073)				
Female x Age 40–54	0.169**	(0.072)				
Age of youngest child 1–7 years	-0.195***	(0.019)	-0.012	(0.033)	-0.287***	(0.023)
Married	0.083***	(0.018)	0.088***	(0.03)	0.053**	(0.024)
Home owner	0.058***	(0.016)	0.067***	(0.025)	0.038*	(0.022)
Post-comprehensive education	0.239***	(0.016)	0.196***	(0.022)	0.281***	(0.023)
Higher education	0.358***	(0.027)	0.303***	(0.045)	0.415***	(0.034)
Healthcare	0.093***	(0.028)	-0.075	(0.069)	0.116***	(0.034)
Clerical	-0.055*	(0.03)	-0.05	(0.05)	-0.053	(0.038)
Commercial	-0.082**	(0.034)	-0.173***	(0.054)	-0.03	(0.044)
Agriculture	0.032	(0.043)	0.089	(0.057)	-0.09	(0.071)
Transportation	-0.025	(0.045)	-0.025	(0.055)	0.039	(0.104)
Industrial	0.065**	(0.028)	0.105***	(0.039)	-0.053	(0.044)
Services	-0.054*	(0.031)	-0.088	(0.054)	-0.052	(0.039)
Other	0.164***	(0.031)	0.131***	(0.047)	0.186***	(0.041)
Partial professional skills	-0.002	(0.018)	-0.048*	(0.028)	0.035	(0.024)
Complete professional skills	-0.031	(0.02)	-0.053*	(0.03)	-0.014	(0.026)
Disability	-0.313***	(0.029)	-0.347***	(0.045)	-0.293***	(0.037)
Residential area urban	-0.135***	(0.016)	-0.156***	(0.023)	-0.121***	(0.022)
Residential area population centre	-0.036*	(0.02)	0.002	(0.03)	-0.069**	(0.028)
Spouse unemployed > 6 months	-0.206***	(0.027)	-0.242***	(0.041)	-0.195***	(0.035)
Spouse has post-comp. or higher education	0.111***	(0.017)	0.123***	(0.028)	0.069***	(0.023)
Basic UE allowance	-0.401***	(0.028)	-0.446***	(0.038)	-0.381***	(0.041)
Labour market support	-0.481***	(0.018)	-0.571***	(0.027)	-0.392***	(0.025)
Earnings related UE allowance	-0.357***	(0.019)	-0.404***	(0.028)	-0.329***	(0.026)
No unemployment 1996	-0.167***	(0.016)	-0.166***	(0.023)	-0.162***	(0.021)
Unemployed > 6 months 1996	-0.269***	(0.019)	-0.306***	(0.027)	-0.226***	(0.026)
Capital income	-1.151**	(0.456)	-1.962***	(0.748)	-0.719	(0.565)
Wealth [10 <sup>6</sup> FIM]	0.026	(0.035)	0.203*	(0.108)	-0.001	(0.043)
Liabilities [10 <sup>6</sup> FIM]	0.443***	(0.08)	0.34***	(0.107)	0.588***	(0.138)
Spouse's income [10 <sup>6</sup> FIM]	-0.031	(0.124)	0.518**	(0.26)	0.005	(0.141)
Spouse's wealth [10 <sup>6</sup> FIM]	-0.002	(0.069)	0.253	(0.195)	-0.005	(0.075)
Spouse's liabilities [10 <sup>6</sup> FIM]	-0.041	(0.067)	-0.113	(0.222)	0.008	(0.07)
Citizenship other than Finnish	-0.1**	(0.039)	-0.05	(0.057)	-0.147***	(0.054)



## Appendix 3/2

<i>Piecewise-model Interactions, all</i>	<i>Endstate ALMP</i>					
	<i>All Coeff.</i>	<i>s.e.</i>	<i>Men Coeff.</i>	<i>s.e.</i>	<i>Women Coeff.</i>	<i>s.e.</i>
tp1	-9.08***	(0.194)	-8.884***	(0.221)	-9.245***	(0.191)
tp2	-9.42***	(0.195)	-9.26***	(0.224)	-9.557***	(0.193)
tp3	-9.284***	(0.196)	-9.084***	(0.226)	-9.441***	(0.195)
tp4	-9.152***	(0.197)	-9.047***	(0.229)	-9.254***	(0.195)
tp5	-8.863***	(0.197)	-8.734***	(0.229)	-8.972***	(0.196)
tp6	-9.037***	(0.2)	-8.894***	(0.235)	-9.148***	(0.202)
tp7	-9.233***	(0.205)	-9.212***	(0.249)	-9.265***	(0.209)
tp8	-8.955***	(0.206)	-8.65***	(0.241)	-9.197***	(0.216)
tp9	-9.187***	(0.221)	-9.158***	(0.281)	-9.204***	(0.232)
tp10	-9.427***	(0.239)	-9.016***	(0.285)	-9.805***	(0.29)
Female	0.027	(0.239)				
Age 16–19	3.337***	(0.189)	3.371***	(0.201)	3.626***	(0.174)
Age 20–29	2.64***	(0.184)	2.641***	(0.193)	2.719***	(0.169)
Age 30–39	2.362***	(0.184)	2.333***	(0.19)	2.555***	(0.168)
Age 40–54	2.197***	(0.182)	2.184***	(0.184)	2.486***	(0.164)
Female x Age 16–19	0.281	(0.246)				
Female x Age 20–29	0.046	(0.242)				
Female x Age 30–39	0.147	(0.244)				
Female x Age 40–54	0.273	(0.243)				
Age of youngest child 1–7 years	-0.028	(0.033)	-0.012	(0.066)	-0.054	(0.039)
Married	0.011	(0.034)	0.114*	(0.061)	-0.04	(0.04)
Home owner	0.018	(0.03)	0.016	(0.051)	0.018	(0.038)
Post-comprehensive education	0.261***	(0.028)	0.26***	(0.044)	0.27***	(0.037)
Higher education	0.38***	(0.05)	0.521***	(0.088)	0.33***	(0.062)
Healthcare	0.236***	(0.054)	0.092	(0.132)	0.34***	(0.067)
Clerical	0.288***	(0.056)	0.247**	(0.096)	0.367***	(0.072)
Commercial	0.232***	(0.063)	0.228**	(0.101)	0.283***	(0.082)
Agriculture	-0.028	(0.086)	-0.069	(0.12)	0.035	(0.13)
Transportation	-0.08	(0.094)	-0.157	(0.116)	0.18	(0.195)
Industrial	0.018	(0.055)	-0.059	(0.081)	0.198**	(0.08)
Services	-0.021	(0.059)	-0.075	(0.108)	0.05	(0.075)
Other	0.609***	(0.057)	0.574***	(0.09)	0.679***	(0.075)
Partial professional skills	-0.067**	(0.033)	-0.13**	(0.055)	-0.02	(0.042)
Complete professional skills	-0.089**	(0.036)	-0.127**	(0.06)	-0.06	(0.045)
Disability	-0.119***	(0.046)	-0.131*	(0.077)	-0.122**	(0.057)
Residential area urban	-0.348***	(0.028)	-0.42***	(0.045)	-0.313***	(0.036)
Residential area population	-0.194***	(0.036)	-0.164***	(0.057)	-0.218***	(0.047)
Spouse unemployed > 6 months	-0.169***	(0.045)	-0.236***	(0.078)	-0.145**	(0.056)
Spouse has post-comp. or higher	0.125***	(0.031)	0.185***	(0.054)	0.078**	(0.038)
Basic UE allowance	-0.18***	(0.058)	-0.258***	(0.085)	-0.139*	(0.079)
Labour market support	0.281***	(0.033)	0.18***	(0.051)	0.346***	(0.042)
Earnings related UE allowance	0.196***	(0.035)	0.159***	(0.056)	0.209***	(0.046)
No unemployment 1996	-0.109***	(0.029)	-0.181***	(0.047)	-0.075**	(0.038)
Unemployed > 6 months 1996	-0.061*	(0.033)	-0.092*	(0.05)	-0.04	(0.043)
Capital income	-1.361	(1.147)	-3.581	(2.342)	-0.441	(1.001)
Wealth [10 <sup>6</sup> FIM]	0.009	(0.085)	-0.251	(0.328)	0.031	(0.078)
Liabilities [10 <sup>6</sup> FIM]	0.148	(0.168)	-0.053	(0.247)	0.329	(0.257)
Spouse's income [10 <sup>6</sup> FIM]	0.17	(0.225)	0.543	(0.486)	0.242	(0.253)
Spouse's wealth [10 <sup>6</sup> FIM]	0.005	(0.128)	0.212	(0.415)	0.023	(0.136)
Spouse's liabilities [10 <sup>6</sup> FIM]	-0.307**	(0.151)	-0.705	(0.545)	-0.227	(0.155)
Citizenship other than Finnish	0.214***	(0.058)	0.335***	(0.09)	0.127	(0.078)

## Appendix 3/3

<i>Piecewise-model Interactions, all</i>	<i>All</i>		<i>Endstate employment</i>			
	<i>Coeff.</i>	<i>s.e.</i>	<i>Men Coeff.</i>	<i>s.e.</i>	<i>Women Coeff.</i>	<i>s.e.</i>
tp1	-6.482***	(0.104)	-6.611***	(0.123)	-6.57***	(0.128)
tp2	-7.011***	(0.105)	-7.005***	(0.126)	-7.208***	(0.131)
tp3	-7.483***	(0.109)	-7.522***	(0.132)	-7.618***	(0.137)
tp4	-7.723***	(0.115)	-7.966***	(0.145)	-7.682***	(0.143)
tp5	-7.801***	(0.121)	-8.015***	(0.155)	-7.762***	(0.153)
tp6	-8.119***	(0.137)	-8.234***	(0.174)	-8.166***	(0.182)
tp7	-8.299***	(0.154)	-8.685***	(0.216)	-8.096***	(0.195)
tp8	-8.406***	(0.179)	-8.535***	(0.231)	-8.437***	(0.253)
tp9	-8.759***	(0.256)	-8.777***	(0.324)	-8.951***	(0.396)
tp10	-8.432***	(0.256)	-8.823***	(0.373)	-8.21***	(0.337)
Female	-0.178	(0.125)				
Age 16–19	1.301***	(0.112)	1.359***	(0.12)	1.622***	(0.124)
Age 20–29	1.676***	(0.092)	1.754***	(0.099)	1.609***	(0.106)
Age 30–39	1.493***	(0.09)	1.504***	(0.095)	1.441***	(0.103)
Age 40–54	1.299***	(0.088)	1.313***	(0.09)	1.393***	(0.099)
Female x Age 16–9	0.367**	(0.153)				
Female x Age 20–29	-0.027	(0.129)				
Female x Age 30–39	-0.075	(0.131)				
Female x Age 40–54	0.1	(0.13)				
Age of youngest child 1–7 years	-0.221***	(0.028)	0.002	(0.044)	-0.351***	(0.036)
Married	0.136***	(0.027)	0.105**	(0.041)	0.12***	(0.036)
Home owner	0.095***	(0.024)	0.1***	(0.036)	0.069**	(0.034)
Post-comprehensive education	0.294***	(0.026)	0.253***	(0.034)	0.349***	(0.04)
Higher education	0.5***	(0.04)	0.392***	(0.065)	0.596***	(0.054)
Healthcare	0.089**	(0.039)	-0.179*	(0.101)	0.092*	(0.048)
Clerical	-0.24***	(0.045)	-0.302***	(0.078)	-0.227***	(0.057)
Commercial	-0.233***	(0.051)	-0.394***	(0.082)	-0.147**	(0.067)
Agriculture	0.214***	(0.06)	0.271***	(0.078)	0.061	(0.102)
Transportation	0.062	(0.064)	0.097	(0.077)	-0.052	(0.166)
Industrial	0.199***	(0.039)	0.263***	(0.056)	-0.075	(0.066)
Services	-0.005	(0.045)	-0.107	(0.08)	0.014	(0.057)
Other	-0.477***	(0.052)	-0.42***	(0.076)	-0.544***	(0.073)
Partial professional skills	0.067**	(0.028)	0.012	(0.041)	0.109***	(0.038)
Complete professional skills	0.007	(0.029)	-0.011	(0.042)	0.017	(0.041)
Disability	-0.781***	(0.056)	-0.832***	(0.086)	-0.743***	(0.073)
Residential area urban	-0.063**	(0.025)	-0.08**	(0.035)	-0.044	(0.036)
Residential area population centre	0.029	(0.031)	0.103**	(0.043)	-0.039	(0.045)
Spouse unemployed > 6 months	-0.226***	(0.042)	-0.192***	(0.058)	-0.282***	(0.062)
Spouse has post-comp. or higher education	0.132***	(0.026)	0.119***	(0.039)	0.09**	(0.036)
Basic UE allowance	-0.384***	(0.041)	-0.38***	(0.055)	-0.382***	(0.062)
Labour market support	-0.869***	(0.03)	-0.838***	(0.043)	-0.879***	(0.044)
Earnings related UE allowance	-0.372***	(0.028)	-0.333***	(0.04)	-0.419***	(0.039)
No unemployment 1996	-0.259***	(0.023)	-0.247***	(0.033)	-0.258***	(0.032)
Unemployed > 6 months 1996	-0.403***	(0.028)	-0.434***	(0.039)	-0.364***	(0.041)
Capital income	-1.963**	(0.821)	-3.042**	(1.265)	-1.357	(1.078)
Wealth [10 <sup>6</sup> FIM]	-0.012	(0.057)	0.323**	(0.137)	-0.111	(0.108)
Liabilities [10 <sup>6</sup> FIM]	0.613***	(0.111)	0.595***	(0.139)	0.596***	(0.201)
Spouse's income [10 <sup>6</sup> FIM]	-0.062	(0.181)	0.931**	(0.379)	-0.181	(0.21)
Spouse's wealth [10 <sup>6</sup> FIM]	-0.154	(0.107)	0.148	(0.258)	-0.167	(0.12)
Spouse's liabilities [10 <sup>6</sup> FIM]	0.089	(0.082)	0.098	(0.294)	0.116	(0.086)
Citizenship other than Finnish	-0.705***	(0.085)	-0.592***	(0.114)	-0.812***	(0.128)

## Appendix 3/4

<i>Piecewise-model Interactions, all</i>	<i>Endstate economic inactivity</i>					
	<i>All</i>		<i>Men</i>		<i>Women</i>	
	<i>Coeff.</i>	<i>s.e.</i>	<i>Coeff.</i>	<i>s.e.</i>	<i>Coeff.</i>	<i>s.e.</i>
tp1	-6.18***	(0.103)	-6.075***	(0.14)	-6.329***	(0.13)
tp2	-5.935***	(0.104)	-5.802***	(0.142)	-6.098***	(0.132)
tp3	-6.107***	(0.107)	-5.926***	(0.146)	-6.308***	(0.136)
tp4	-6.295***	(0.111)	-6.232***	(0.154)	-6.393***	(0.141)
tp5	-6.379***	(0.117)	-6.413***	(0.165)	-6.4***	(0.148)
tp6	-6.45***	(0.123)	-6.393***	(0.172)	-6.535***	(0.16)
tp7	-6.686***	(0.136)	-6.532***	(0.185)	-6.868***	(0.184)
tp8	-5.437***	(0.114)	-5.265***	(0.155)	-5.643***	(0.15)
tp9	-6.261***	(0.157)	-6.101***	(0.216)	-6.441***	(0.214)
tp10	-6.125***	(0.166)	-6.063***	(0.235)	-6.207***	(0.22)
Female	-0.085	(0.087)				
Age 16–19	1.23***	(0.089)	1.124***	(0.107)	1.006***	(0.101)
Age 20–29	0.686***	(0.08)	0.636***	(0.097)	0.896***	(0.088)
Age 30–39	0.273***	(0.081)	0.212**	(0.091)	0.392***	(0.085)
Age 40–54	-0.075	(0.076)	-0.103	(0.081)	0.022	(0.077)
Female x Age 16–19	-0.266**	(0.107)				
Female x Age 20–29	0.18*	(0.095)				
Female x Age 30–39	0.091	(0.104)				
Female x Age 40–54	0.104	(0.104)				
Age of youngest child 1–7 years	-0.413***	(0.041)	-0.083	(0.074)	-0.54***	(0.05)
Married	0.047	(0.038)	0.024	(0.064)	0.05	(0.048)
Home owner	0.012	(0.033)	0	(0.051)	0.019	(0.044)
Post-comprehensive education	0.177***	(0.029)	0.103**	(0.041)	0.245***	(0.043)
Higher education	0.094*	(0.054)	0.021	(0.09)	0.144**	(0.069)
Healthcare	-0.066	(0.058)	-0.036	(0.138)	-0.145**	(0.071)
Clerical	-0.139**	(0.06)	0.072	(0.095)	-0.295***	(0.078)
Commercial	-0.163**	(0.066)	-0.196*	(0.103)	-0.193**	(0.088)
Agriculture	-0.259***	(0.093)	-0.111	(0.121)	-0.499***	(0.153)
Transportation	-0.101	(0.088)	-0.071	(0.108)	-0.013	(0.186)
Industrial	-0.117**	(0.055)	-0.021	(0.078)	-0.291***	(0.088)
Services	-0.146**	(0.061)	-0.026	(0.102)	-0.249***	(0.079)
Other	0.25***	(0.058)	0.22**	(0.088)	0.251***	(0.079)
Partial professional skills	-0.032	(0.036)	-0.077	(0.054)	-0.001	(0.048)
Complete professional skills	-0.009	(0.041)	-0.056	(0.062)	0.035	(0.055)
Disability	0.002	(0.05)	0.016	(0.076)	-0.005	(0.066)
Residential area urban	0.019	(0.032)	-0.016	(0.046)	0.052	(0.046)
Residential area population centre	0.06	(0.041)	-0.008	(0.06)	0.121**	(0.058)
Spouse unemployed > 6 months	-0.231***	(0.053)	-0.368***	(0.085)	-0.144**	(0.068)
Spouse has post-comp. or higher education	0.028	(0.035)	0.043	(0.056)	0.009	(0.045)
Basic UE allowance	-0.7***	(0.053)	-0.725***	(0.071)	-0.715***	(0.078)
Labour market support	-0.783***	(0.032)	-0.834***	(0.047)	-0.733***	(0.046)
Earnings related UE allowance	-0.996***	(0.036)	-1.131***	(0.053)	-0.9***	(0.049)
No unemployment 1996	-0.025	(0.031)	0.063	(0.047)	-0.081*	(0.043)
Unemployed > 6 months 1996	-0.284***	(0.039)	-0.283***	(0.056)	-0.28***	(0.054)
Capital income	-0.592	(0.557)	-0.89	(0.748)	-0.376	(0.881)
Wealth [10 <sup>6</sup> FIM]	0.116**	(0.054)	0.226	(0.193)	0.084	(0.058)
Liabilities [10 <sup>6</sup> FIM]	0.329*	(0.176)	0.01	(0.251)	0.775***	(0.29)
Spouse's income [10 <sup>6</sup> FIM]	-0.154	(0.258)	-0.48	(0.558)	-0.056	(0.298)
Spouse's wealth [10 <sup>6</sup> FIM]	0.259**	(0.128)	0.404	(0.437)	0.199	(0.137)
Spouse's liabilities [10 <sup>6</sup> FIM]	-0.062	(0.148)	-0.197	(0.432)	0.015	(0.153)
Citizenship other than Finnish	0.075	(0.069)	0.071	(0.101)	0.074	(0.096)

## Appendix 4

<i>Split-model</i>						
<i>Interactions, all</i>						
<i>Hazard</i>	<i>All</i>		<i>Men</i>		<i>Women</i>	
	<i>Coeff.</i>	<i>s.e.</i>	<i>Coeff.</i>	<i>s.e.</i>	<i>Coeff.</i>	<i>s.e.</i>
tp1	-1.118***	(0.065)	-1.084***	(0.084)	-1.307***	(0.078)
tp2	-1.38***	(0.066)	-1.277***	(0.086)	-1.608***	(0.079)
tp3	-1.567***	(0.068)	-1.478***	(0.089)	-1.768***	(0.082)
tp4	-1.592***	(0.07)	-1.653***	(0.093)	-1.681***	(0.084)
tp5	-1.483***	(0.071)	-1.58***	(0.096)	-1.532***	(0.086)
tp6	-1.617***	(0.076)	-1.633***	(0.103)	-1.711***	(0.093)
tp7	-1.787***	(0.084)	-1.885***	(0.116)	-1.801***	(0.103)
tp8	-1.136***	(0.081)	-1.016***	(0.107)	-1.342***	(0.102)
tp9	-1.701***	(0.104)	-1.724***	(0.145)	-1.757***	(0.133)
tp10	-1.471***	(0.117)	-1.413***	(0.158)	-1.59***	(0.158)
Female	-0.126*	(0.069)				
Age 16–19	1.768***	(0.062)	1.814***	(0.071)	1.933***	(0.067)
Age 20–29	1.464***	(0.056)	1.53***	(0.064)	1.541***	(0.06)
Age 30–39	1.234***	(0.055)	1.233***	(0.061)	1.317***	(0.059)
Age 40–54	1.008***	(0.054)	1.037***	(0.057)	1.17***	(0.055)
Female x Age 16–19	0.186**	(0.08)				
Female x Age 20–29	0.08	(0.072)				
Female x Age 30–39	0.044	(0.074)				
Female x Age 40–54	0.16**	(0.073)				
Age of youngest child 1–7 years	-0.206***	(0.02)	0.027	(0.035)	-0.309***	(0.024)
Married	0.078***	(0.019)	0.062*	(0.032)	0.051**	(0.024)
Home owner	0.053***	(0.017)	0.076***	(0.027)	0.021	(0.023)
Post-comprehensive education	0.242***	(0.017)	0.196***	(0.024)	0.287***	(0.024)
Higher education	0.346***	(0.028)	0.268***	(0.047)	0.412***	(0.036)
Healthcare	0.073**	(0.029)	-0.067	(0.073)	0.084**	(0.036)
Clerical	-0.075**	(0.031)	-0.061	(0.053)	-0.084**	(0.04)
Commercial	-0.107***	(0.035)	-0.181***	(0.056)	-0.074	(0.046)
Agriculture	-0.001	(0.045)	0.053	(0.06)	-0.132*	(0.074)
Transportation	-0.057	(0.048)	-0.047	(0.058)	0.007	(0.108)
Industrial	0.027	(0.029)	0.084**	(0.041)	-0.115**	(0.045)
Services	-0.079**	(0.032)	-0.093	(0.057)	-0.09**	(0.041)
Other	0.146***	(0.032)	0.119**	(0.049)	0.158***	(0.044)
Partial professional skills	-0.027	(0.019)	-0.081***	(0.03)	0.015	(0.025)
Complete professional skills	-0.047**	(0.021)	-0.066**	(0.032)	-0.034	(0.028)
Disability	-0.327***	(0.03)	-0.384***	(0.048)	-0.296***	(0.039)
Residential area urban	-0.144***	(0.017)	-0.185***	(0.025)	-0.116***	(0.023)
Residential area population centre	-0.053**	(0.022)	-0.023	(0.032)	-0.077***	(0.029)
Spouse unemployed > 6 months	-0.225***	(0.028)	-0.277***	(0.043)	-0.208***	(0.037)
Spouse has post-comp. or higher education	0.108***	(0.018)	0.129***	(0.029)	0.059**	(0.024)
Basic UE allowance	-0.414***	(0.03)	-0.48***	(0.042)	-0.382***	(0.044)
Labour market support	-0.512***	(0.02)	-0.601***	(0.029)	-0.43***	(0.027)
Earnings related UE allowance	-0.383***	(0.021)	-0.436***	(0.031)	-0.359***	(0.028)
No unemployment 1996	-0.166***	(0.016)	-0.159***	(0.025)	-0.163***	(0.022)
Unemployed > 6 months 1996	-0.276***	(0.019)	-0.323***	(0.028)	-0.232***	(0.027)
Capital income [10 <sup>6</sup> FIM]	-1.056**	(0.437)	-2.026***	(0.744)	-0.614	(0.532)
Wealth [10 <sup>6</sup> FIM]	0.025	(0.037)	0.228*	(0.128)	-0.007	(0.045)
Liabilities [10 <sup>6</sup> FIM]	0.395***	(0.084)	0.264**	(0.112)	0.549***	(0.146)
Spouse's income [10 <sup>6</sup> FIM]	0.11	(0.137)	0.66**	(0.273)	0.187	(0.158)
Spouse's wealth [10 <sup>6</sup> FIM]	0.034	(0.072)	0.369*	(0.208)	0.028	(0.078)
Spouse's liabilities [10 <sup>6</sup> FIM]	-0.038	(0.065)	-0.079	(0.233)	0.01	(0.067)
Citizenship other than Finnish	-0.096**	(0.041)	-0.043	(0.06)	-0.146***	(0.056)
Cure probability, const	-5.059***	(0.139)	-4.786***	(0.171)	-5.248***	(0.192)
c = Pr(never fail)	0,006313		0,008277		0,005229	
Likelihood ratio test of c=0:	chi2(01)=125.30***		chi2(01)=82.02***		chi2(01)=73.23***	

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