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Abstract

The recession of the early 1990s caused a serious unemployment problem in Finland. This study analyses the determinants of unemployment duration using individual data from 1987 to 2000. Duration until employment is modelled using a proportional hazard model with piecewise constant baseline hazard. The main focus is on the relative contribution of compositional variation and macroeconomic conditions to unemployment duration. According to the results, the observed compositional variation implies only a small increasing trend in the average duration during the recession period.

JEL Classification: E32, J64

Keywords: Business cycles, unemployment duration

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1 Introduction

This study investigates the cyclical variation in unemployment duration in Finland using individual data from 1987 to 2000. The Finnish economy experienced exceptional changes in the analysis period. After a boom in the late 1980's, the economy turned into a very deep recession. Between 1991 and 1993, GDP fell over 10% and the unemployment rate increased fivefold. The late 1990's was a period of recovery and stable growth but the unemployment problem remained.

The cyclical variation in unemployment duration follows the same pattern as the aggregate unemployment. Figure 1 illustrates the mean and the median durations of the unemployment spells in the analysis data. For spells that began before the recession, the mean duration was below 100 days. When the recession started at the end of 1990, the mean duration increased quickly. The peak is reached in 1992 and after that the duration declines steadily. The main question in this study is whether compositional variation contributed to these changes in duration, especially during the recession period.

A recession period usually causes an increase in displacements and reduction in hirings as firms adjust to lower demand. As it is more difficult to find a job, unemployment durations become longer. An indirect effect of recession is that the composition of individuals becoming unemployed may change. It is often assumed that an increase in displacements leads to a lower average employability of unemployed individuals (e.g. Baker, 1992). This happens if firms choose to lay off the least productive workers first. However, the high number of mass layoffs during the recession may have an opposite effect as firms closing down do not sort displaced workers.

In the empirical model, two main sources of the variation in unemployment duration are identified. The outflow effect of the macroeconomic conditions is captured by the unemployment rate. The compositional effect of inflow changes is modelled by using an extensive set of individual characteristics. Annual and quarterly dummies are used to capture the residual variation. The relative influence of the different sources of variation are compared by predicting unemployment durations using a duration model. Similar strategy has been previously used by Rosholm (2001).

Generally the main motivation in understanding cyclical variation in unemployment is to design more efficient labour market policies. In particular, if compositional variation plays a major role, it indicates that active labour market programmes should be adjusted according to the cycle. It should be noted that only the impact of observed individual heterogeneity is studied. However, this is the relevant part of heterogeneity as the same information is also observed by the policy makers.

Most of the earlier studies on the cyclicality of unemployment duration and compositional variation have analysed macrodata because large panel datasets

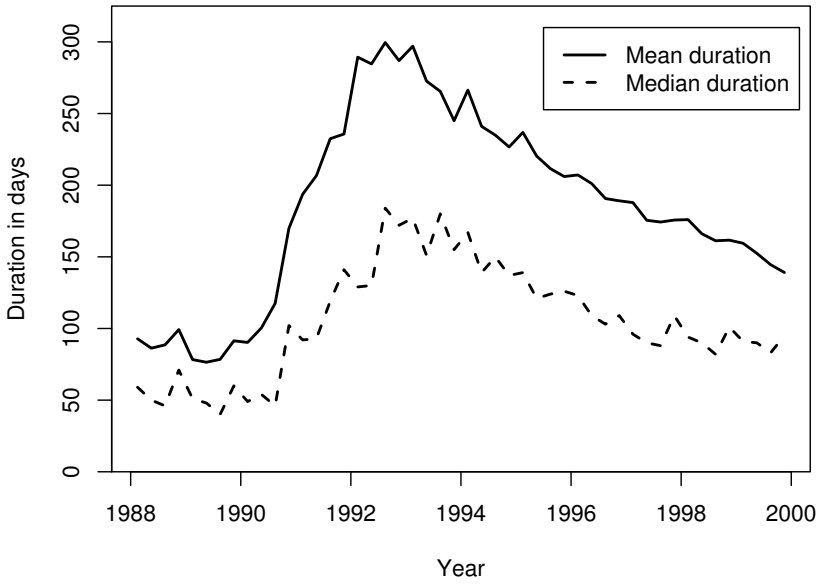

Figure 1: Mean and median duration of unemployment spells by the quarter of entry (source: analysis data).

have become available only recently. One of the main questions in the macro level analysis is how to identify the effect of heterogeneity (for demographic group level analysis, see Baker, 1992; Abbring, van den Berg & van Ours, 2001). The method introduced by van den Berg & van Ours (1994) allows the estimation of mixed proportional hazard model with discrete aggregate data on outflow from unemployment. The main advantage of the method is that this type of data are more commonly available than microlevel data, especially for long time periods. Abbring, van den Berg & van Ours (2002) apply this method to study cyclical variation in French unemployment. The same approach has been used in other studies (e.g. Turon 2003; Burgess & Turon 2005; Cockx & Dejemeppe 2005; Dejemeppe 2005).

The first studies analysing cyclical variation in unemployment duration using microdata suffered from relative small sample sizes and short follow-up periods (e.g. Dynarski & Sheffrin 1990). Rosholm (2001) addresses this topic using register data with large sample size and long time period. He analyses Danish data from 1981 to 1990 and finds that compositional variation is important in explaining unemployment duration and that the average quality of those becoming unemployed improves during booms. Other microdata studies that emphasise business cycle variation include Imbens & Lynch (2006) who analyse unemployed youth and Bover, Arellano & Bentolila (2002) who, however, do not focus on the

compositional variation.[1]

The analysis dataset used in this study is a 10% representative sample of the Finnish workforce containing information from several administrative registers from 1987 to 2000. Most importantly the data include the dates of transitions to and out of unemployment. The unemployment spells are followed until the end of 2001. In addition, information is provided on transitions to employment and to active labour market programmes. A rich set of variables describing individual characteristics are available on annual level. These data are used to create a set of labour market history variables for each individual.

Unemployment duration until employment is modelled using a proportional hazard model with a piecewise constant baseline hazard. All unemployment spells starting between the beginning of 1988 and the end of 1999 are included in the model. The key variable in the model is the seasonally adjusted regional unemployment rate. It is included as a time-varying covariate that changes value quarterly. Annual and regional fixed effects are used to control for general regional differences and calendar time effects. Thus, the main source for identifying variation is obtained from within region variation in the unemployment rate. The time-varying quarterly dummies capture seasonal variation in employment. Individual characteristics are included as fixed covariates.

The model is estimated separately for genders and four time periods because the parameter values of the model change over the business cycle. The results show that the inflow composition changes during the recession as unemployed individuals become older and better educated on average. The structural change in the economy is also reflected in the occupational distribution. However, the observed compositional variation implies only a relatively small increasing trend in the predicted average duration between 1988 and 1993. This means that the characteristics of new unemployed individuals became slightly less favourable for employment. The seasonality in unemployment duration, that is predicted using inflow variation, is strong and its pattern changes after the recession.

The remaining paper is organised as follows. Section 2 briefly discusses the economic development and the labour market policy in Finland. The analysis data are described and descriptive statistics are shown in Section 3. Section 4 discusses econometric methods. Results are presented in Section 5 and Section 6 concludes.

[1] Compositional variation has not been analysed explicitly using Finnish data but the effect of business cycle on unemployment duration has been studied to some extent by Holm, Kyyrä & Rantala (1999) and Koskela & Uusitalo (2006).

2 Institutional setting

2.1 Finnish economy

The Finnish economy was very volatile during the analysis period. Variation in unemployment and GDP growth is illustrated in Figure 2. The late 1980s was characterised by high economic growth and low unemployment. Especially the proportion of long-term unemployment[2] decreased which was mostly due to the government's policy to use active labour market programmes (ALMP) to prevent people from falling into this category. The boom turned into an economic crisis in 1990 and the unemployment rate started to rise dramatically.[3] During the following years, the proportion of long-term unemployed grows quickly because of the large number of layoffs at the time when re-employment possibilities were weak. The economy started to recover in 1993 and the unemployment rate stabilised. During the next years, the GDP grew and the unemployment rate declined. However, the proportion of long-term unemployment did not decrease. This can be seen as a result of a structural change in the economy: economic recovery took place only on some sectors of the economy and there was a large number of people who had poor employment possibilities. In the late 1990s, the economy was booming again. The unemployment rate decreased steadily but the high share of long-term unemployment was persistent.

2.2 Finnish labour market policy

Institutional features have a strong effect on individual's behaviour during unemployment. The unemployment benefit system affects the incentives to search and to accept a job. The strong emphasis on ALMP in Finland is the main reason for individuals to exit other state than employment.

The unemployment benefit system is a combination of a basic daily allowance and an earnings-related allowance with limited duration.[4] The basic allowance is 23 euros per day and it is paid for 5 days per week. Those with children get an increase from 4 to 8 euros. The duration of the basic allowance is unlimited but it is required that the unemployed person is willing to accept a job offer. The benefit is lost for 30 to 90 days if the person has quit a job, refuses to accept a job or refuses to participate in ALMP.

To be entitled for the earnings-related allowance, a membership in an unemployment fund and a 10 months employment history during the last two years

[2]The long-term unemployment rate is the main macroeconomic indicator that is related to unemployment duration. Individuals are defined as long-term unemployed after 12 months of unemployment.

[3]For more detailed discussion on Finnish economic development and unemployment, see Koskela & Uusitalo (2006).

[4]The figures are for the year 2003.

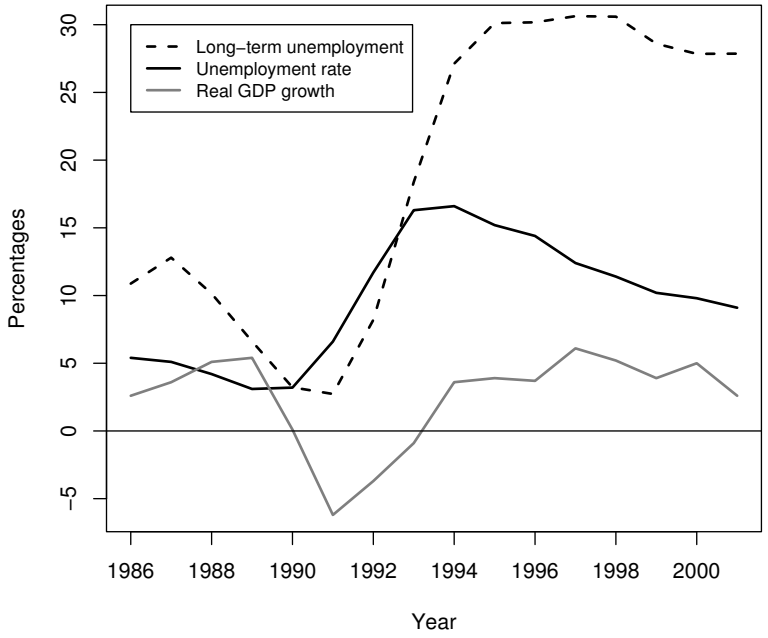

Figure 2: Unemployment rate, proportion of long-term unemployed and GDP growth in Finland (Finnish Labor Review 1/2002; Statistics Finland).

are required.[5] The replacement rate decreases with earnings. It varies from almost 80% to below 40% with monthly earnings from 1000 euros to 4000 euros, respectively. For the median income earner, the net replacement ratio is 64%. The duration of the earnings-related benefit is 500 days and the benefits are paid for 5 days per week, i.e. the maximum duration is close to two years.

There are some special rules considering young and elderly people. An unemployed person under 25 years of age is obliged to seek and participate in vocational education.[6] Otherwise a young person is not eligible for the basic allowance. Before 1997 people over 53 years of age were entitled for the earnings-related allowance until the retirement age. In 1997 the age limit was raised to 55 years.

Since the 1970s, the activation of unemployed individuals has played an important role in the Finnish labour market policy. The main objective has been to reduce frictions in the market by offering education and guidance in job search. Participation in labour market training increases the length of the earnings-related allowance by 4 months. The share of the labour force in training has varied from

[5]The required number of months in work was raised from 6 to 10 months in 1997. The requirements were changed again in 2003.

[6]This rule came into effect first in 1996 for those under 20 years of age but it was extended for those under 25 in 1997.

1% to 2% in the 1990s.

Another form of ALMP is to offer subsidised jobs for individuals who have difficulties in finding a job. At the end of the 1980s, government had an aim of full employment and since 1988 there was a commitment to offer a subsidised job for all individuals in long-term unemployment. For those under 20 years of age, the time limit was 6 months. As a result of this policy, the proportion of long-term unemployment was very low before the recession. However, soon after the dramatic rise in unemployment, it became impossible to offer a job for all and the commitment was abandoned gradually by 1993. The share of the labour force in subsidised jobs rose from 1% to 2.5% between 1990 and 1997.

Wages in Finland are determined to a large extent by collective agreements between trade unions and employer organisations. During the analysis period, the coverage of agreements was around 95% of workers. There is no minimum wage legislation but collective contracts contain job-complexity and education specific minimum wages.

3 Data

3.1 Analysis data

The analysis data are based on the Employment Statistics database of Statistics Finland. The dataset is a representative sample of 350,000 individuals between 12 to 75 years of age living in Finland in 1997. The information in the data is combined from several administrative registers from 1987 to 2000. The most important information for this study is provided by the labour administration. The dates of individual labour market transitions are recorded. The information on job spells comes from the pension institutes.

The analysis data are constructed as an inflow sample by including unemployment spells starting between the beginning of 1987 and the end of 1999. The follow-up ends at the end of 2001 which means that the ongoing spells are censored at that time. Spells starting after 1999 are excluded to allow at least two years follow-up and because some background variables are not available for 2000. The background variables include demographic and socio-economic characteristics of individuals.

There are some drawbacks in the dataset. Only one employment spell and one ALMP spell of each type is recorded per year. In addition, only four unemployment spells are included annually. However, the share of individuals with four spells in one year is very low in the analysis data.

The registers of labour administration are not complete. Approximately 6% of the unemployment spell end dates and 20% of the information on the exit state are missing in the original dataset. It is possible to fix a major proportion of the missing data by using other information in the dataset. However, the overall share

of missing information remains above 10% because the exit state is often encoded as 'other state or unknown'.[7]

The major institutional changes should be taken into account when unemployment is analysed over a long time period. Especially the reform in 1997 concerning elderly people had a major impact on the employment probability (Kyyrä & Wilke, 2007). This is addressed by limiting analysis data to individuals from 20 to 49 years of age. In addition, 2906 individuals are removed from the data because of missing covariate information. This leaves a dataset of 111,764 individuals having 423,126 unemployment spells between 1988 and 1999.

3.2 Variables

The key variable in this analysis is the indicator of macroeconomic conditions or the business cycle. The previous studies have used several different measures. Popular choices include the unemployment rate, GDP or some transformation of these. The regional unemployment rate is used in this study as it is directly linked to the changes in labour demand. It is available as a quarterly series for 13 labour force districts. Regional series has two advantages over national series. Firstly, it takes into account the regional differences that are relatively large in Finland. Secondly, it brings more variation and strengthens the identification. To remove variation that is not related to the business cycle, seasonally adjusted unemployment series is used (see Appendix).

Quarterly dummies are used to capture the strong seasonal variation in employment probability. Annual dummies denoting the year unemployment begins are included to capture time trends that are not captured by the unemployment rate. The region of residence is included to take into account fixed regional differences.

Individual background information is observed either at the end of the year preceding unemployment or when individuals register as unemployed. The variables are: gender, age (6 categories), education (4), broad occupation (9), family type (6), native language (3), the statistical classification of the residence area (3) and a disability indicator. In addition, the following variables were constructed using the information on labour market history available in the data: time in unemployment during previous 12 months (4 categories), previous labour market state (4 categories) and indicator for repeated unemployment (over two spells during the past 12 months). A detailed variable description is provided in Appendix.

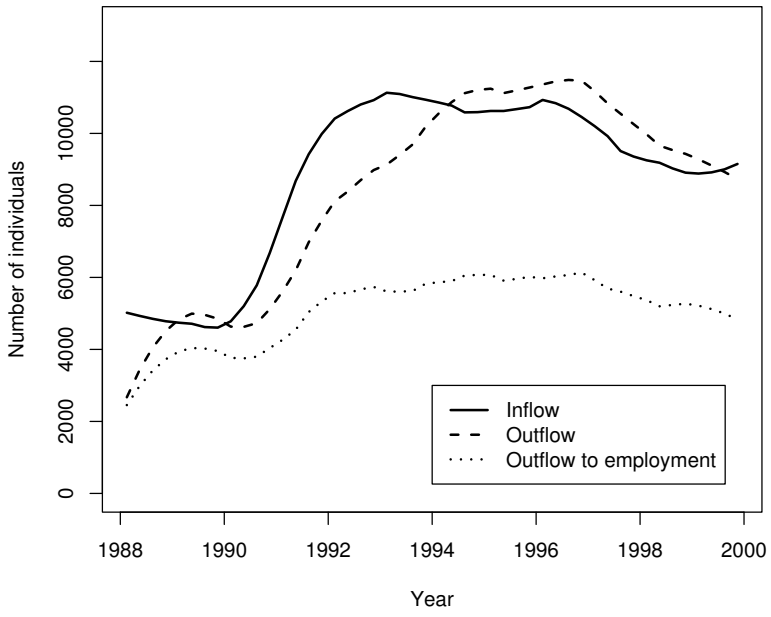

Figure 3: Smoothed quarterly inflow to unemployment and outflows from unemployment. Both number of exits to any state and number of exits to employment are shown.

3.3 Descriptive statistics

The changes in the number of unemployed individuals can be illustrated using inflow and outflow series. Figure 3 presents quarterly flow series computed from the data. Because of strong seasonality, Loess smoothing is used.[8] When the recession starts in 1990, the gap between inflow and outflow starts to grow. The number of unemployed individuals increases quickly until 1994 when the outflow finally exceeds the inflow. After that, the outflow remains higher than inflow and the unemployment rate decreases slowly but steadily. It is interesting that flows remain on much higher level after the recession. This reflects the fact that repeated unemployment increases during the recession. The large impact of ALMP is seen in the outflow to employment which grows slowly compared with other flows.[9]

Table 1 presents the exits from unemployment by the exit state and the year unemployment has started. The shares of exit reasons vary substantially between years. In the late 1980's, around 60% of the individuals are known to exit to

[7] The details of the procedures that were used to fix missing information are presented in Verho (2005).

[8] Loess is a local regression method proposed by Cleveland (1979).

[9] The same employment definition is used here as in the duration model. Employed include recalls and exits to unknown state.

employment. When the recession starts this share drops quickly while the number of individuals exiting to active labour market programmes increases. Also the number of individuals who leave the labour force grows. In recalls, there is a large peak in 1993. When the recovery in the economy starts around 1994, there is no large change in the share of individuals exiting to active labour market programmes or out of the labour force.

Table 1: Exit states from unemployment in percentages and the total number of unemployment spells by the starting year of unemployment.

	Employed	Recall	Unknown	ALMP	Out of LF	Total
1988	61.60	8.90	13.90	8.10	7.50	20123.00
1989	61.20	8.50	14.30	8.00	8.00	19090.00
1990	47.30	8.50	19.50	18.20	6.50	21471.00
1991	28.50	3.80	31.80	29.40	6.40	37117.00
1992	29.10	5.50	25.60	29.90	10.00	42780.00
1993	31.90	10.90	14.30	31.20	11.80	44619.00
1994	42.30	6.00	8.10	31.10	12.50	42607.00
1995	43.00	5.60	7.70	32.20	11.50	42371.00
1996	43.70	5.10	7.90	32.10	11.10	43949.00
1997	43.80	5.10	7.50	32.30	11.30	37869.00
1998	44.70	4.90	10.40	29.50	10.50	36195.00
1999	45.10	5.40	14.30	24.80	10.40	34935.00
Total	41.50	6.30	14.30	27.70	10.20	423126.00

Note: Employed = exit to employment can be identified from the data, Recall = recalled by the previous employer, Unknown = exit state cannot be identified from the data, ALMP = labour market training or subsidised work, Out of LF = exit from labour force.

The unknown state in Table 1 consists of individuals for whom the exit state could not be determined from the data. If individuals find a new job without using the public employment services, the labour administration is often not informed. To some extent it is possible to identify exits to employment by using the information on labour market history that is available in the data. Yet a relative high share of individuals exit to unknown state. The share of unknown exits increases especially during the recession.

The changes in the composition of individuals who flow into unemployment may contribute to the cyclical variation of the average unemployment duration. Figure 4 shows the annual inflow composition by age, education and occupation. In 1987, half of the individuals entering unemployment are under 30 years. Their share drops and the share of over 40 years old grows gradually by 10 percentage points. At the same time, the proportion of individuals with basic education declines while tertiary education becomes more common among the unemployed

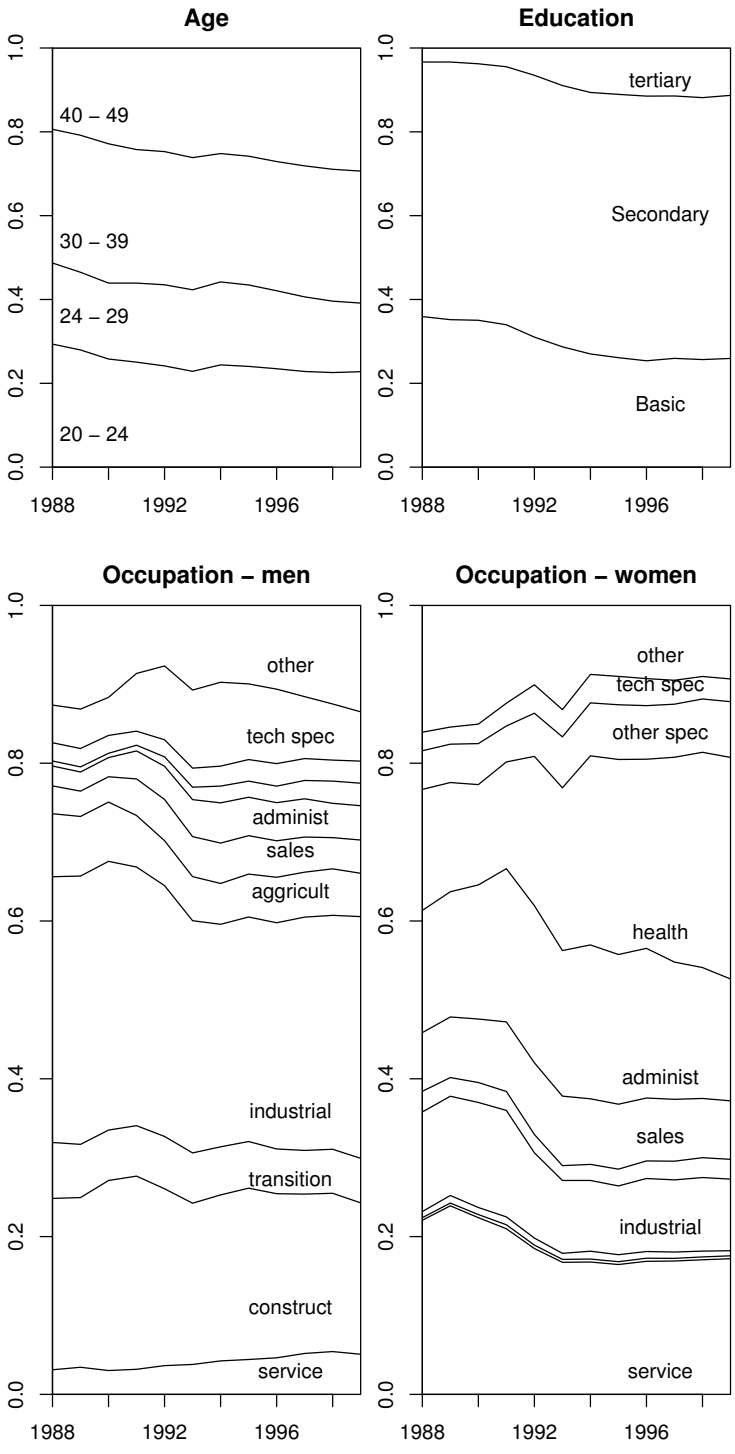

Figure 4: Variation in the composition of inflow for age, education and occupation.

individuals. These trends are roughly similar for men and women.

The occupational distributions of unemployed individuals are given in the lower panels of Figure 4 by gender since there are large differences. For unemployed men, the common occupations are in industrial and construction work. During the analysis period, the share of the other occupations increases slightly. Between 1990 and 1992, the proportion of technical specialists grows while especially the share of industrial occupation diminishes. The common occupations for unemployed women are in health care, service and administrative work. During the period, the share of health care and other specialist occupations grows and the share of service and industrial occupations decreases. The distribution changes one year later than for men. The detailed characteristics of unemployed individuals are presented in Appendix.

4 Econometric methods

4.1 Model

Unemployment durations are conveniently modelled by specifying a model for the hazard function. An unemployment duration T is censored when the exit state is other than employment or when the duration is longer than the follow-up period. Also spells that end to recall or to exit into unknown state are considered as exits to employment. The exits to unknown state are more likely exits to employment than exits out of the labour force in the analysed age groups.[10] The follow-up period is limited to three years.

The model is used to study the determinants of unemployment duration over time. This is done by predicting the impact of inflow composition and the business cycle variables. A proportional hazard model with piecewise constant baseline hazard is chosen because it provides a flexible specification that is useful for prediction purposes. The model for hazard θ at duration t can be denoted

$$\theta(t) = \lambda(t) \exp(x(t)\beta),$$

where $\lambda > 0$ is the baseline hazard and $\exp(x(t)\beta)$ is the systematic part including the explanatory variables x. The piecewise constant baseline hazard is specified using 14 interval parameters α_j. The first two intervals are 30 days to capture the quickly deceasing hazard at the beginning of the spell. The next 11 intervals are 60 days and the last interval is a residual piece from 720 to 1095 days. If $\alpha_j > \alpha_{j+1}$, it implies a negative duration dependence between intervals j and $j+1$. This gives a step function

[10] The exits to unknown state are not strongly related to the duration of spell. The main results of compositional analysis are robust to changing the event definition by treating the exits to unknown state as censored observations.

$$\lambda(t) = \exp(\alpha_j), \quad c_{j-1} \leq t < c_j, \quad j = 1, \ldots, 14.$$

Three different type of explanatory variables are included in the model. The individual background variables x_1 are observed at the beginning of the spell and kept fixed. The regional unemployment rate $u_{\tau(t)}$ varies quarterly in calendar time τ and depends on the duration time t. To allow a non-linear effect of unemployment rate, also a second order term is included. The residual calendar time variation is captured by a vector of fixed annual dummies Y and time-varying quarter dummies $Q_{\tau(t)}$ which are taking into account seasonality in employment. For technical reasons, time-varying covariates change value only between intervals. Finally, regional differences are controlled by including a vector of dummies for the region of residence R. This specification gives a model

$$\theta(t) = \exp(\alpha_j) \cdot \exp(x_1\beta_1 + R\beta_2 + Y\beta_3 + \beta_4 Q_{\tau(t)} + \beta_5 u_{\tau(t)} + \beta_6 u^2_{\tau(t)}).$$

The model is extended by including interaction terms between the linear unemployment term $u_{\tau(t)}$ and individual characteristics x_1 as well as the baseline hazard α_j. The interaction terms allow the effect of individual characteristics and the duration dependence vary according to the level of unemployment. The unemployment rate $u_{\tau(t)}$ is the difference from the mean unemployment rate in the analysis period (10%).

When the region of residence and the year the unemployment begins are controlled for, the main source for identifying variation for the unemployment rate is obtained from within region variation across the business cycle. Regional variation in Finland is large although many regions have similar trends (see Appendix). A second source for identifying variation is obtained from the time-variation of the quarterly unemployment rate during unemployment spells. When a spell continues over a quarter, the value of the unemployment rate changes.

The proportional hazard model is a log-linear model. Thus, it is assumed that covariates have a constant multiplicative effect on the employment hazard. However, in reality effects can vary over the duration of spells, between time periods and sub-populations. Interacting the time-varying business cycle proxy with individual characteristics allows some dependence between covariates and the duration of spell. When a long time period with large macroeconomic fluctuation is analysed, as in this case, it is very likely that parameters vary in time. Indeed, it seems that there are different time periods that follow roughly the phases of the business cycle.[11]

[11] The annual variation of the hazard rate can be studied non-parametrically using, for example, cumulative hazards. Time variation of the model parameters can be examined by estimating the model separately by the year unemployment begins. The cumulative hazards are presented in

To take into account the differences in parameter values between different periods, the model is estimated separately for the pre-recession period (spells that begin in 1988–1989), the recession period (1990–1992), the recovery period (1993–1995) and the growth period (1996–1999). In fact, the baseline hazards are relatively similar between the last two periods but there are differences in other parameters. The model is also estimated separately for genders because there are evident differences in baseline hazards and other parameters.

Duration models suffer from downward biased estimates when there is unobserved heterogeneity, especially in case of baseline hazard and time-varying covariates. A possible solution would be to follow Heckman & Singer (1984) who suggest estimating the mixing distribution in a mixed proportional hazard model to correct the bias. However, the interest in the parameter estimates is limited in this case because the model is mainly used for predicting. Therefore, the explicit modelling of the unobserved heterogeneity is not very useful as it doesn't change the mean effects (Wooldridge, 2002, p. 706). In addition, there seems to be a trade-off between the flexibility of the baseline hazard and the number of the mass-points used in the non-parametric unobserved heterogeneity distribution (Baker & Melino, 2000).

The piecewise constant baseline hazard implies that single intervals are independent and follow an exponential regression model.[12] Many individuals experience multiple spells during single analysis periods (see Appendix). This is typical for individuals in seasonal work or for those who have a loose attachment to the labour force. However, it is assumed in the analysis that after controlling an extensive set of individual covariates and detailed labour market history variables, the multiple spells can be considered as independent observations.

4.2 Identification of the sources of variation

The different sources of variation in unemployment duration until employment are identified following Rosholm (2001). The components are compositional variation, an outflow effect that affects all unemployed individuals and residual calendar-time variation. A similar approach has also been used with aggregated data (e.g. Abbring et al., 2002). The basic idea is to allow each component to take different values over time while keeping others fixed. Then the expected unemployment durations $\mathrm{E}(T|x_1, R, Y, Q, u)$ are predicted quarterly for each year which will show the variation that the studied component creates.

Appendix. Also the yearly estimated models (not reported) point to the conclusion that the analysis period should be split as the baseline hazard and the other parameter values differ noticeable between the periods.

[12] The model is a special case of a Weibull model or a Poisson model with an offset parameter which implies that the model can be conveniently estimated using the standard procedures available in statistical software packages.

The compositional variation gives the impact of the observed individual heterogeneity. The predictions are obtained for each cohort of individuals who enter unemployment in a given quarter and year. The variables taking different values are x_1 and R according to the inflow composition. The regional unemployment u is kept on the average level of the analysis period (10%). Also the annual and quarterly dummies are kept on their average level ($\overline{Y}$,$\overline{Q}$). This measures, for example, the impact of change in the average age or education of individuals who enter unemployment between the first quarter of 1988 and last quarter of 1999.

The outflow effect is obtained using the aggregate unemployment rate as a proxy for the business cycle. The predictions are computed for the average person ($\overline{x_1, R}$) in the data and u takes the values of the seasonally adjusted quarterly aggregate unemployment rate. The calendar time dummies are kept again on their average level ($\overline{Y}$,$\overline{Q}$). This gives the direct influence of the business cycle on unemployment duration. Finally, the influence of the residual calendar-time variation is predicted using the annual and quarterly dummies (Y, Q) while keeping other variables at their expected level. The predictions are obtained for the average person ($\overline{x_1, R}$) and the unemployment rate is kept on 10% level.

5 Results

The results are presented first for a basic model without interactions terms. The marginal effects of the key covariates are shown to illustrate what determines unemployment durations and how large is the variation between the analysis periods. Then the model is extended by interacting the linear unemployment rate term with individual covariates and baseline hazard. This allows duration dependence and the effect individual characteristics to vary by the level of unemployment in the region. To motivate the extension of the model, significance of the interaction terms are tested. Finally, the impact of compositional, business cycle and residual-time variation on unemployment duration is studied.

5.1 Effect of covariates

The coefficients of the model give the marginal effect of the variables on the log hazard. The key covariate in the analysis is the regional unemployment rate. It is included as a second order polynomial in the model. Figure 5 shows the effects for the range of aggregate unemployment rates that are observed in each analysis period. The unemployment rate has a statistically significant effect in all cases except for women in 1988–89. Generally, an increase in the unemployment rate is related to a lower hazard rate and longer unemployment duration. However, for the low values of unemployment in 1988–89 and high values in 1990–92 the relation is reverse for men. The magnitude of coefficients is relatively small which

means in practise that the regional unemployment rate works somewhat poorly as a proxy for the business cycle.

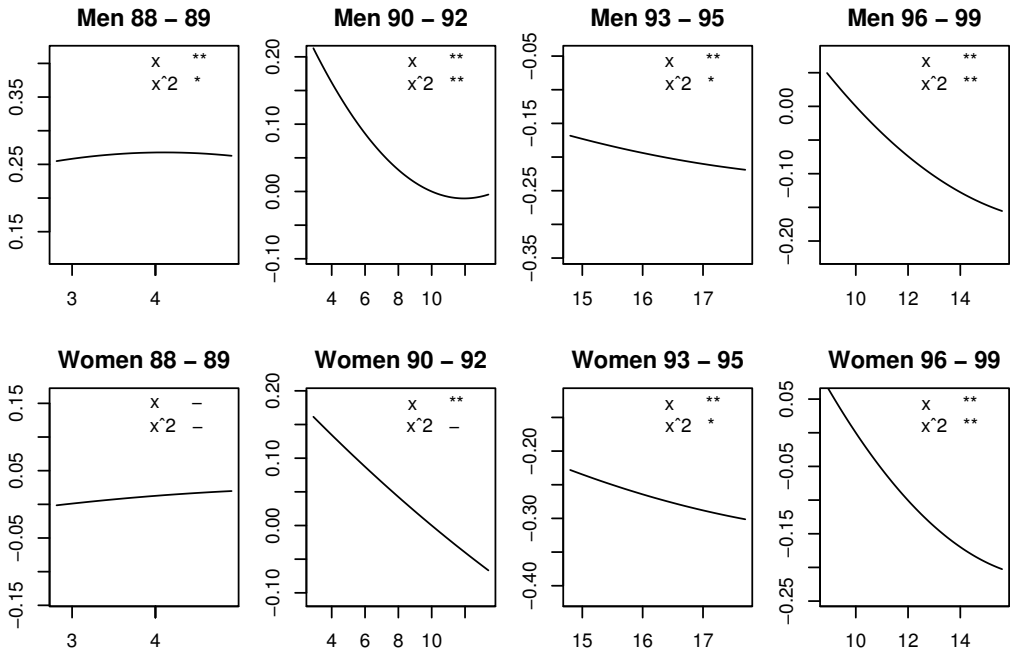

Figure 5: The effect of the regional unemployment rate on log hazard for a range of values in percentages. The significance of the coefficients on 5% level is denoted by * and on 1% level by **.

Figure 6 presents the coefficients for a set of interesting individual covariates. There are obvious changes in the parameters between the periods. This points to the conclusion that compositional variation contributes through both inflow variation and changes in the relative position of the different groups of unemployed individuals. Interacting the regional unemployment rate with individual covariates provides some more flexibility in the model.

There are interesting patterns in the coefficients that are related to the changes in relative labour demand. The increase in the coefficients show that the relative position of 25–29 and 45–49 years old men becomes better during the analysis period. In case of education, the individuals with tertiary education perform worse after the recession, i.e. the last two coefficients are lower. The recession also changed demand for different skills which is reflected in the large time variation in the occupation coefficients. The full model output is presented in Appendix.

The basic model is extended by interacting the regional unemployment rate $u_{\tau(t)}$ with baseline hazard α_j and individual covariates x_1. Table 2 shows the

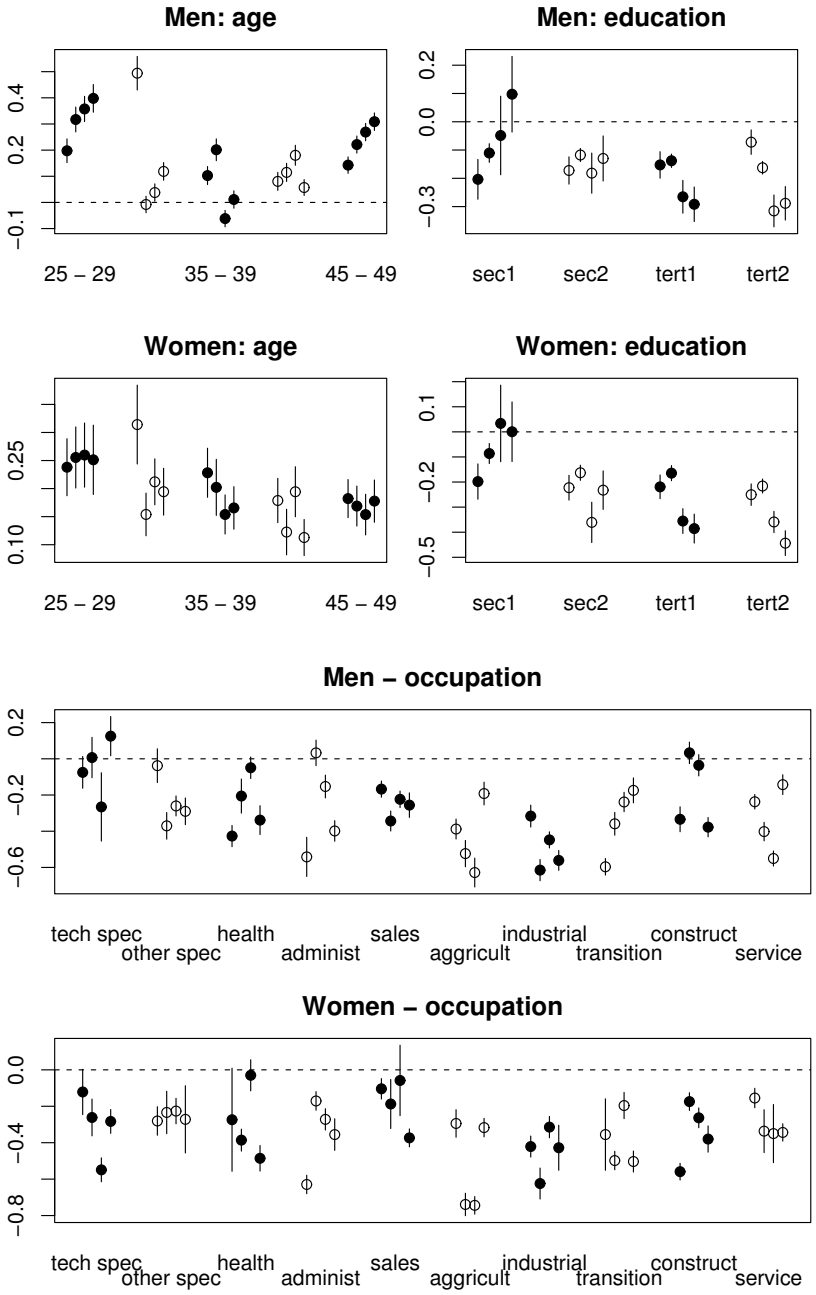

Figure 6: Coefficients for age, education and occupation. y-axis shows the marginal effect on log hazard. The baseline group is 20–24 years old with basic education and 'other' occupation. Successive points show the coefficients for the four analysis periods. Vertical bars denote 95% confidence intervals.

results of likelihood ratio tests between the basic model and models where a single interaction term is introduced at a time. The interaction with baseline hazard is significant in every model which indicates that duration dependence changes with the level of unemployment. Also all interactions with individual covariates are significant except in case of disability indicator for men and area type for women. For consistency, all interaction terms are included in the full model for both genders.

Table 2: Tests of interaction between the regional unemployment rate and individual covariates.

	88–89	90–92	93–95	96–99
Men				
baseline	**	**	**	**
age	-	**	**	**
education	**	**	**	**
occupation	**	**	**	**
family type	*	**	-	**
language	-	**	**	*
area type	*	**	**	-
disability	-	-	-	-
unemployment history	**	**	**	**
repeated unempl.	*	-	-	*
previous state	*	**	**	**
Women				
baseline	*	**	**	**
age	-	*	**	**
education	**	**	**	**
occupation	**	**	**	**
family type	-	**	-	*
language	*	**	-	-
area type	-	-	-	-
disability	**	-	*	*
unemployment history	-	**	**	**
repeated unempl.	-	-	-	**
previous state	-	**	**	**

Likelihood ratio tests are done by including a single interaction term at a time. No significance is denoted by -, 5% level significance by * and 1% level by **.

5.2 Determinants of unemployment duration

The decomposition analysis illustrates the relative contribution of compositional changes in the unemployment inflow, the outflow effect and the residual-time variation. The aggregate unemployment rate is shown in Figures 7 and 8 due to its role

as a business cycle proxy. The predicted average unemployment duration series are discontinuous because the predictions are obtained from separate models.

Figure 7 presents the impact of compositional variation. The upper panel shows that the predicted compositional variation is relatively small compared with overall changes in the average unemployment duration. However, the lower panel with finer scale reveals that compositional variation includes trends and noticeable seasonal variation. Before 1993 there seems to be a mild increasing trend which means that the average observed characteristics of individuals become less favourable for employment.[13] Between 1993–96 the magnitude of the variation is small. From 1996 onwards the variation in the predictions is larger but there is no evident trend.

The seasonality in the compositional variation is quite strong, especially in the early periods. In 1988–89, the within year variation is 13% of the predicted mean duration in the period. The respective share is half smaller in 1990–92 and becomes even smaller later. In the first two periods, the later quarter individuals enter unemployment, the worse characteristics they have. In the two last periods, the picture changes as the characteristics are worse for those who enter unemployment in the second quarter.

The magnitude of changes between the annual mean durations are smaller. In the first period, the increase is 1.9% and in the second period the largest change is 3.5% compared with the previous year. Between 1993 and 1996, the respective changes are very small but in the last period the change between 1997 and 1998 is relatively large, -7.1%. The previous studies have mixed results on the relevance of compositional variation. Rosholm (2001) finds noticeable procyclical compositional variation, i.e. the characteristics of individuals entering unemployment improve during booms. The results of this analysis are more in line with van den Berg & van den Klaauw (2001), Abbring et al. (2002) and Imbens & Lynch (2006) who find the influence of cyclical compositional effects to be small or negligible. Also Abbring et al. (2001) and Abbring et al. (2002) find seasonality in compositional variation to be important. However, Abbring et al. (2002) find the pattern to be quite different in France as those entering unemployment in the last two quarters have the highest exit rates.

The effect of unemployment rate and residual variation are shown in Figure 8. The predictions are done using the seasonally adjusted aggregate quarterly unemployment rate. It seems that the model is unable to contribute the business cycle variation to the unemployment rate and the majority of the variation is captured by the annual dummies. This is true especially in the recession period. The model performs better in 1996–99 where the unemployment rate captures the declining trend and the residual variation consists mainly of seasonal variation.

[13]When compositional variation is studied without the labour market history variables, the pattern changes interestingly. The small increasing trend changes to a small decreasing trend.

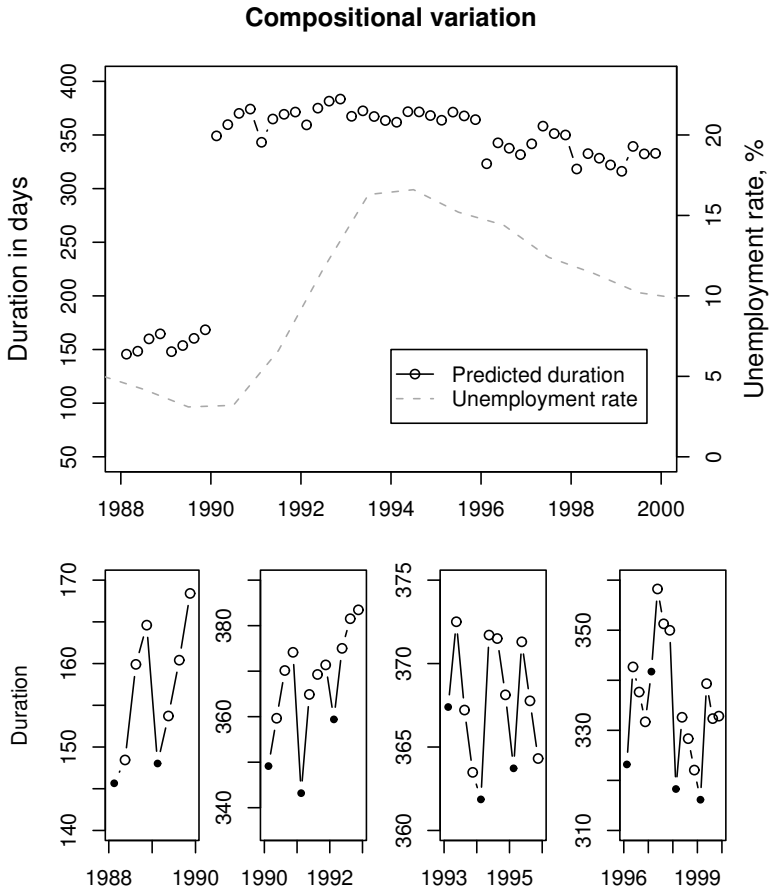

Figure 7: Effect of compositional variation on unemployment duration and the unemployment rate. The upper panel shows the predictions on the same scale and the lower panel shows the analysis periods on separate scales (black dot denotes the first quarter of each year).

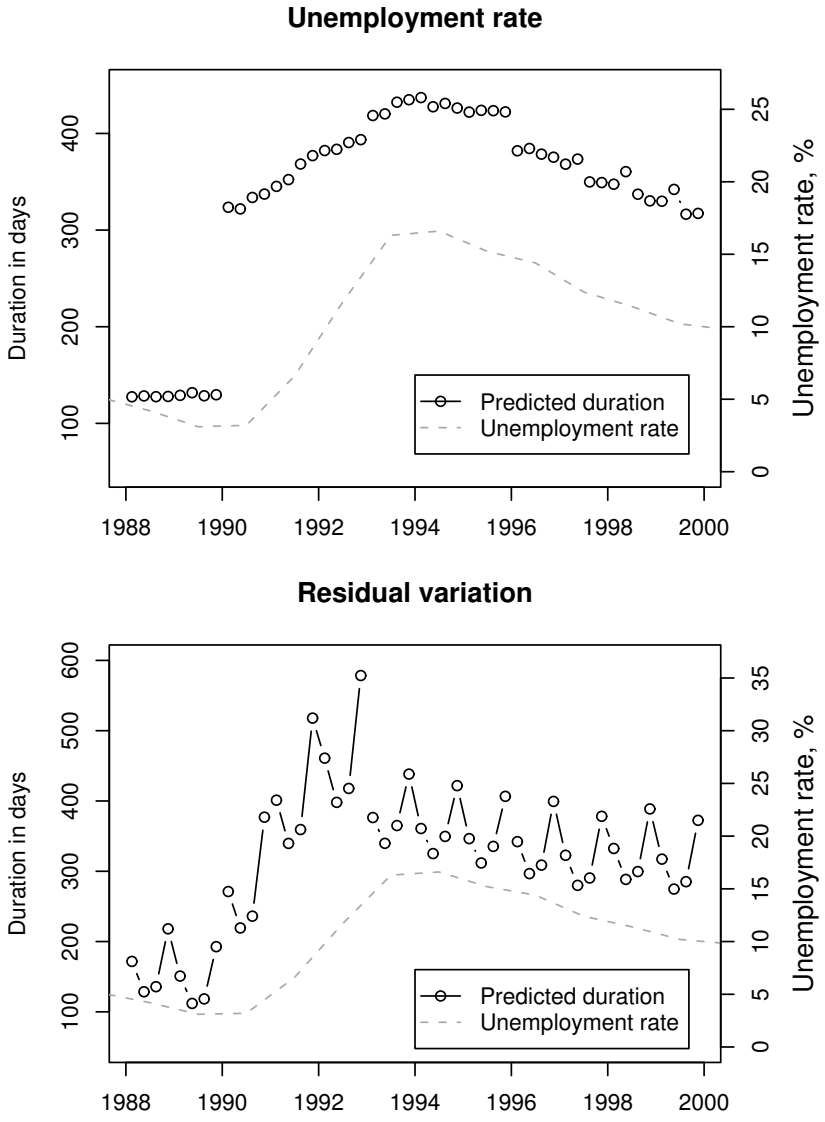

Figure 8: Effect of aggregate unemployment rate and residual variation on duration and the unemployment rate.

The predicted impact of quarterly dummies is very large. This is partly due to the fact that the seasonal dummies are kept constant during the predicted spells, which overstates their effect. Interestingly, the quarterly dummies show a different type of seasonality than compositional variation. The summer season seems to be the best time for employment while the last quarter of the year is the worst.

6 Conclusions

The unemployment rate in Finland increased dramatically during the recession in the early 1990s. The unemployment rate is influenced by both the number of inflow and the average duration of unemployment. This study analyses the determinants of unemployment duration in Finland using individual data from 1987 to 2000. The main question in the study is how much the changes in the composition of unemployed individuals contributed to the large increase in the average unemployment duration during the recession.

Three different components in the unemployment duration are identified following Rosholm (2001). The compositional effect is obtained by taking into account the changes in the observed heterogeneity of inflow. For example, when more individuals who are slowly employed enter unemployment, the average duration increases. The outflow effect is captured by using the regional unemployment rate as a proxy for macroeconomic conditions. Annual and quarterly dummies are used to capture residual calendar-time variation.

Eight separate duration models are estimated for genders and for the unemployment spells starting in the following time periods: 1987–1989, 1990–1992, 1993–1995 and 1996–1999. The analysis shows that there are large changes in the parameter values between the periods. This is not surprising given the large structural change that took place in the economy. The change is also reflected in the inflow composition as individuals entering unemployment become older and better educated on average. Also the occupational distribution changes.

The observed compositional variation implies only a relatively small increasing trend in the predicted unemployment duration in the recession period. This means that the change in the composition of new unemployed individuals is not a major component in the large increase in the unemployment duration. The characteristics of individuals became slightly less favourable for employment. The result can be contrasted to Rosholm (2001) who finds a noticeable effect of compositional variation. Unimportant cyclical inflow composition effects, that are more similar to this study, have been found by van den Berg & van den Klaauw (2001), Abbring et al. (2002) and Imbens & Lynch (2006). Interestingly, the seasonal variation predicted using compositional variation is relatively strong. This points to the conclusion that it is more important to take seasonality into account than worry about business cycle variation when adjusting labour market policy.

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Appendix

Table 3: Variable description

Variable	Description
age	Age in years at the beginning of unemployment. Classified to 6 groups: 21–25, 26–30, 31–35, 36–40, 41–45, 46–50.
education	The highest degree earned at the time unemployment starts according to Statistics Finland classification: basic (comprehensive school), secondary 1 (lower), secondary 2 (upper), tertiary 1 (lower) and tertiary 2 (upper).
occupation	Occupational classification according to the labour administration, see Table 4.
family type	Type of the family: other (single or unmarried couple), married couple with children, married couple, unmarried couple with children or single parent.
language	Native language: Finnish, Swedish or other.
area type	Statistical classification of the residence area (municipality): urban, semi urban area or rural.
disability	Indicator for persons who have been defined mentally or physically disabled by the labour administration. The 1997 data is used for missing information in 1998–1999.
ue history	Length of unemployment during the previous 12 months. Time in unemployment is computed using the unemployment spell information in the data and classified into: 0, 0–29, 30–179, 179–365 days.
repeated ue	Indicator for more than two unemployment spells during the previous 12 months. The number of spells is computed using the information in the data. This captures individuals who experience repeated unemployment.
previous state	Previous labour market state before entry into unemployment. Derived using information in the data on employment and active labour market programmes for the previous two months. Levels are other, subsidised employment, labour market training and employment.
region	Region of residence by labour force district (13 regions).
quarter	Quarter of year. Included as a time-varying covariate.
start year	The year unemployment spell begins.
regional ur	Regional unemployment rate in percentages by labour force district. Included as a time-varying covariate.

Table 4: Description of occupation classification

Class	Description
other	No occupation classification.
tech spec	Technical specialists (engineering , chemistry, physics, biology)
other spec	Other specialists (includes teaching, law, journalism, art and humanist research)
health	Health care and social workers.
administ	Administrative, clerical and IT workers.
sales	Commercial workers (marketing, property, finance and sales)
aggricult	Agriculture, forestry and fishing workers.
transport	Transportation and post workers.
construct	Construction and mining workers.
industrial	Industrial workers.
service	Service workers (includes security, hotels and restaurants, military).

Table 5: Number of unemployment spells per individual

	88–89	90–92	93–95	96–99
1	15407	27240	31002	26185
2	6117	14998	20728	18126
3	2289	7263	10155	11384
4	830	3065	3952	6556
5 or more	263	1841	1997	5347
sum	24906	54407	67834	67598

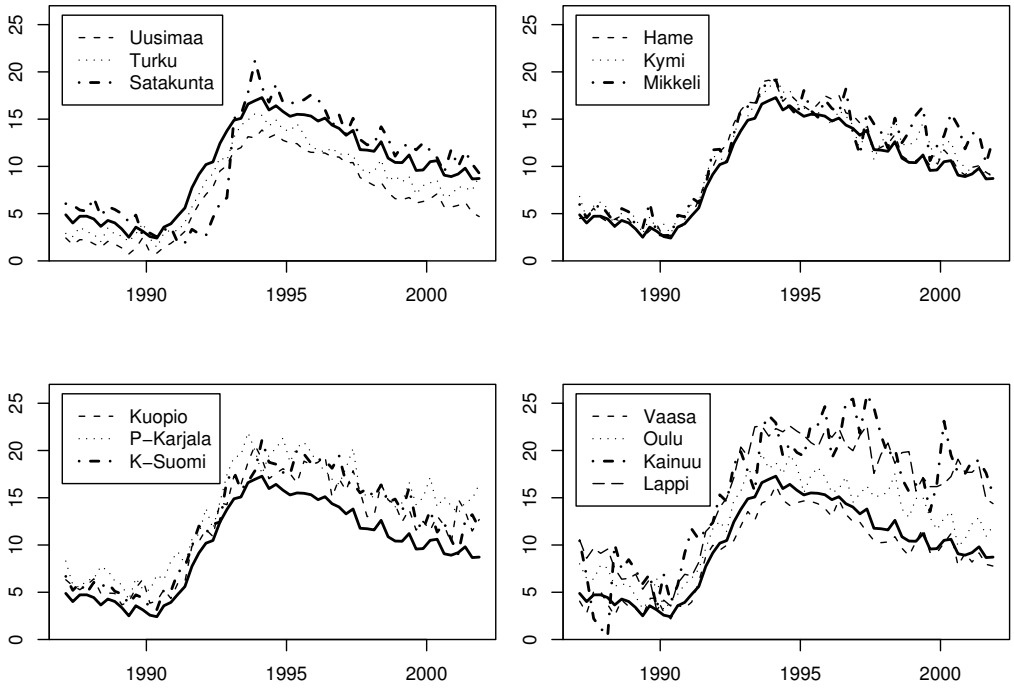

Figure 9: Seasonally adjusted regional and aggregate (solid line) unemployment rate series (source: Labour Force Survey). The definition of unemployment changed in 1997 due to EU standards. The series by the old definition is available for the period 1987–1996 and by the new definition for the period 1995–2001. The overlapping period was used to adjust 1987–1994 unemployment rates using a linear model (R-squared 0.97). Seasonal adjustment was done separately for each series using quarterly seasonal dummies.

Table 6: Descriptive statistics for men (%).

	1988–1989	1990–1992	1993–1995	1996–1999
Age: (19,24]	28.17	24.56	24.21	24.44
(24,29]	18.49	19.15	19.28	16.76
(29,34]	16.63	16.17	16.01	15.91
(34,39]	16.42	15.96	14.37	14.30
(39,44]	12.56	15.10	14.57	14.06
(44,49]	7.73	9.04	11.56	14.54
Education: primary	37.89	33.83	29.81	30.33
secondary 1	5.93	6.05	7.23	7.32
secondary 2	53.44	55.23	54.83	54.79
tertiary 1	1.34	2.95	4.60	4.05
tertiary 2	1.41	1.95	3.53	3.52
Occupation: other	12.88	8.87	10.16	11.93
tech spec	4.88	7.63	10.04	7.79
other spec	2.32	2.04	2.55	2.78
health	0.65	0.88	1.90	2.49
administ	2.48	3.58	4.88	4.62
sales	3.37	4.58	5.02	4.33
aggricult	7.78	6.39	5.41	5.72
industrial	33.84	32.65	28.73	29.56
transport	6.92	6.49	6.14	5.61
construct	21.62	23.55	21.03	20.12
service	3.27	3.34	4.14	5.06
Family type: other	34.88	36.51	35.60	43.09
married	4.05	4.67	5.04	4.44
married & children	43.88	44.49	45.21	37.03
unmarried & children	4.60	5.97	5.98	7.03
single parent	12.58	8.37	8.17	8.42
Language: Finnish	97.55	96.37	95.16	95.21
Swedish	1.98	2.72	3.29	2.70
other	0.47	0.91	1.55	2.09
Area type: urban	51.88	53.75	54.41	56.22
semi urban	14.98	16.03	16.50	16.58
rural	33.15	30.21	29.09	27.19
disabled	6.03	4.41	3.93	3.80
UE history: 0	45.52	47.11	29.07	28.16
(0,30]	11.27	9.96	7.21	7.92
(30,180]	33.75	31.35	35.85	37.69
(180,365]	9.45	11.58	27.87	26.22
Repeated UE	3.13	2.51	2.39	2.84
Previous state: other	72.53	72.15	64.99	65.41
subsidised empl	8.08	8.26	13.24	10.84
training	3.31	3.84	7.13	9.39
work	16.07	15.75	14.65	14.37
Region: Uusimaa	12.76	18.25	19.61	12.82
Turku	7.31	7.54	8.29	11.35
Satakunta	5.59	5.26	4.86	6.06
Hame	13.30	14.62	14.42	16.42
Kymi	7.44	6.86	6.70	6.29
Mikkeli	5.22	4.59	4.47	5.32
Kuopio	7.31	6.20	5.99	6.22
P-Karjala	5.45	4.64	4.43	5.03
K-Suomi	5.25	5.67	5.49	5.20
Vaasa	7.53	8.04	8.32	8.88
Oulu	9.89	8.55	8.30	7.72
Kainuu	4.37	3.35	2.98	3.77
Lappi	8.58	6.43	6.14	4.92
N obs	21696	59837	67974	73318

Table 7: Descriptive statistics for women (%).

	1988–1989	1990–1992	1993–1995	1996–1999
Age: (19,24]	29.30	25.20	23.20	21.60
(24,29]	19.50	18.60	19.90	18.20
(29,34]	16.70	16.20	16.30	16.90
(34,39]	14.70	15.90	15.30	15.30
(39,44]	11.30	14.50	14.00	14.70
(44,49]	8.60	9.70	11.30	13.30
Education: primary	32.70	31.70	24.50	21.50
secondary 1	8.10	9.20	9.40	8.80
secondary 2	55.10	53.50	53.60	54.60
tertiary 1	1.20	2.40	6.90	8.60
tertary 2	2.80	3.20	5.60	6.50
Occupation: other	15.80	11.90	10.30	9.30
tech spec	2.30	3.10	3.60	3.10
other spec	4.90	5.10	6.70	6.80
health	14.60	15.70	23.10	26.20
administ	15.70	19.10	19.00	17.20
sales	7.60	8.80	8.40	7.70
aggricult	2.50	2.40	2.00	2.40
industrial	12.60	12.30	9.00	9.20
transport	0.90	0.90	0.90	0.80
construct	0.30	0.50	0.40	0.40
service	23.00	20.20	16.70	17.00
Family type: other	22.30	28.00	30.40	31.80
married	6.40	6.50	6.80	6.40
married & children	49.90	46.30	45.20	40.50
unmarried & children	5.10	7.80	5.60	7.40
single parent	16.30	11.30	12.00	13.90
Language: Finnish	97.30	96.20	95.10	95.00
Swedish	2.10	2.80	3.50	3.10
other lang	0.60	1.00	1.30	1.90
Area type: urban	54.40	57.10	58.60	59.40
semi urban	15.90	16.10	16.30	16.80
rural	29.70	26.90	25.10	23.80
Disabled	7.90	7.60	5.50	5.00
UE history: 0	52.90	54.20	37.20	33.00
(0,30]	10.50	10.20	7.90	9.60
(30,180]	28.90	27.60	32.60	36.80
(180,365]	7.80	8.00	22.40	20.70
Repeated UE	2.90	2.40	2.30	2.60
Previous state: other	62.30	63.20	61.50	57.50
subsidised empl	10.10	8.50	13.70	14.20
training	3.50	4.50	6.70	10.30
work	24.10	23.80	18.10	17.90
Region: Uusimaa	9.60	16.50	19.40	12.60
Turku	6.80	7.90	8.60	11.30
Satakunta	7.20	6.10	5.10	6.30
Hame	16.70	15.60	15.40	18.60
Kymi	9.00	7.80	7.70	6.60
Mikkeli	5.00	4.30	4.30	5.10
Kuopio	5.90	5.80	5.60	6.00
P-Karjala	5.00	4.50	4.00	4.60
K-Suomi	6.20	6.20	5.50	5.20
Vaasa	9.10	8.80	9.00	9.20
Oulu	8.50	7.40	7.20	7.10
Kainuu	3.20	2.80	2.60	3.20
Lappi	7.90	6.40	5.60	4.20
N obs	17517	41531	61623	79630

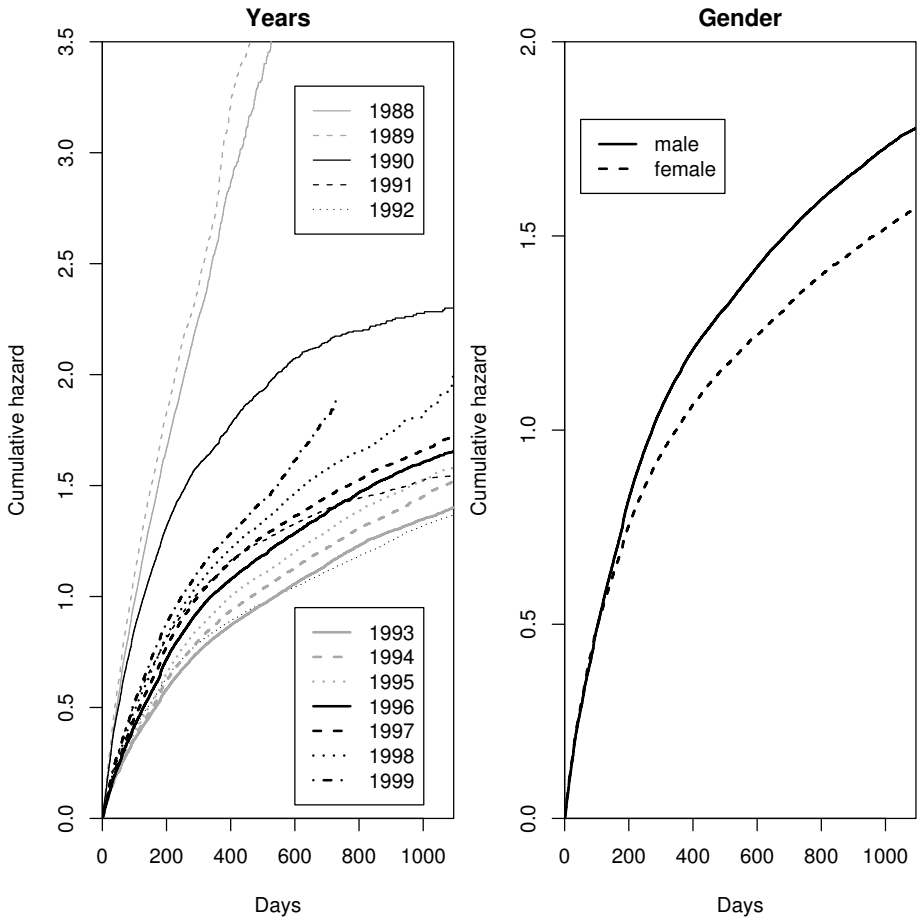

Figure 10: Cumulative hazard of employment by starting year of unemployment and gender.

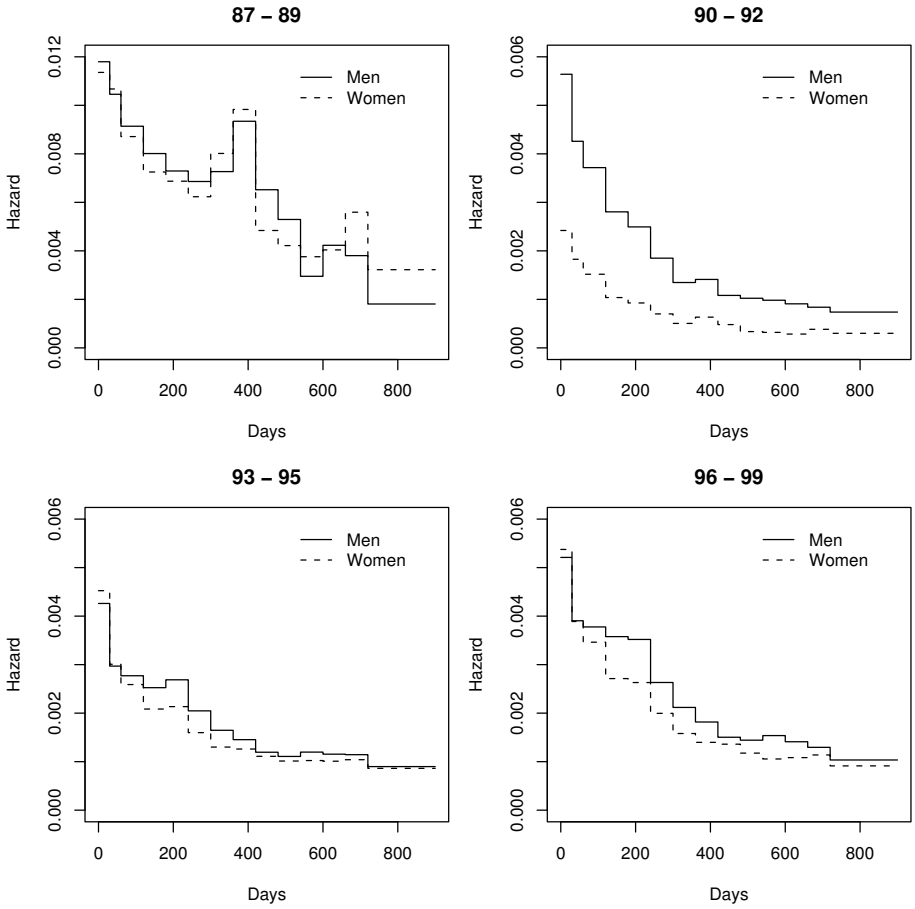

Figure 11: Estimated baseline hazards for men and women.

Table 8: Coefficients for men's model

	88-89		90–92		93–95		96–99	
	Coef	S.E.	Coef	S.E.	Coef	S.E.	Coef	S.E.
(Intercept)	4.71	0.081	5.094	0.045	5.863	0.041	5.484	0.03
piece2	0.121	0.02	0.281	0.016	0.361	0.017	0.288	0.015
piece3	0.255	0.02	0.417	0.015	0.43	0.016	0.322	0.014
piece4	0.387	0.027	0.699	0.019	0.523	0.017	0.376	0.016
piece5	0.481	0.036	0.816	0.022	0.461	0.019	0.392	0.018
piece6	0.542	0.049	1.115	0.028	0.733	0.023	0.683	0.023
piece7	0.484	0.064	1.432	0.034	0.951	0.027	0.9	0.029
piece8	0.233	0.081	1.386	0.039	1.076	0.032	1.053	0.035
piece9	0.593	0.128	1.652	0.05	1.272	0.039	1.243	0.043
piece10	0.801	0.18	1.707	0.056	1.348	0.044	1.284	0.048
piece11	1.386	0.317	1.748	0.062	1.27	0.047	1.22	0.053
piece12	1.026	0.354	1.826	0.069	1.306	0.053	1.307	0.062
piece13	1.132	0.448	1.907	0.079	1.315	0.06	1.392	0.072
piece14	1.875	0.409	2.034	0.048	1.557	0.037	1.617	0.048
age (24,29]	0.198	0.023	-0.008	0.016	-0.062	0.016	0.057	0.015
age (29,34]	0.317	0.024	0.038	0.017	0.011	0.017	0.143	0.016
age (34,39]	0.358	0.025	0.119	0.017	0.08	0.018	0.221	0.017
age (39,44]	0.398	0.027	0.103	0.018	0.115	0.018	0.269	0.017
age (44,49]	0.494	0.033	0.201	0.021	0.18	0.019	0.309	0.017
education sec1	-0.204	0.036	-0.172	0.025	-0.153	0.024	-0.072	0.022
education sec2	-0.111	0.017	-0.118	0.012	-0.138	0.012	-0.163	0.011
education tert1	-0.049	0.071	-0.182	0.036	-0.265	0.03	-0.315	0.029
education tert2	0.097	0.068	-0.13	0.041	-0.292	0.031	-0.288	0.03
occupation tech spec	-0.075	0.045	-0.049	0.03	-0.388	0.028	-0.239	0.027
occupation other spec	0.007	0.057	-0.339	0.041	-0.524	0.037	-0.174	0.035
occupation health	-0.266	0.096	-0.542	0.055	-0.628	0.041	-0.334	0.035
occupation administ	0.125	0.055	0.033	0.036	-0.192	0.032	0.033	0.03
occupation sales	-0.038	0.048	-0.153	0.032	-0.316	0.031	-0.036	0.03
occupation aggricult	-0.37	0.038	-0.398	0.029	-0.615	0.03	-0.377	0.027
occupation industrial	-0.26	0.028	-0.167	0.023	-0.448	0.023	-0.237	0.02
occupation transition	-0.29	0.038	-0.344	0.028	-0.561	0.028	-0.402	0.026
occupation construct	-0.427	0.03	-0.224	0.023	-0.596	0.023	-0.551	0.021
occupation service	-0.206	0.048	-0.256	0.035	-0.359	0.032	-0.143	0.028
family married	-0.169	0.039	-0.275	0.025	-0.263	0.024	-0.298	0.023
family married & child	-0.21	0.018	-0.203	0.012	-0.27	0.012	-0.253	0.011
family unmarried & child	-0.143	0.037	-0.025	0.023	-0.187	0.022	-0.218	0.019
family single parent	-0.026	0.025	0.046	0.021	0.022	0.021	0.018	0.019
language Swedish	0.097	0.055	-0.1	0.031	-0.183	0.027	-0.177	0.028
language other	-0.113	0.108	0.071	0.059	0.37	0.05	0.5	0.04
area type semi urb	-0.053	0.022	-0.109	0.015	-0.073	0.014	-0.114	0.013
area type rural	-0.066	0.019	-0.056	0.013	-0.056	0.013	-0.072	0.012
disaibility	0.479	0.035	0.392	0.03	0.623	0.033	0.519	0.03
ue history (0,30]	-0.177	0.025	-0.201	0.017	-0.376	0.02	-0.275	0.018
ue history (30,180]	0.034	0.018	0.05	0.012	-0.139	0.013	-0.036	0.012
ue history (180,365]	0.259	0.028	0.339	0.02	0.186	0.015	0.427	0.014
repeated ue	-0.159	0.043	-0.25	0.032	-0.447	0.029	-0.323	0.027
prev state subs empl	0.686	0.033	1.22	0.027	1.096	0.02	0.941	0.019
prev state training	0.234	0.042	0.598	0.032	0.618	0.024	0.645	0.02
prev state work	0.191	0.021	0.51	0.016	0.306	0.015	0.289	0.014
region Turku	0.038	0.04	-0.156	0.022	-0.142	0.023	-0.12	0.024
region Satakunta	0.268	0.055	0.008	0.027	-0.165	0.038	-0.22	0.038
region Hame	0.187	0.044	-0.076	0.022	-0.098	0.034	-0.161	0.033
region Kymi	0.158	0.051	-0.135	0.026	-0.189	0.035	-0.177	0.038
region Mikkeli	0.325	0.055	-0.091	0.031	-0.096	0.039	-0.158	0.041
region Kuopio	0.291	0.055	-0.178	0.028	-0.065	0.04	-0.119	0.042
region P-Karjala	0.388	0.062	-0.18	0.034	-0.089	0.046	-0.107	0.048
region K-Suomi	0.324	0.058	-0.129	0.029	-0.03	0.041	-0.128	0.046
region Vaasa	0.288	0.046	-0.105	0.024	-0.107	0.026	-0.14	0.029
region Oulu	0.197	0.053	-0.233	0.026	-0.179	0.037	-0.191	0.043
region Kainuu	0.34	0.062	-0.191	0.039	0.019	0.055	-0.106	0.058
region Lappi	0.203	0.057	-0.142	0.032	-0.069	0.05	-0.123	0.056
quarter II	-0.411	0.021	-0.332	0.014	-0.248	0.014	-0.328	0.013
quarter III	-0.347	0.022	-0.159	0.014	-0.04	0.014	-0.114	0.013
quarter IV	0.203	0.023	0.391	0.016	0.275	0.015	0.298	0.014
year 2	-0.1	0.017	0.395	0.019	-0.078	0.012	-0.1	0.015
year 3			0.492	0.03	-0.126	0.013	-0.056	0.018
year 4							-0.107	0.021
regional ur	0.091	0.027	0.011	0.003	0.046	0.013	0.042	0.006
regional ur^2	0.008	0.003	-0.003	0	-0.002	0.001	-0.003	0

Table 9: Coefficients for women's model

	88-89		90–92		93–95		96–99	
	Coef	S.E.	Coef	S.E.	Coef	S.E.	Coef	S.E.
(Intercept)	4.41	0.1	4.682	0.056	5.529	0.048	5.462	0.033
piece2	0.062	0.023	0.281	0.018	0.408	0.018	0.323	0.015
piece3	0.265	0.024	0.466	0.018	0.558	0.017	0.44	0.014
piece4	0.449	0.032	0.847	0.024	0.775	0.02	0.684	0.018
piece5	0.502	0.042	0.961	0.029	0.751	0.022	0.714	0.02
piece6	0.6	0.058	1.241	0.036	1.041	0.027	0.991	0.026
piece7	0.348	0.07	1.568	0.045	1.247	0.033	1.224	0.033
piece8	0.144	0.099	1.34	0.051	1.278	0.038	1.347	0.04
piece9	0.853	0.197	1.617	0.069	1.405	0.046	1.374	0.048
piece10	0.991	0.268	1.976	0.091	1.497	0.055	1.519	0.06
piece11	1.106	0.354	2.025	0.102	1.487	0.063	1.628	0.074
piece12	1.034	0.409	2.14	0.117	1.5	0.072	1.602	0.084
piece13	0.708	0.448	1.844	0.112	1.47	0.081	1.552	0.094
piece14	1.26	0.379	2.086	0.071	1.658	0.052	1.773	0.066
age (24,29]	0.238	0.026	0.154	0.019	0.154	0.018	0.113	0.016
age (29,34]	0.255	0.028	0.212	0.021	0.166	0.019	0.182	0.017
age (34,39]	0.26	0.029	0.194	0.021	0.179	0.02	0.169	0.018
age (39,44]	0.251	0.032	0.228	0.022	0.123	0.021	0.154	0.018
age (44,49]	0.314	0.036	0.202	0.025	0.194	0.023	0.178	0.019
education sec1	-0.198	0.036	-0.223	0.025	-0.219	0.024	-0.25	0.022
education sec2	-0.086	0.02	-0.163	0.015	-0.165	0.015	-0.216	0.014
education tert1	0.034	0.078	-0.361	0.041	-0.356	0.025	-0.359	0.022
education tert2	0.001	0.061	-0.232	0.039	-0.386	0.029	-0.444	0.025
occupation tech spec	-0.121	0.064	-0.03	0.044	-0.294	0.039	-0.196	0.037
occupation other spec	-0.262	0.052	-0.486	0.036	-0.739	0.032	-0.503	0.029
occupation health	-0.549	0.034	-0.629	0.026	-0.744	0.025	-0.559	0.023
occupation administ	-0.283	0.033	-0.171	0.026	-0.317	0.026	-0.174	0.025
occupation sales	-0.281	0.04	-0.272	0.03	-0.421	0.029	-0.263	0.028
occupation aggricult	-0.234	0.059	-0.355	0.044	-0.624	0.043	-0.38	0.037
occupation industrial	-0.226	0.036	-0.104	0.029	-0.314	0.03	-0.155	0.027
occupation transition	-0.272	0.094	-0.188	0.069	-0.428	0.063	-0.337	0.06
occupation construct	-0.274	0.144	-0.058	0.099	-0.355	0.1	-0.35	0.081
occupation service	-0.386	0.031	-0.373	0.025	-0.498	0.026	-0.344	0.024
family married	0.08	0.04	0.057	0.028	0.006	0.024	-0.011	0.022
family married & child	0.014	0.023	0.05	0.016	0.088	0.014	0.014	0.013
family unmarried & child	0.181	0.043	0.234	0.026	0.378	0.028	0.245	0.022
family single parent	0.067	0.028	0.176	0.023	0.244	0.021	0.223	0.017
language Swedish	0.091	0.061	-0.083	0.038	-0.148	0.029	-0.138	0.026
language other	0.24	0.117	0.299	0.074	0.413	0.064	0.578	0.047
area type semi-urb	-0.055	0.025	-0.075	0.018	-0.052	0.016	-0.075	0.014
area type rural	-0.062	0.021	-0.067	0.016	-0.072	0.015	-0.09	0.013
disability	0.538	0.037	0.36	0.028	0.56	0.032	0.557	0.029
ue history (0,30]	-0.278	0.029	-0.317	0.02	-0.486	0.021	-0.488	0.017
ue history (30,180]	0.002	0.021	-0.049	0.016	-0.193	0.014	-0.159	0.012
ue history (180,365]	0.147	0.036	0.206	0.029	0.101	0.018	0.26	0.016
repeated	-0.3	0.05	-0.352	0.039	-0.507	0.034	-0.431	0.029
prev state subs empl	0.553	0.034	0.901	0.031	0.939	0.023	0.665	0.017
prev state train	0.014	0.047	0.305	0.034	0.576	0.029	0.592	0.021
prev state work	0.101	0.021	0.243	0.015	0.204	0.015	0.167	0.013
region Turku	0.072	0.049	-0.121	0.027	-0.181	0.026	-0.123	0.024
regSatakunta	0.295	0.064	0.043	0.032	-0.101	0.045	-0.149	0.041
region Hame	0.124	0.052	-0.084	0.027	-0.134	0.039	-0.126	0.034
region Kymi	0.245	0.06	-0.117	0.032	-0.118	0.04	-0.094	0.04
region Mikkeli	0.191	0.065	-0.105	0.038	-0.078	0.045	-0.088	0.044
region Kuopio	0.193	0.067	-0.091	0.035	-0.081	0.047	-0.07	0.046
region P-Karjala	0.355	0.074	-0.113	0.043	-0.029	0.055	0.06	0.052
region K-Suomi	0.235	0.067	-0.103	0.035	-0.144	0.047	-0.076	0.049
region Vaasa	0.285	0.054	-0.011	0.029	-0.053	0.029	-0.005	0.03
region Oulu	0.269	0.064	-0.168	0.034	-0.145	0.044	-0.114	0.046
region Kainuu	0.218	0.077	-0.052	0.053	0.085	0.066	0.033	0.065
region Lappi	0.136	0.069	-0.142	0.04	-0.114	0.06	-0.047	0.062
quarter II	-0.091	0.025	-0.037	0.018	0.013	0.017	0.005	0.016
quarter III	-0.051	0.025	-0.099	0.017	-0.042	0.016	-0.113	0.014
quarter IV	0.281	0.026	0.313	0.019	0.108	0.017	0.067	0.015
year 2	-0.157	0.019	0.453	0.025	-0.045	0.014	-0.033	0.017
year 3			0.714	0.039	-0.07	0.016	-0.007	0.02
year 4							-0.059	0.024
regional ur	0.014	0.034	0.021	0.004	0.061	0.015	0.058	0.007
regional ur^2	0.002	0.003	0	0	-0.003	0.001	-0.004	0