Unemployment and under-employment: the case of Switzerland

Dragana Djurdjevic

November 2003 Discussion paper no. 2003-18

Department of Economics University of St. Gallen

Editor: Prof. Jörg Baumberger
University of St. Gallen
Department of Economics
Bodanstr. 1
CH-9000 St. Gallen
Phone ++41 71 224 22 41
Fax ++41 71 224 28 85
Email joerg.baumberger@unisg.ch

Publisher: Forschungsgemeinschaft für Nationalökonomie
an der Universität St. Gallen
Dufourstrasse 48
CH-9000 St. Gallen
Phone ++41 71 224 23 00
Fax ++41 71 224 26 46

Electronic Publication: www.fgn.unisg.ch/public/public.htm

Unemployment and under-employment: the case of Switzerland[1]

Dragana Djurdjevic

Author's address:

Dragana Djurdjevic
SIAW
Dufourstrasse 48
9000 St.Gallen
Tel. ++41 71 224 27 67
Fax ++41 71 224 22 98
Email dragana.djurdjevic@unisg.ch
Website www.siaw.unisg.ch\lechner\djurdjevic

[1] I am grateful to the State Secretariat of Economic Affairs of the Swiss Government (Seco) and the Bundesamt für Sozialversicherung (BFS) for providing data. Financial support from the Swiss National Science Foundation (4045-059673) is gratefully acknowledged. I am indebted to François Laisney and Phu Nguyen Van for their help and encouragement. I received helpful comments from Michael Lechner, Patrick Puhani, Ruth Miquel and Blaise Melly. I also thank Heidi Steiger for her assistance in preparing the data. I am finally grateful to Jacques Silber, Reinhold Schnabel and Said Hanchane. All remaining errors are mine.

Abstract

I analyze the effect of unemployment on subsequent employment history for Switzerland. Using administrative panel data from the unemployment insurance system and the social security databases, I estimate a discrete time hazard model for the exit from the different labor market states: unemployment, employment characterized by either earnings losses, gains or relatively stable earnings, and out-of-the labor force. I find that having previously experienced unemployment increases the risk of persistent unemployment. A further analysis based on personal characteristics such as gender, age, foreign citizenship and qualification permits to identify two profiles of unemployed persons. The “higher-risk” unemployed, namely the female, foreign and less skilled workers are prone to remain trapped in bad situations or to experience employment instability. On the contrary, the male, younger and skilled workers are more likely to exit from unemployment and if they experience earnings losses, it is more for transitory periods.

Keywords

exclusion, wages, discrete time hazard model

JEL Classification

J64

1 Introduction

Since the beginning of the 1990s, unemployment has become a source of worry among the OECD countries. High unemployment rates for the period 1989-1999, as well as substantial differences between countries, in particular between the US and the European countries, were observed. In addition, the number of persons that employment agencies find difficult to place, especially those hit by long-term unemployment increased substantially. This last decade has thus shown a growing interest in the problem of long-term unemployment. While the existing literature mainly focused on this topic, little attention was paid to the issue of repeated unemployment. However, the movements between unemployment and lower paid employment can lead to the same exclusion problems as long-term unemployment.

This paper investigates the impact of unemployment on subsequent employment history for the case of Switzerland. The aim of the analysis is twofold: I identify the determinants of the risk of exiting unemployment as well as those for the risk of re-entering unemployment.

First, the analysis of exit from unemployment permits to address the question whether unemployment exerts a negative effect on the stability of subsequent earnings, and to what extent it may facilitate the withdrawal from the labor market. This question is relevant in terms of policy implications: as unemployment may affect the workers differently, some policies may not suit some workers. For instance, training programs are more likely to target the male and the less skilled unemployed, while measures aimed at encouraging participation tend to be more appropriate to female and elderly workers than to prime age male workers because it seems that this latter category of workers always participates in the labor market. However, the existing economic applications usually study the consequences of unemployment on subsequent earnings without considering its impact on non-participation. Most of the existing applications concern the US and focus on the effect of a job loss on displaced workers (see the studies by Ehrenberg and Oaxaca, 1976, Addison and Portugal, 1989, Ruhm, 1991, Jacobson *et al*, 1993, Houle and van Audenrode, 1995, for the US and the recent studies by Arulampalam, 2001, and Greggory and Jukes, 2001 for the UK). These studies focus on workers highly attached to the labor market, namely the high-tenure and male workers. They report evidence for significant long-lasting earnings losses associated with job

displacement. These findings are not surprising because little emphasis is laid on workers weakly attached to the labour force. These workers like the female and the elderly workers are more likely to withdraw from the labor market after the end of an employment spell. A survey by Layard, Nickell and Jackman (1991) shows indeed that half of the unemployment spells in the US end in withdrawal from the labor force rather than in a job. Furthermore, studies by Flinn and Heckman (1983), Tano (1992) and Gönül (1992) address the question on whether unemployment and out of the labor force are behaviorally distinct states. That is why I distinguish three different labor market states: unemployment, employment and out-of-the labor force.

Second, the analysis of re-entry into unemployment is useful because it can capture the phenomenon of repeated unemployment. However, this latter aspect has received little attention in the literature. Cappellari and Jones (2003), and Stewart (2002) investigate the movements into and out of unemployment in their studies about low pay and unemployment. Using a first order Markov Chain model, they estimate the probability for a currently low paid individual of becoming unemployed as well as the probability for a currently unemployed individual to become low paid when he move into a new job. They find that experience in low paid jobs acts as the main channel for repeated unemployment. These two studies examine the extent of state dependence in unemployment and employment. Other studies, by Lauer (2003) and Kalwij (2001), adopt a different methodological approach based on duration dependence. Lauer (2003) studies the effect of education on the risk of not finding a job once unemployed, but also on the risk of entering unemployment once employed. Kalwij (2001) investigates the effect of the business cycle on the probability of leaving and re-entering unemployment for individuals who are not able to find stable employment. For the Swiss case, the analysis of the probability of entering unemployment permits to identify the workers prone to experience multiple spells of unemployment with intervening spells of employment.

Duration analysis is the modelling framework used in this paper. Since the early 1980's, empirical studies mostly have analysed single spells data (see Lancaster, 1979 and Nickell, 1979 for the pioneering work on unemployment duration). The standard models of single spells data have then been extended to the case of multiple duration data (Kalbfleisch and Prentice, 1980). Another strand of literature focuses on duration analysis in presence of unobserved heterogeneity (Heckman and Singer, 1984). Seminal work by Kiefer (1988) and Lancaster (1990) provides a good description of the estimation methods with a particular

emphasis laid on the specification and identification. The methodological framework applied for this analysis is a discrete time competing risk model. The econometric analysis focuses on the entry into and the exit out of unemployment by specifying a hazard rate model for each of the labor market states. The exit from unemployment is first analyzed using multiple destination states composed of employment with different earnings changes and of inactivity. Using a conditional analysis, I can identify which workers are hit by long-term unemployment and whether these workers tend to leave the labor market or to incur earnings losses once they become employed. Second, I investigate the re-entry into unemployment by studying the exit from the employment states and from inactivity. This permits to address the question of repeated unemployment. Besides analyzing the transitions unemployment - employment - unemployment, I can go one step further and figure out whether the earnings losses occurring after unemployment are more likely to be temporary or not. Finally, a complementary analysis can be conducted by investigating the transitions between the different employment situations defined according to the position of the earnings before and after the unemployment spell. This could shed some light on the ability of some workers to climb up the earnings ladder: the initial earnings losses after an unemployment spell may be temporary, and after some months of continuous employment, workers can move on to better paid jobs. Hence, I propose to address these economic questions by estimating a dynamic model describing the above transitions in order to identify which workers are more prone to remain unemployed for a longer time and which workers are likely to incur earnings losses or to withdraw from the labor market. Furthermore, I can figure out whether these latter workers will remain trapped in such bad situations or will accept a lower paid job for a transitory time before moving on to a better situation with higher earnings.

The paper is organized as follows. Section 2 gives a brief overview of the empirical evidence about unemployment in Switzerland. Then, Section 3 looks at the data which are used for the econometric model presented in Section 4. Section 5 presents the estimation results for the different exit rates. Finally, Section 6 concludes.

2 Empirical evidence for Switzerland

This section discusses why the Swiss case is interesting and gives some brief overview of the existing empirical studies about unemployment in Switzerland.

Switzerland is a small country in the OECD and has one of its lowest unemployment rates. It is however interesting to focus on the Swiss case because its unemployment experience is special: with almost zero rates in the 1970s-1980s (less than 1% in the 1970s and 1.1.% in 1982), the country experienced a continuous increase in unemployment in the beginning of the 1990s. Unemployment reached its peak in 1997 with a rate of 5.2%. Two facts explain these latter scenarios (OECD, 1996). While during the 1970s unemployment increased in the other OECD countries, it failed to do so in Switzerland because the employment decrease was absorbed by the foreign work force (which mostly owned a non-permanent work permit). In the 1990s, the share of the foreigners having a permanent work permit and the share of women entering the labor force increased substantially. This implied that the employment decrease was much less absorbed compared to the 1970s. As a consequence, unemployment affected all workers categories, but the less qualified and the foreign workers were the most hit. In addition, the number of persons difficult to be placed and in long-term unemployment increased substantially. This concerned in particular elderly workers in addition to the previously mentioned workers categories. Since 1998 the economy started to recover with an unemployment rate of 1.9% in 2001, but the recent unemployment recovery raises the question whether or not Switzerland is still a special case among the OECD countries (Flückiger, 1998).

This paper attempts to evaluate the impact of unemployment on subsequent employment history for Switzerland. The question is twofold: I first propose to investigate the consequences of unemployment on subsequent earnings but also on inactivity. Then, I suggest to address the question of repeated unemployment by assessing the probability of re-entering unemployment. To my knowledge, there is no empirical study for Switzerland investigating the issues of subsequent earnings and inactivity simultaneously. Moreover, the issue of repeated unemployment has been ignored for the Swiss case. The existing applications focus indeed on one particular aspect of unemployment only. The recent studies by Gerfin *et al* (2002), and Gerfin and Lechner (2002) evaluate the effects of active labor market programs on different labor market outcomes like the employment probability and the earnings of some potential participants. Puhani (2002) investigates the general labor market environment in Switzerland in the 1990s. He shows that the less skilled workers in Switzerland are affected by a negative relative demand shock which results in higher relative unemployment for this group. Sheldon (1999) analyzes the determinants of long-term unemployment. He finds that a lack of professional qualification, an advanced age and foreign citizenship are the main

factors explaining long-term unemployment. Using a quantile analysis, he further finds that among those with four years of continuous employment after unemployment, more than 50% have found a job with a higher wage than in the last job occupied before becoming unemployed. Sheldon thus investigates the first aspect of the consequences of unemployment on subsequent employment history leaving out the second aspect related to inactivity. However, only a partial emphasis is laid on this first aspect of unemployment. Sheldon does not control for observed heterogeneity. This is rather restrictive, since the personal characteristics of the unemployed play a significant role in determining their chances of finding a job. Gerfin and Schellhorn (1995) analyze the duration dependence effect of unemployment. Using a rotating panel of the Swiss Labor Force Survey, they estimate a discrete-time hazard rate by considering two possible destinations: employment and inactivity. They address the question of the persistence of unemployment by calculating the re-employment probability as well as the probability to withdraw from the labor market. Although unemployment, employment and inactivity are distinguished, Gerfin and Schellhorn study does not focus on the effect of unemployment on the subsequent earnings. Therefore, this paper aims at improving existing studies about unemployment in Switzerland.

3 Data and descriptive statistics

3.1. Database

The data set consists of administrative records that link the information system for placement and labor market statistics (AVAM) with the unemployment offices payment system (ASAL) which contains longitudinal data on individual unemployment histories. From these databases, I obtained data from January 1996 to August 2000 for all persons who were registered on December 31st, 1997 (247 603 persons). For a sample of about 80 000 persons, I received additional data from the social security system (AHV) for the period 1988-1999. After having combined the AVAM/ASAL data with the AHV data, I construct for each individual a continuous profile, from entry until December 1999, that identifies the different labor force states.

The AVAM/ASAL database provides information about the personal characteristics, the labor force histories and unemployment payments, whereas the AHV database indicates the

professional status and earnings of the workers without giving any detail on sociodemographic characteristics, except for nationality. The interest of this combination is twofold. First, treating the AVAM/ASAL and AHV data separately as in Sheldon's study (1999) leads to a possible loss of information in the sense that an individual's characteristics are important to determine her chances to find a job. Second, with this combination, we dispose of an informative database. We have indeed information on sociodemographics, regional location of the labor office in charge, unemployment benefits, entitlement period, nature of desired job, retrospective labor market situation and earnings for the period 1988-1997. This information is useful because it permits to capture individual heterogeneity to some extent.

3.2. Definition of the states

The combination of the AVAM/ASAL/AHV data permits to create a profile of states for each individual. This profile involves the state occupied each month between entry into unemployment and December 1999. In reality, these persons registered as job seekers. This implies that the persons working part-time and searching for a full-time job can register at the labor office and are eligible for *UI* benefits according to the Unemployment Insurance law (AVIG). The AVIG and ILO unemployment definitions are different. According to the former, all persons defined as unemployed are entitled to *UI* benefits. Unemployment encompasses the persons not working and searching for a job as well as the persons working part-time and searching for a full-time or an additional part-time job. The latter enter in the unemployment definition as part-time unemployed, while the former are categorized as full-time unemployed. On the contrary, the ILO definition does not account for part-time unemployment: only the non working persons searching for a full- or part- time job are categorized as unemployed. The part-time unemployed represent 7.5% of the persons who registered in the labor office in the sample. It would be possible to distinguish between part-time and full-time unemployment in the subsequent econometric analysis. However, the number of observations is too small to an additional state. Moreover, the introduction of an additional state would considerably increase computation time for the econometric analysis. Therefore, I choose to consider only one category for unemployment. Unemployment (*U*) is thus defined using the positive information from the unemployment insurance (*UI*) system, while the employment (*E*) and the out of the labor force (*OLF*) states stem from the Social

Security data. When the *UI* data system records no information about the benefits, the Social Security data are used to determine whether some positive information on earnings is recorded or not. We refer to *E* in case of positive information and to *OLF* otherwise. The definition of these states thus guarantees that they are mutually exclusive. Besides the distinction between unemployment, employment and out-of-the labor force, I further categorize employment according to the position of the earnings before and after the first unemployment spell beginning between October and December 1997. I use this point of time as reference because it corresponds to the period where the unemployment rate is the highest. Thus, the different employment states are defined as follows: *Down* (resp. *Up*) for situations characterizing earnings losses (resp. gains) and *Constant* refers to employment where the earnings remain relatively stable (between -5% and 5%[1]).

3.3. Selected sample

As previously mentioned, the data concern people who were unemployed on December 31st, 1997. The data sampling thus correspond to a stock sampling scheme. This affects the duration data distribution. The distribution of completed unemployment spells collected by sampling the persons unemployed at a given date is different from that obtained from a sample of inflows into unemployment (Lancaster, 1990, p.161). A satisfactory treatment of stock sampling data would require to fully model the rate of entry in unemployment i.e. to find a process that describes the full state history for each individual (Lancaster, 1990). This solution is rather complicated. A common practice for handling stock sampling is to ignore the elapsed duration data if data on the duration of the spells beginning after the sampling date are available. Inference is then done on these latter spells which provide a flow sampling scheme. However, by eliminating the elapsed duration data, a large fraction of the spells is left out. Due to the length-biased sampling, the probability that a person unemployed for a longer time is sampled at the selection date is greater than that obtained for a person recently unemployed. As a consequence, the exclusion of these elapsed duration data will lead to the selection of a very specific sample where the "low-risk" unemployed workers are over-represented. For this study, I attenuate this selection problem, because I select the entrants into unemployment over the period from the 1st October to the 31st December 1997 instead of using the spells beginning after the 31st December 1997. This selection leads to a sample of

[1] -5% and 5% correspond to the 50th and 60th percentile of the distribution of the earnings changes (conditional

30035 persons. Comparing the distribution of the personal characteristics in the initial sample of 80000 persons with that in the selected sample of 30035 persons, I find that there is no over-represented or under-represented category after the selection compared to the initial sample. For instance, with the selected sample, there are 0.8% less elderly workers, 1.9% more single workers and 4% less women. The analysis of observed characteristics is however not sufficient if unobserved heterogeneity is present. Some factors which are not controlled for may indeed influence the selection. However, the data I have at my disposal provides information about the subjective valuations of the case workers on the ability of the unemployed to find a job. This variable can capture the workers' motivation which is usually not observed by the econometrician. As argued by Gerfin and Lechner (2002), little unobserved heterogeneity should enter the processus of selection into unemployment once information about workers' motivation is controlled for. It turns out that there are 1% more unemployed who are classified as "easy to be place" in the selected sample than in the initial sample. The claim that this selected sample is representative of the population of unemployed in December 1997 thus does not seem exaggeratedly strong.

3.4. Descriptive statistics

The data are presented in a person-month format that permits to identify the different *U*, *E* and *OLF* spells. Table 1 indicates that among the non right-censored unemployment spells, a large fraction of spells end in *E* (76%) and to a lesser extent in *OLF* (24%). Once employed, the persons tend to remain in this situation (49%). But a substantial number of persons return to *U* (70% of the non right-censored employment spells). On the contrary, the unemployed who transit into *OLF* tend to withdraw temporarily from the labor market: 60% of the *OLF* spells end in *U* or *E*, while 40% of the *OLF* spells correspond to inactive persons who remain out the labor market.

on being employed).

Table 1: Sample composition

Spells of	***Unempl.***	***Empl.***	***OLF***
Number of observations	337 054	351 970	90 074
Number of individuals	30 035	26 238	12 444
Number of spells	48 315	38 894	16 306
Individuals with 1 spell	30 035 (100%)	26 238 (100%)	12 444 (100%)
Individuals with 2 spells	12 890 (42.9%)	10 343 (39.4%)	3 114 (25%)
Individuals with 3 spells	4 575 (15.2%)	1 957 (7.5%)	628 (5%)
Individuals with more than 3	815 (2.7%)	356 (1.4%)	120 (1%)
Right-censored spells	4 477 (9.3%)	19 067 (49.0%)	6 491 (39.8%)
Non right-censored spells ending in			
Unempl.		14 011 (70.7%)	4 269 (43.5%)
Empl.	33 348 (76.1%)		5 546 (56.5%)
OLF	10 490 (23.9%)	5 816 (29.3%)	

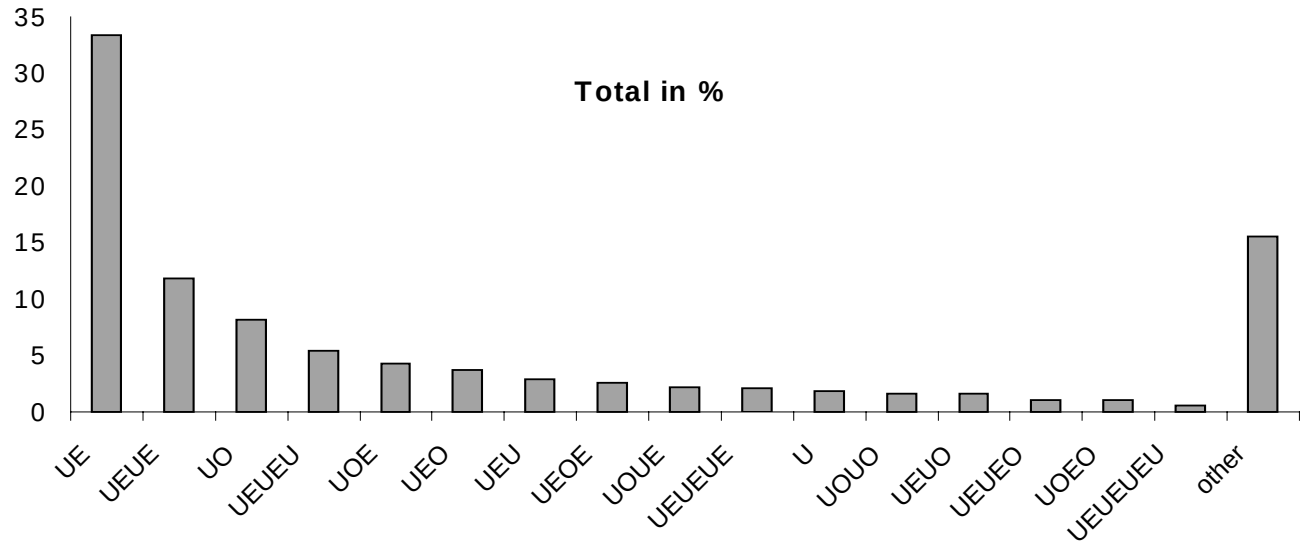
Notes: own calculations.

A more detailed analysis of the sequences of states observed per person confirms these previous features. Figure 1 indicates that the 5 main observed transitions in the observation window are characterized by the following sequences: *UE* (33.4%), *UEUE* (11.8%), *UO* (8.2%), *UEUEU* (5.5%) and *UOE* (4.2%). It also reports that 1.9% of persons in the sample are encountering an unique *U* spell during the entire observation period[2].

Concerning gender differences, both men and women are experiencing the transitions from *U* to *E* with the same rate. However, it turns out that inactivity is more frequently experienced by female workers than by their male counterparts. On the contrary, it seems that men are more likely to encounter sequences involving multiple *U* and *E* spells (see Appendix 1).

[2] In Switzerland, a person who becomes unemployed is eligible for *UI* benefits for a period of 2 years after her registration at the labor office. The 564 persons in the sample encountering this unique *U* spell come to the end of her entitlement period in December 1999 in 65% of cases and are eligible for a second entitlement period in 35% of cases.

Figure 1: Observed sequences of states



Notes: sorted by incidence, the category "other" correspond to the other sequences observed in the data such as *UOU*, *UOUEUE*, *UEUEUEUE* and *UOUE* (each of these sequences is represented with a frequency of less than 1%).

Table 2 gives further details on the observed transitions. We first notice that persons encountering transitions of type *U* and *UO* are hit by long-term unemployment. Women tend to "suffer" more than their male counterparts. As an illustration, they stay on average for 460 days unemployed before withdrawing from the labor market (against 422 for men). Second, they are more disadvantaged in terms of earnings preceding the first *U* spell: they earned on average 1450 CHF less than men. However, this result can be explained by a higher share of part-time work experienced by women in Switzerland[3]. A further analysis of some personal characteristics reveals that people hit by long-term unemployment are more likely to be older than 50, married, foreign workers with a permanent permit and less skilled (see Appendix 2).

[3] The data I have at my disposal do not permit to control for the number of hours worked. As a consequence, it is not possible to induce from an observed earnings whether a woman earns less because of a lower wage rate or of a lower number of hours worked.

Table 2: **Analysis of the main transitions by some personal characteristics**

Type of transitions	Pers.	*Unempl.* Duration	*Empl.* duration	*OLF* duration	Previous earnings in CHF[a]	Last earnings in CHF[a]
UE						
Women	4 099	308.66	473.50		3150.71	3052.52
Men	5 924	263.33	515.09		4535.32	4366.51
Total	10 023	281.87	498.08		3969.07	3829.14
UEUE						
Women (34%)	1 211	206.5 150.2	133.2 286.7		3043.24	2893.0 2945.5
Men (66%)	2 349	169.2 134.6	161.6 302.7		4218.16	3898.8 4089.8
Total	3 560	181.9 139.9	152.0 297.3		3818.49	3556.7 3700.6
UO						
Women	1 208	460.93		326.51	2821.53	
Men	1 246	422.50		360.02	4298.60	
Total	2 454	441.42		343.52	3571.40	
UEUEU						
Women (28%)	450	152 144 73	202.7 198.5		2895.22	2813.8 2799.2
Men (72%)	1 189	142 133 50.7	210.9 214.6		4243.12	3992.6 4105.4
Total	1 639	145 136 56.8	208.6 210.2		3873.04	3668.9 3746.7
UOE						
Women	529	254.71	341.48	187.51	2925.92	2662.60
Men	761	209.22	373.07	196.46	4294.07	3967.67
Total	1 290	227.88	360.12	192.79	3733.02	3432.49
UEUEUE						
Women (34%)	218	159 113 110	106 104 184		2885.34	2394 2429 2753
Men (66%)	417	157 110 103	103 99 194		3979.65	3558 3360 3764
Total	635	157 111 105	104 100 191		3603.97	3158 3040 3355
U						
Women	283	777.89			3266.12	
Men	281	772.88			4718.81	
Total	564	775.39			3989.89	

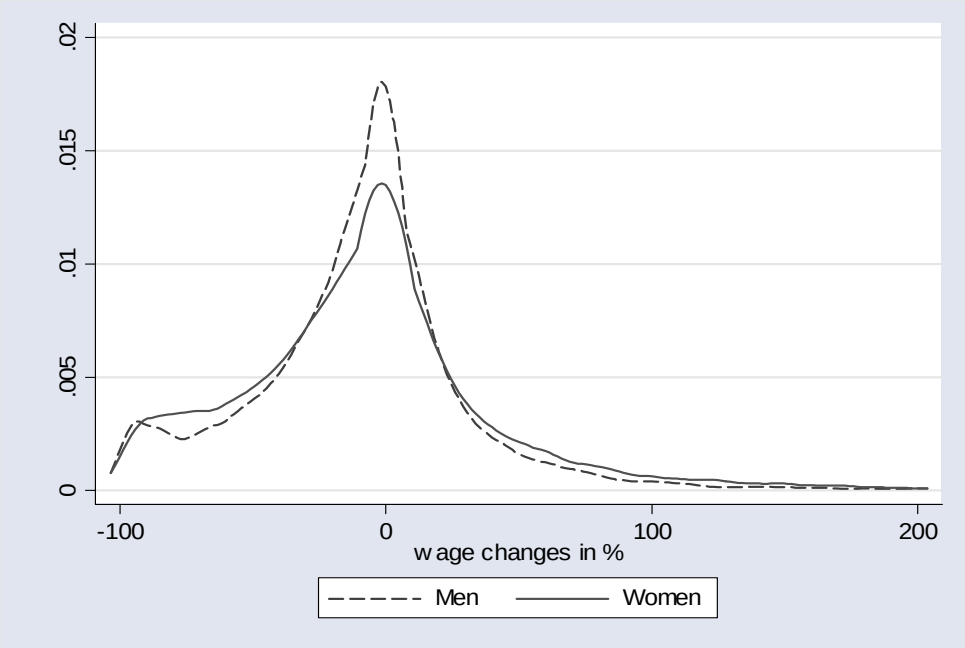
Notes: Unempl. = Unemployment, *Empl.* = Employment, *OLF* = Out of the Labor Force; [a] means.
Unemployment duration is calculated for each person since its registration between October and December 1997 until December 1999. Right-censored spells are also taken into account in this measure.

Turning to the point of repeated unemployment, as previously mentioned men are more concerned by this type of situation: at least 60% of the transitions involving several *U* spells separated by intervening *E* spells are occupied by men. Typically, people encountering repeated unemployment are i) workers between 30 and 50, ii) married, although the share of

single men increases with the number of *U* spells, iii) foreign workers for men and Swiss for women, iv) semiskilled workers (see Appendix 2). However, male workers who encounter repeated unemployment are more likely to have occupied medium positions in the last job preceding unemployment compared to their female counterparts, more represented in lower positions.

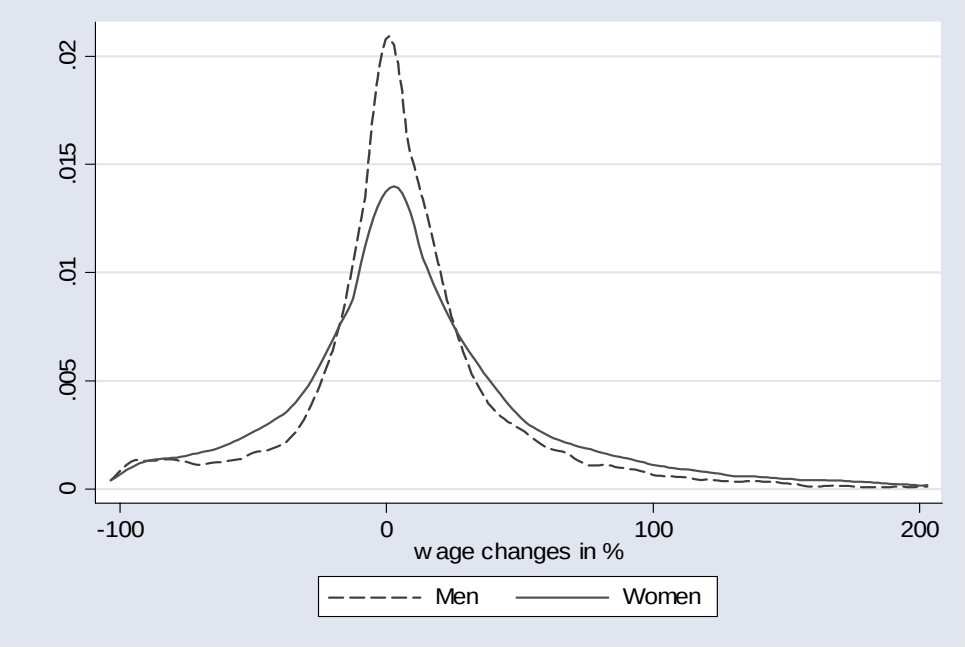
The previous developments give some indications about the profile of the workers encountering different manifestations of unemployment: repeated and long-term unemployment. We can go further by investigating which workers categories are mostly experiencing earnings losses after having encountered unemployment. Figures 2 and 3 present some kernel densities functions for the earnings changes. They report the distribution for two points of time: I compare the earnings changes one month following unemployment (Figure 2) and 12 months following unemployment (Figure 3). It turns out that unemployment exerts

Figure 2: Kernel densities of earnings changes in % by gender *(1st month employed after unemployment)*



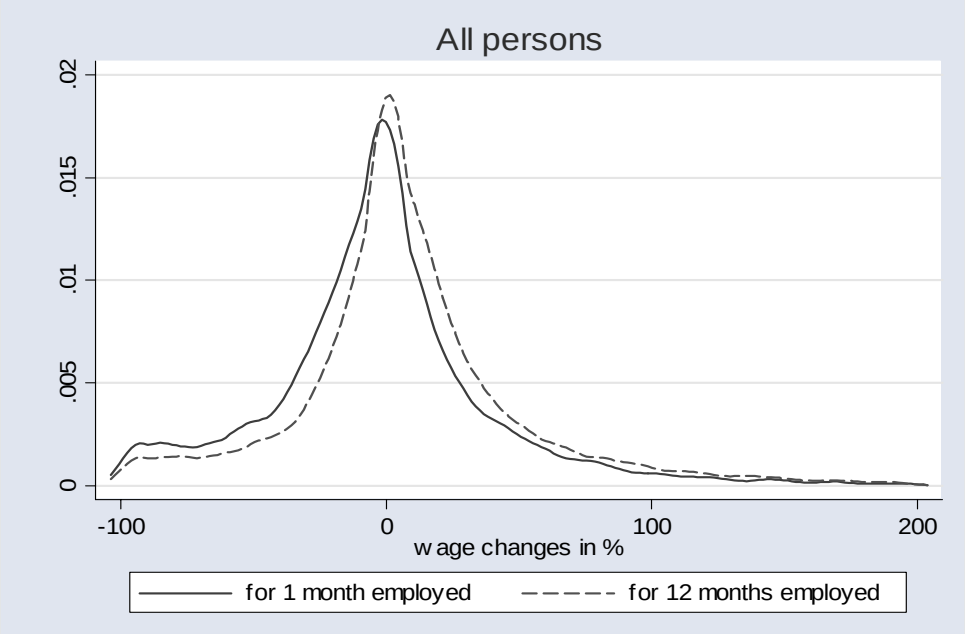
Notes: own calculations. See Appendix 3 for results by age. Theoretically, there is no points characterising earnings changes lower than -100%. These points are generated during the kernel density computation. From a statistical point of view, the estimation points *x* close to the boundary have only a one-sided neighborhood over which to average the *y* values (see Härdle, 1989).

Figure 3: Kernel densities of earnings changes in % by gender *(12 months employed after unemployment)*.



Notes: own calculations. See Appendix 3 for results by age.

Figure 3*bis*: Kernel densities of earnings changes in % *(comparison between 1 and 12 months employed)*.

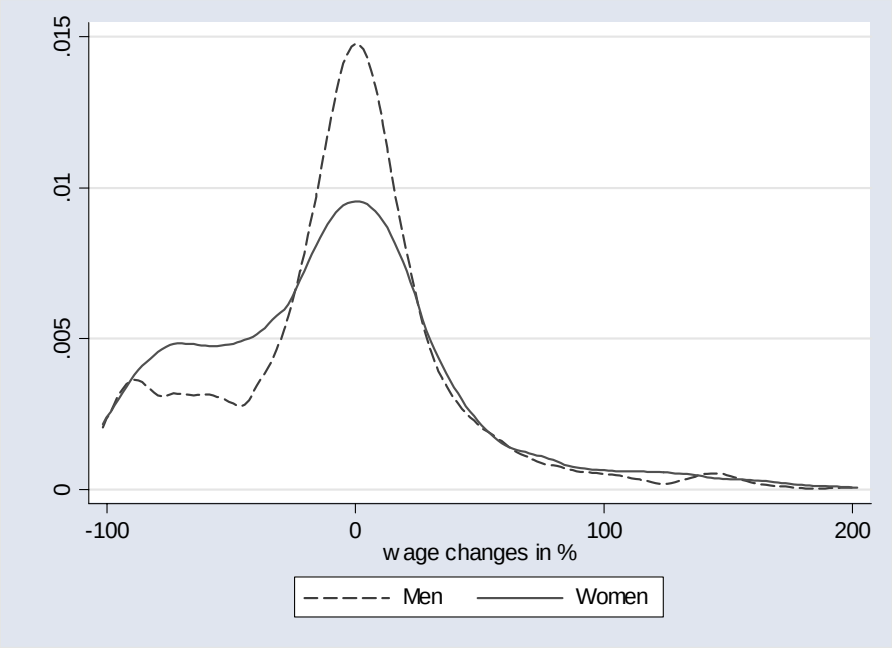


Notes: own calculations. The comparison is based on the same individuals implying that the higher concentration observed after 12 months of continuous employment does not stem from the fact that employed workers for 1 month return into unemployment thereafter.

a rather negative impact on subsequent employment: the persons having encountered unemployment and who transit into employment tend indeed to lose one month after the unemployment spell has completed. An analysis of some personal characteristics shows that women and elderly workers tend to be the most hit (see Appendix 3 for the figures by age). However, this negative effect seems to be temporary. Indeed, the comparison of the earnings before and after unemployment, conditional on continuous employment of 12 months shows that earnings tend to increase with tenure (Figure 3bis). This holds by gender and by age categories, although women seem to experience more wage instability than men (Figure 3). In addition, elderly workers lose more than their younger counterparts even after 12 months of continuous employment. This could again be explained by the fact that women and some older workers experience the sequence full-time employment – unemployment - part-time employment.

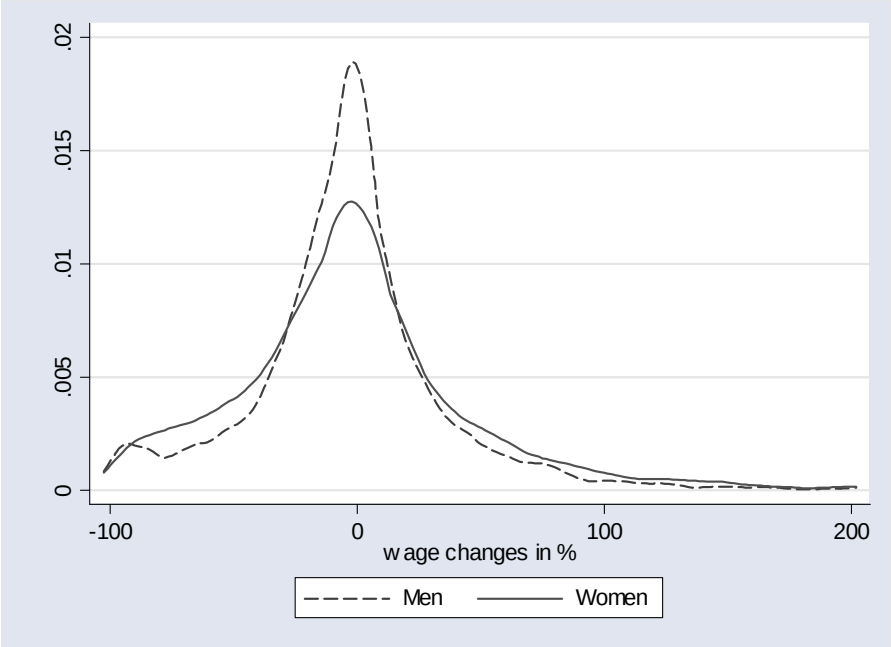
The previous patterns shed some light on the workers categories prone to suffer the most from earnings losses after unemployment. The following statements permit to identify the sequences of states that increase the risk of earnings losses. I compute the kernel density functions of the earnings changes for the sequences *UE*, *UOE* and *UEUE* (Figures 4).

Figure 4a: Kernel densities of earnings changes in % by gender for sequences *UOE*.



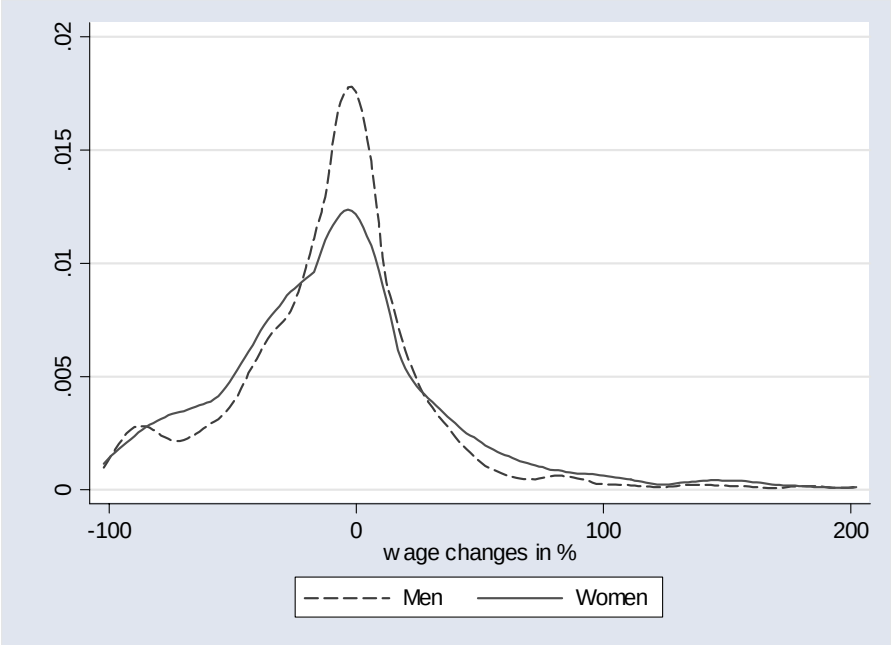
Notes: own calculations. See Appendix 4 for differences by age. Earnings in employment are non zero, but 7.5% of persons have earnings less than 500 CHF (10% for women and 5.7% for men).

Figure 4b: Kernel densities of earnings changes in % by gender for sequences *UE*.



Notes: own calculations. See Appendix 4 for differences by age.

Figure 4c: ***(…continued)*** for sequences *UEUE* **.**



Notes: Figure 4 finished. Own calculations. See Appendix 4 for results by age.

Figure 4b shows first that earnings seem to remain relatively stable for the persons transiting directly from *U* to *E*. There is an exception for the female and elderly workers who tend to lose more than their male and younger counterparts (see Appendix 4 for the figures by age). Second, the persons experiencing transitions *UOE* are losing the most (Figure 4a). This suggests that staying without a job for a long time (228 days on average in *U* and 190 days in *OLF*, see Table 2) has a strong negative effect on the subsequent earnings[4]. That is why the female and elderly workers who tend to be longer non-employed experience more losses than their male and younger counterparts. As a consequence, long-term joblessness exerts a negative impact on subsequent re-employment history. Furthermore, the persons experiencing multiple sequences of *U* and *E* do not perform better than those experiencing long-term joblessness (Figure 4c). This is particularly the case for women and older workers who tend to be confined in under-employment. Therefore, repeated and long-term unemployment seem to be different manifestations of the same problem of under-employment: people encountering long-term unemployment or repeated unemployment are likely to experience earnings losses at their re-entry into employment.

In summary, these results show evidence for the existence of some disadvantaged workers. First, women are encountering the main difficulties: they are hit by both long-term unemployment and inactivity. In addition, once employed they tend to occupy lower job positions that are less demanding in terms of own time investment. As a consequence, they are less paid and they are more likely to work part-time. These results raise the question whether the participation choices are more voluntary than due to constraints. Second, elderly workers experience more inactivity, especially older men.

4 Methodological framework

For the empirical analysis, I specify a discrete-time competing risks duration model. The data are presented in a person-month format such that the time unit is the month. The difference over the continuous-time duration model is that we do not model the duration spent in a given state. Instead, we look for each month whether an exit occurs or not. The consequence is that discrete-time duration models can be estimated by a regression model involving a binary dependent variable, and can thus be estimated with the existing software packages. Jenkins

[4] We could also think that these individuals are discouraged about the existence of future perspectves such that

(1995) presents in a formal way a method of estimation for single-state discrete-time hazard models based on the estimation of a logit model. Steiner (2001) and Lauer (2003) extend Jenkins's method to the multiple-state discrete time hazard models.

Before presenting the econometric model formally, I discuss why a discrete-time competing risks model is suitable to answer the economic questions of interest. According to the sampling scheme presented in the previous section, each person sampled in the data begins her history with an unemployment spell. I can thus identify the number of months of stay in unemployment before transition into the different employment states (*Down*, *Up* and *Constant*) and into inactivity. Modeling the exit rate from unemployment enables to figure out how the movements out of unemployment depend on the duration of stay in unemployment. It also permits to identify which workers are more likely to encounter earnings losses or to withdraw from the labor market after an unemployment spell. As previously mentioned, I am further interested in the probability of re-entering unemployment: I want to investigate whether the persons experiencing earnings losses after an unemployment spell will encounter employment instability. The specification of the exit rates from the employment and inactivity states permits to capture these movements into unemployment. In addition, the dynamics of earnings can be examined by estimating the transitions between the different employment states. This will shed light on the existence of workers who succeed to transit and to remain in a good employment situation with higher earnings than that preceding unemployment. Thus, by modeling a discrete time hazard rate for each of the states, I can capture the short-term and long-term effect of unemployment. It seems that the modeling framework adopted in this study suit to the data I have at my disposal. Each person begins with unemployment. The different trajectories can be observed thereafter. I can identify the profile of the persons prone to remain trapped in bad situations: by either remaining unemployed or by transiting into lower paid jobs or into inactivity and by remaining in these situations for a longer while. I also observe the profile of the persons who accept a lower paid job for a transitory period before moving to better paid jobs and remaining in this good employment situation.

4.1. Presentation of the model

The model presented in this section derives from the formulations proposed by Jenkins (1995) in the case of two competing risks and by Lauer (2003) in the case of multiple competing

---

the causality can be reverse.

risks. Let us assume that T_{ij}^s represents the time spent by individual *i* in the s^{th} spell of state *j*. It is partitioned into a discrete number of intervals I_t (one month in the application). In addition, the set of conditioning variables is defined by $x_i(t)$.

The destination-specific hazard rate h_{ijk}^s conditional on $x_i(t)$ and some unobserved individual factors ε_{ijk} gives the probability that individual *i* transits from state *j* to state *k* in the interval I_t given her survival in state *j* until the beginning of I_t [5]. It is defined as follows:

$$h_{ijk}^s\left(t\middle|x_i(t),\varepsilon_{ijk}\right) \equiv P\left(T_{ij}^s = t, \delta_{ijk}^s = 1 \middle| T_{ij}^s \geq t; x_i(t), \varepsilon_{ijk}\right),$$

where $i = 1, ..., N$; $t = 1, ..., T_{ij}^s$; $j,k = 1, ..., K$ and δ_{ijk}^s is the transition indicator for the s^{th} spell. As the different states are mutually exclusive, we can write the total hazard H_{ij}^s as the probability of exiting state *j* in interval I_t conditional on survival until the beginning of I_t.

$$H_{ij}^s\left(t\middle|x_i(t),\varepsilon_{ijk}\right) \equiv P\left(T_{ij}^s = t \middle| T_{ij}^s \geq t; x_i(t), \varepsilon_{ijk}\right) = \sum_{k \neq j} h_{ijk}^s\left(t\middle|x_i(t),\varepsilon_{ijk}\right).$$

The survivor function derives naturally from this last expression (cf. Lancaster, 1990). It gives the unconditional probability of remaining in state *j* up to time *t*:

$$S_{ij}^s\left(t\middle|x_i(t),\varepsilon_{ijk}\right) \equiv P\left(T_{ij}^s > t\middle|x_i(t),\varepsilon_{ijk}\right) = \prod_{z=1}^{t}\left(1 - H_{ij}^s\left(z\middle|x_i(t),\varepsilon_{ijk}\right)\right).$$

The unconditional probability p_{ijk}^s that individual *i* transits from state *j* to state *k* in I_t is obtained by taking the product of the probability of transiting into *k* in I_t given she has sojourned in state *j* until I_t begins times the survival in state *j* until *t-1*.

$$p_{ijk}^s\left(t\middle|x_i(t),\varepsilon_{ijk}\right) \equiv P\left(T_{ij}^s = t, k\middle|x_i(t),\varepsilon_{ijk}\right) = h_{ijk}^s\left(t\middle|x_i(t),\varepsilon_{ijk}\right) S_{ij}^s\left(t-1\middle|x_i(t),\varepsilon_{ijk}\right). \qquad (4.1)$$

Using equation (4.1), we can write the likelihood function for the departure state *j*. Assuming that all observations conditional on $x_i(t)$ and unobserved factors are independent, we obtain the following expression[6]:

[5] The unobserved effects vary with the individual and with the type of transition. This specification is initiated by Nguyen Van *et al* (2004, forthcoming in JBES) in their study about performance of German firms.

[6] the conditioning variables $x_i(t)$ and ε_{ijk} are omitted temporarily from the notation.

$$L_j = \prod_i \prod_s \left[\prod_{k \neq j} \left(p_{ijk}^s \right)^{\delta_{ijk}^s} \right] \left(S_{ij}^s \right)^{\gamma_{ij}^s},$$

where δ_{ijk}^s stands for the transition indicator and γ_{ij}^s for the censoring indicator.

By rearranging the data so that the month is the unit of analysis instead of the spell, we can rewrite the above likelihood function using the indicator y_{ijkt}^s which is equal to 1 if δ_{ijk}^s = 1 and $t = T_{ij}^s$ (Jenkins, 1995 and Lauer, 2003).

$$L_j = \prod_i \prod_s \prod_{k \neq j} \prod_{t=1}^{T_{ij}^s} h_{ijk}^s(t)^{y_{ijk}^s} \left[1 - \sum_{k \neq j} h_{ijk}^s(t) \right]^{1 - \sum_{k \neq j} y_{ijk}^s}. \qquad (4.2)$$

The advantage of rearranging these data resides in obtaining an easier form for the likelihood function. Indeed, by specifying a multinomial logit form for the hazard rate (see equation (4.3)), equation (4.2) turns out to be the standard multinomial logit likelihood functions where the censored observations constitute an additional state and the transition indicators are given by the *y* indicators.

$$h_{ijk}^s\left(t \middle| x_i(t), \varepsilon_{ijk}\right) = \frac{\exp\left(\alpha_{jk}(t) + x_i{}'\beta_{jk} + \varepsilon_{ijk}\right)}{1 + \sum_{l \neq j} \exp\left(\alpha_{jl}(t) + x_i{}'\beta_{jl} + \varepsilon_{ijl}\right)}. \qquad (4.3)$$

The x_i represent the control variables such as age, gender, qualification and previous employment history that are constant within the observation window. The exogeneity of the x_i is defined in the sense of Sims's non-causality (see Heckman and Borjas, 1980): they are assumed not to be determined by the future outcomes of the unemployment, employment and inactivity processes. Usually, individual characteristics do not depend on these processes. However, it turns out that the decisions about marital status, qualification and previous occupation may be the result from past unemployment experiences. It is also the case for lagged duration variables that may be suspected of endogeneity. As proposed by Heckman and Borjas (1980), the solution would be to find some exogenous variables that change across spells such that their lagged values can be used as instruments for the lagged durations. As these variables are not at my disposal, I do not tackle this problem of potential endogeneity. As a consequence, I am not able to make any claim about causal effects, at least for these variables.

The terms α_{jk} stand for the baseline hazard which captures the duration dependence i.e. it gives the duration pattern without taking the observed heterogeneity into account. A negative duration dependence means that the longer a person stays in a given state, say unemployment, the more likely is this person to remain unemployed. The specification of the baseline hazard is thus important. A common but restrictive approach consists in specifying a parametric functional form for the baseline hazard. This approach is strong because the assumptions on the form are hard to justify from an economic point of view, and they can thus lead to misspecification problems. Instead, I choose a semi-parametric approach by specifying a piecewise constant hazard. Besides avoiding the misspecification problem, this method presents the advantage of being flexible: time intervals for which the number of observations is very small or for which the duration effect is found to be constant can be aggregated. In the application, I assume that the duration dependence pattern may vary among the states. The modeling of the baseline hazard is thus specific to each departure state.

Further specification choices concern the unobserved factors. I adopt a non-parametric approach instead of using the common approach based on the specification of a distribution function for ε_{ijk}. There is indeed evidence from Heckman and Singer (1984) that the choice of a functional form influences the parameters estimates. The non-parametric approach based on the existence of some latent classes of individuals is described by Heckman and Singer (1984). However, this mass point approach provides poor prospects in case of multiple sources of heterogeneity, since few points of support are found relative to the number of unobserved factors (see Chesher and Santos Silva, 2002). In this study, the ε's are supposed to be drawn from a discrete distribution with *R* mass points such that the following conditions are imposed:

$$\sum_{r=1}^{R}\pi_r = \sum_{r=1}^{R}\Pr\left(\varepsilon_{rjk}\right)=1,\ E\left(\varepsilon_{jk}\right)=\sum_{r=1}^{R}\pi_r\varepsilon_{rjk}=0 \text{ and } \varepsilon_{rjk}\perp x_i(t).$$

The likelihood function is thus given by:

$$L_j=\sum_{r=1}^{R}\pi_r\left\{\prod_i\prod_s\prod_{k\neq j}\prod_{t=1}^{T_{ij}^s}h_{ijk}^s\left(t\middle|x_i(t),\varepsilon_{rjk}\right)^{y_{ijk}^s}\left[1-\sum_{k\neq j}h_{ijk}^s\left(t\middle|x_i(t),\varepsilon_{rjk}\right)\right]^{1-\sum_{k\neq j}y_{ijk}^s}\right\}$$

This likelihood function has been estimated using GLLAMM[7], a Stata program written for the estimation of a class of multilevel latent variable models (see Rabe-Hesketh *et al*, 2001, 2004; and Rabe-Hesketh and Skrondal, 2003).

4.2. Specification tests

The main limitation of the multinomial logit specification is the property of "Independence of Irrelevant Alternatives" (IIA) which has to be fulfilled. The IIA means in a three alternatives setting that the ratio of the probabilities of any two modalities does not depend on the attributes of a third modality (Gouriéroux and Montfort, 1989). A popular class of tests for testing the validity of the IIA involves partitioning the choice set of alternatives into subsets and then comparing the coefficients (see Hausman and McFadden (HM) test, 1983) or the likelihood functions (see Small and Hsiao (SH), 1985) from the complete model and from the restricted model obtained by leaving out one or more alternatives. The idea behind the test is simple. If the IIA is valid, then omitting one or several alternatives should not change the model structure (the estimated coefficients for the HM test and the likelihood functions for the SH test). The main problem with testing the IIA in a multiple alternatives setting is to find which partition set to choose. There is indeed empirical evidence from Brooks, Fry and Harris (1998) that the size and power properties of the IIA test are sensitive to the chosen subset of alternatives. They further show using a Monte-Carlo analysis that a version of the SH test performs the best in a four alternatives setting[8]. To my knowledge, no studies have been published on the properties of the IIA tests in a five alternatives setting. Therefore, I will adopt the same approach as Brooks, Fry and Harris using the "median" version of the SH test: the IIA hypothesis is rejected by the model if more than half of the individual tests obtained by leaving one, two or three states reject the IIA. In addition, the IIA hypothesis will be tested on the specification without unobserved heterogeneity which is much less demanding in terms of computation time. I will assume that if the alternatives turn to be independent in this

[7] Generalized Linear Latent And Mixed Models

[8] The IIA null hypothesis is rejected when more than half of the individual tests reject ("median" version of the test). They further show that the tests rejecting the IIA if all individual tests reject ("minimum" version) and the test rejecting the IIA if only one single test rejects ("maximum" version of the test) have very poor size properties. This test procedure is restrictive, since it uses a simplifying assumption according which the *p*-value of the test stems from the χ^2 distribution of the single tests (actually, the true distribution of the test should be calculated using a bootstrap technique).

specification, then they are also independent in the less restrictive specification which allows unobserved heterogeneity.

Next, I will use an additional specification test that tests whether or not some of the states can be pooled. With these tests, I can first figure out whether *Down*, *Constant* or *Up* can be distinguished or not. In addition, I can test whether or not *U* and *OLF* can be pooled into a single state. This will contribute to the current debate about whether *U* and *OLF* are behaviorally distinct states. The test consists in testing whether the coefficients (apart from the intercept) are the same for the two candidates for aggregation (see Cramer and Ridder, 1991; Judge, Hill, Griffiths and Lee, 1985).

5 Estimation results

5.1. Explanatory variables

This empirical study aims at identifying the categories of workers prone to be trapped in bad employment situations and the ones who succeed to move to higher-paid employment and to remain in it. Therefore, a conditional analysis is conducted to account for observed heterogeneity of the individuals. This should allow me to recover some causal relationships about the individual, regional and previous job characteristics as well as those about the previous workers' labor market history[9]. More precisely, gender, age, marital and family status and foreign citizenship belong to the sociodemographic variables (see Table 3 for a brief description and definition). Other variables also accounted for are related to geographical characteristics with the city size and the region of residence, to previous job characteristics with qualification and previous occupation, and finally to characteristics for previous employment history. The meaning of the variables presented in Table 3 is easy to understand. However, some variables deserve some further comments. First, the dummy variable for being a woman and married has been introduced as a gender interaction term to give more flexibility to the functional form of the hazard function. Second, the classification skilled- semi skilled- unskilled depends on the duration of the apprenticeship (see Table 3). Finally, the variable for aptitude to be placed results from the subjective valuations of the case workers on the ability of the unemployed to find a job. As previously mentioned, it allows to

[9] There is a risk of endogeneity for instance for marital status or qualification.

Table 3: Explanatory variables

Variables	Description
Variables common to all analyses	
Gender	2 categories: female, male
Age	3 categories: younger than 30, between 30 and 50, older than 50
Marital and family status	Dummy for married woman Dummy for at least one person to support
Foreign citizenship	3 categories: Swiss, foreign worker with a permanent permit, foreign worker with a non-permanent permit
Qualification	3 categories: skilled (apprenticeship of at least 3 years), semi-skilled (1-2 year), unskilled (no apprenticeship or during less than 1 year)
Previous occupation	5 categories: textile and retail trade, construction and transportation, tertiary activity (entrepreneur, senior official, justice, architecture, science, news), office and computer, others
Aptitude to be placed	3 categories: easy and very easy, medium, difficult and special case
City size	3 categories: large city (more than 100 000 inhabitants), small city (between 10 and 100 000 inhabitants), rural region (fewer than 10 000 inhabitants)
Region of residence[10]	5 categories: Ostschweiz, Zentralschweiz, Région Lémanique, Nordschweiz, Espace Mittelland
Previous employment history[11]	Dummies for having been unemployed, employed or inactive in the past
Variables specific to the analysis of exit from Unemployment	
Duration	10 categories: 1-2 months (reference), 3-4 months, 5-7 months, 8-9 months, 10-12 months, 13-16 months, 17-19 months, 20-21 months, 22-24 months, 25-27 months
Variables specific to the analysis of exit from Down (earnings losses)	
Duration	10 categories: 1-2 months (reference), 3-4 months, 5-6 months, 7-8 months, 9-10 months, 11-12 months, 13-15 months, 16-18 months, 19-21 months, 22-24 months
Variables specific to the analysis of exit from Constant (earnings differences between -5% and 5%)	
Duration	7 categories: 1-2 months (reference), 3-5 months, 6-7 months, 8-10 months, 11-13 months, 14-18 months, 19-24 months
Variables specific to the analysis of exit from Up (earnings gains)	
Duration	9 categories: 1-2 months (reference), 3-4 months, 5-6 months, 7-8 months, 9-10 months, 11-12 months, 13-15 months, 16-19 months, 20-24 months
Variables specific to the analysis of exit from Out of the Labor Force	
Duration	9 categories: 1-2 months (reference), 3 months, 4-5 months, 6-8 months, 9-10 months, 11-13 months, 14-16 months, 17-20 months, 21-24 months

Source: AVAM/ASAL/AHV databases. The variables common to all analyses are defined on the 31st, December 1997.

[10] Ostschweiz (East: Schaffhausen, Turgau, Appenzell R, Appenzell I, St.Gallen, Glarus, Graubünden, Ticino), Zentralschweiz (Center: Luzern, Oberwalden, Niderwalden, Uri, Schwyz, Zug, Zürich), Région Lémanique (South west: Geneva, Vaud, Valais), Nordwestschweiz (North west: Aargau, Basel Land, Basel City), Espace Mittelland (West: Jura, Neuchâtel, Fribourg, Bern, Solothurn).

[11] The variables are equal to one if the number of months spent in unemployment (resp. employment and inactivity) since 1993 is positive.

capture the motivation of the unemployed, which is usually not observable by the econometrician.

I use the above mentioned variables because I expect that being a female, elderly or less skilled worker are factors that increase the risk of remaining unemployed and decrease the risk of moving to better employment situations. On the contrary, I expect a positive effect for a male, younger and skilled worker for transitions involving better employment situations. In addition, I predict that workers having previously experienced unemployment will encounter the main difficulties. A negative coefficient should be thus found. Turning to the duration dependence pattern, I specify different month dummies. The number of month dummies used for the baseline hazard specification is particular to each departure state. First, there are some institutional facts that impose some dummies. For instance, the entitlement period is of two years in Switzerland. This implies that after 24 months of continuous unemployment, the hazard curve should display a jump. That is why a dummy for 25-27 months is introduced, even though the number of observations decreases as the elapsed duration increases. For the other departure states, longer intervals are used for the longer elapsed durations.

All estimation results will be presented for the purpose of completeness. However, there are some transitions that are of greater interest. Therefore, only some of the results will be interpreted.

5.2. Exit from Unemployment

First, I discuss the results obtained from the specification tests and then I comment on the estimation results.

Appendix 5 presents the results of different specification tests that permit to lead to the finally retained specification[12]. In a first step, I run a series of individual Wald tests in order to identify the variables that never enter significantly in the regression. It seems indeed desirable to omit these variables because their inclusion in the specification with unobserved heterogeneity will increase the computation time which is already extremely long. It turns out

that among the explanatory variables presented in Table 3, two dummies for single and for north west can be left out. In a second step, I run further Wald tests to test the joint significance of the coefficients for the variables retained in the final specification. Both the partial and global tests reject the null hypothesis that all the coefficients can be set to zero.

Further specification tests related to the functional form of the hazard rate are conducted. I first use additional Wald tests to examine whether some states can be pooled into a single state. The null hypothesis that the coefficients of the two candidates for pooling are not significantly different is rejected for each pair of the potential candidates. Lastly, Small and Hsiao tests for each partition of the states are conducted in order to test the validity of the IIA hypothesis. Once again, if the IIA hypothesis is violated, then the multinomial logit specification is rejected. As pointed out by McFadden (1974), the presence of any degree of substitutability among the states makes the IIA invalid. In the famous example about the choice of the mode of transportation, if for a traveler having an initial choice between a car and a blue bus, a red bus is introduced as an additional choice such that this traveler is indifferent between the red bus and the blue bus, then the IIA is not realistic. This previous framework could apply for the exit from unemployment with *Down*, *Constant* and *Up* being substitutes, so that they can be aggregated into a single state (employment). However, it is unlikely in my opinion that these states are similar: an unemployed person would prefer to move to *Up* than to *Down* after unemployment because her utility is higher from higher earnings. This is confirmed by the results for the pooling tests. The hypothesis that *Down*, *Constant* and *Up* can be aggregated into a single state for any pair of these candidates is strongly rejected. Furthermore, the results of the Small and Hsiao tests indicate that the IIA is also supported by the data for all partition of states. As a consequence, the multinomial logit specification seems to be appropriate to the data.

Next, Table 4 presents the estimation results for the determinants of the exit rate from unemployment based on the selected specification from Appendix 5. Concerning the control variables for personal characteristics, it turns out that being a woman decreases the risk of exiting unemployment. This is in line with our previous predictions that women are more likely to remain unemployed. A more detailed analysis reveals that men leaving unemployment are more likely to find a job with earnings remaining relatively stable with

[12] The tests are conducted using estimations of the model without unobserved heterogeneity because the computation time with two mass points is extremely long (about 6 weeks)

Table 4: Exit from *Unemployment*

Variables	***Down*** **Coeff.**	***Constant*** **Coeff.**	***Up*** **Coeff.**	***OLF*** **Coeff.**
Female worker	**-0.125**	**-0.253**	0.025	**-0.307**
Age (ref: between 30 and 50)				
Younger than 30	**0.108**	**0.140**	**0.437**	**0.170**
Older than 50	**-0.153**	**-0.331**	**-0.291**	0.033
Marital status				
Married woman	-0.034	**-0.235**	**-0.265**	**0.375**
At least one person to support	**-0.236**	**-0.320**	**0.111**	**-0.625**
Foreign citizenship(ref: Swiss)				
Permanent work permanent	**-0.178**	**0.156**	-0.074	0.021
Non permanent work permit	**-0.121**	**0.123**	-0.019	0.077
Qualification (ref: unskilled, semi-skilled)				
Skilled	**0.141**	-0.088	**0.036**	**-0.099**
Previous occupation in (ref: others)				
Textile, retail trade	**-0.192**	0.016	**-0.311**	-0.030
Construction, transportation	**0.223**	**0.273**	**0.139**	0.031
Entrepreneur, senior official, justice, architecture, science, news	**-0.375**	-0.138	-0.015	*-0.176*
Office and computer	**-0.210**	0.011	-0.003	-0.025
Aptitude to be placed (ref: medium)				
Easy	**0.133**	**0.351**	**0.212**	**-0.068**
Difficult	**-0.136**	**-0.471**	**-0.333**	**0.273**
City size (ref: small city, rural region)				
Large city	**-0.097**	**-0.190**	**-0.229**	*0.096*
Region of residence(ref: north west, center)				
East	0.037	**0.231**	0.060	**0.239**
South west	**-0.118**	**0.244**	**0.208**	**-0.166**
West	-0.009	0.126	0.010	0.093
Previous employment history				
Unemployed in 1993-1997	**-0.168**	**-0.284**	-0.039	**0.226**
Employed in 1993-1997	**0.983**	*0.424*	0.199	**-0.228**
Out of labor force in 1993-1997	**-0.121**	**-0.406**	0.096	**0.250**
Baseline hazard in months (ref: 2)				
3-4	**1.124**	**1.285**	**1.359**	**1.099**
5-7	**1.677**	**1.923**	**1.964**	**1.294**
8-9	**1.638**	**1.476**	**1.561**	**1.138**
10-12	**1.607**	**1.136**	**1.279**	**1.249**
13-16	**1.271**	**0.763**	**0.807**	**1.221**
17-19	**1.389**	**0.482**	**1.177**	**1.097**
20-21	**1.989**	**1.309**	**0.831**	**1.454**
22-24	**2.175**	**1.017**	**1.031**	**2.002**
25-27	**4.007**	**2.051**	**1.694**	**4.196**
Constant	**-5.198**	**-5.710**	**-5.298**	**-4.261**

Notes: Table 4 to be continued.

Table 4: ***(... cont.)***

Variables	***Down*** **Coeff.**	***Constant*** **Coeff.**	***Up*** **Coeff.**	***OLF*** **Coeff.**
Mass points				
ε_1	**-1.040**	**0.355**	**0.787**	**-0.749**
ε_2	0.585	-0.198	-0.443	0.422
Log odds of probabilities[1]	**-0.575**			

Notes: log-likelihood: -45 798.49, number of observations: 94 913. These estimations are done for a random sample of 25% of the persons from the initial sample (7 520 persons). Even with the reduction of the sample size, the computation time with mass points is very long (about 2 weeks).
Bold: significant at 5% level, *Italics*: significant at 10%, [1] is given by $\ln(\hat{\pi}_1/1-\hat{\pi}_1)$

respect to those for the last job occupied (coefficient for *Constant* is the highest). In addition, men are more likely to move to *OLF* after unemployment than women. However, the marital status plays a further role for explaining the transition into *OLF* for women: the coefficient for being a married woman is indeed strongly positive and significant. This result is most likely related to family and childbearing reasons. Furthermore, having no person to support exerts a positive effect on exiting unemployment for employment (coefficient of 0.445) and for inactivity (coefficient of 0.625) [13].

Second, age differences play a significant role in explaining the exit from unemployment: compared to the workers of 30-50, elderly workers tend to remain unemployed (negative coefficient for the hazard into employment of -0.775) while their younger counterparts are more likely to exit from unemployment into employment (coefficient of 0.689) and to a lesser extent into *OLF* (coefficient of 0.170). Concerning the different employment situations, younger workers tend to perform better than their counterparts of 30-50 in finding better paid jobs compared to their last jobs (coefficient for *Up* is 0.437).

Turning to the differences related to foreign citizenship, it turns out that being a foreign worker decreases the chances of leaving unemployment for employment (coefficient of -0.096 (resp. -0.017) for the foreigners with permanent (resp. non permanent) permit. A

[13] As the denominator in equation (4.3) is common to all the destination states, the effect in employment can be calculated by adding the 3 coefficients in *Down*, *Constant* and *Up*. We can also compare the coefficients across states.

more detailed analysis of the transitions into the different employment states further shows that the Swiss workers are more likely to move to *Constant* (coefficient of 0.279) but also into *Down* (coefficient of 0.299). This latter result is not strange if we keep in mind that the data do not permit to distinguish between earnings losses that occur from the reduction of the wage rate and those that stem from a reduction of the working time. It is thus possible that the previous negative effect obtained for the Swiss workers reflects such transitions as full-time employment- unemployment- part-time employment. According to the OECD (1996) report, the foreign workers are indeed less likely to accept part-time jobs because they face more financial constraints than the Swiss workers. As a consequence, foreign workers tend more to stay unemployed rather than accepting a part-time job than their Swiss counterparts.

Third, the positive effect of qualification on employment (coefficient of 0.089) and the negative effect on *OLF* suggest that the less skilled tend to remain trapped in unemployment or to withdraw from the labor force compared to the more skilled. The previous job occupied also plays an important role in explaining the exit from unemployment. It turns out that the unemployed workers having previously worked as dressmakers, embroiders or salesmen are more likely to remain unemployed than moving to employment (negative coefficient of -0.487 for textile and retail trade). On the contrary, being previously bricklayers, roofers or drivers positively influences the hazard into employment (coefficient of 0.635). Surprisingly, we further obtain that previous office work has a negative effect of -0.202 on the hazard into employment. It is also the case for the unemployed having previously been self-employed, senior officials, architects or technicians, with a negative effect of -0.528. These results are interpretable with respect to "others" which is a heterogeneous category encompassing farmers, printers, electricians but also teachers and physicians[14]. However, conditional on being unemployed, workers in category "others" stay on average 222 days unemployed against 248 (resp. 259) days for workers in "office and computer" (resp. "architects, engineers, entrepreneurs, senior officials"). This explains why the exit rate into employment is lower for these latter categories compared to the "other" category.

Additional results indicate that being easy (resp. difficult) to place has a positive (resp. negative) effect on the hazard into employment compared to the reference category (medium).

[14] Last occupation in agriculture, mining, food and tobacco, wood and paper, chemical, metals, watches and jewelry, restaurants, printing, technical drawing, security, cleaning, clerical and social work, health care, body care, education, artists.

This can be interpretable in terms of motivation: motivation increases the chances of moving out of unemployment into employment, whereas a lack of motivation is a factor facilitating the discouragement and thus the withdrawal from the labor market (coefficient of 0.273).

Turning to the point concerning the duration dependence pattern, I first find some evidence for negative lagged duration dependence. Having experienced unemployment in the past exerts indeed a negative effect on the exit rate from unemployment into employment (coefficient of -0.491), but a positive effect on the entry into *OLF* (coefficient of 0.226). Similarly, people having been previously employed are more likely to return into employment after unemployment (positive coefficient of 1.606). On the contrary, those with little experience in employment are more prone to leave the labor force after unemployment (coefficient of 0.228). This also holds for people who are less attached to the labor force (coefficient of the previous experience in *OLF* is 0.250). Second, some light can be shed on the duration dependence pattern. There is a significant duration dependence even if unobserved heterogeneity is controlled for. Table 4 shows indeed that the effect of the elapsed duration spells is positive, indicating that the unemployed exit from this state as time passes.

The last results concern the individual unobserved heterogeneity. Accounting for unobserved heterogeneity by specifying two mass points improves the fit of the model[15]. A LR test rejects the null hypothesis that the model without unobserved heterogeneity is valid (see Appendix 5). That means that the preferred model is the mixed multinomial logit model, where unobserved heterogeneity is controlled for. The presence of two mass points indicates that individuals can be divided into two latent classes. The analysis of the coefficients from Table 4 shows that a first group has an above average probability of exiting unemployment for employment (-1.040 + 0.355 + 0.787 = 0.102). Substantial differences arise between the different employment states: persons belonging to this first group are more likely to experience better employment prospects (positive coefficients for *Constant* and *Up* and negative coefficients for *Down* and *OLF*). On the contrary, members of the second group display negative properties towards exiting unemployment for better employment situations: either they stay unemployed or they move to *Down* or *OLF*. In addition, the log odds of probabilities indicates that $\hat{\pi}_1 =$ 0.36 and $\hat{\pi}_2 = 1 - \hat{\pi}_1 =$ 0.64. This means that for some

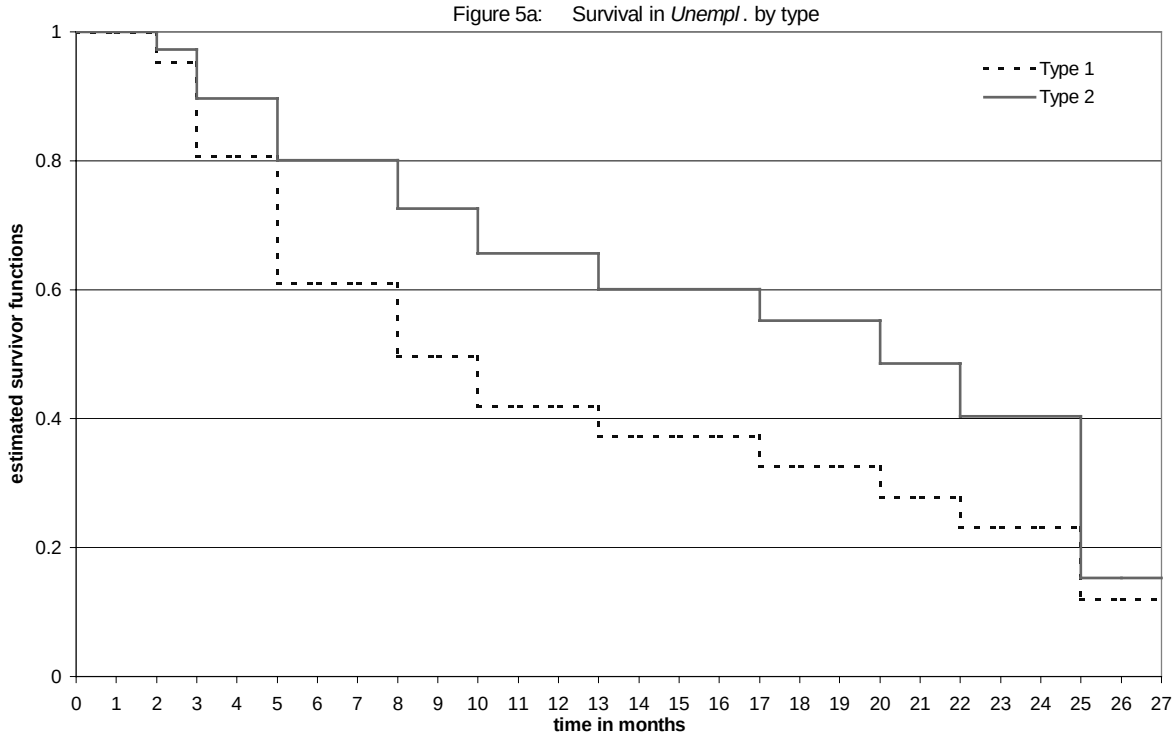
[15] In principle, I could add a further mass point to improve the model. However, this addition would increase the computation time which is already very long with two mass points only (about 6 weeks).

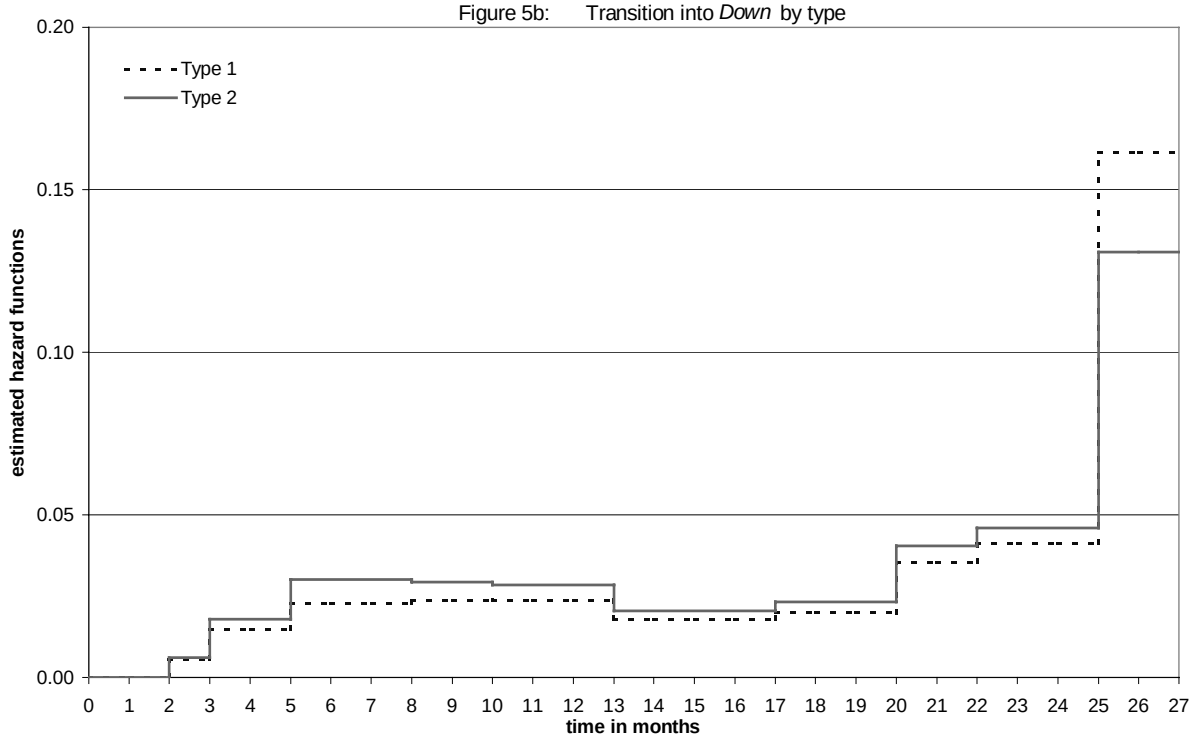
unmeasured factor 64% of persons fall into the second class, i.e. that the majority of unemployed encounter difficulties after the first spell of unemployment in 1997.

To summarize these previous results and to illustrate the duration dependence pattern, I have computed the survivor and hazard functions for two types of individuals. The first profile possesses positive properties towards exiting unemployment: being a male, younger than 30 and Swiss worker without any person to support financially and being skilled, easy to place, without any past unemployment experience. An additional characteristic of this profile is that the workers belong to the first latent class. The second profile owns negative properties such as being a woman, older than 50, foreign worker having at least one person to support and being less skilled, difficult to be placed and unemployed in the past for controls for observed heterogeneity, and belonging to the second latent class for unobserved heterogeneity. The survivor and hazard functions are thus calculated from the estimated coefficients and from the characteristics of the profiles keeping the other variables entering the model equal to their means. The results are presented in Figure 5.

It turns out that workers of type 2 remain longer unemployed. For example, the unconditional probability that an individual who was unemployed at the beginning of the 10^{th} month remains in unemployment until the end of the 12^{th} month is 42% for workers of type 1 and 66% for workers of type 2. Concerning the transition functions into employment, Figure 5b suggests that workers of type 1 and type 2 are almost alike towards exiting unemployment for *Down*, i.e. both are experiencing earnings losses after unemployment. However, the pattern observed for workers of type 1 can be explained, as I previously mentioned, by the fact that a part-time job has been found after unemployment, so that workers of type 1 moving into *Down* experience such transitions as full-time employment – unemployment - part-time employment transitions. It is thus important to know whether the part-time job found results from a voluntary decision or not in order to be able to qualify this as an earning loss. This also raises the question whether or not type 1 workers “accept a lower paid job” for a transitory period because they expect that their earnings will increase thereafter. On the contrary, the jump observed in the transition into *Down* from the 25^{th} month indicates that after the exhaustion of the *UI* benefits (after two years), people accept any offer they receive: they wait in unemployment until they do not have a claim on compensation anymore and they transit into employment thereafter (cf. Boeri and Steiner (1998) for “wait unemployment”).

Figure 5: Exit from Unemployment





Notes: the jump observed up the 25th month corresponds to the unemployed exhausted from *UI* benefits that leave unemployment to employment or inactivity. Type 1 characteristics (men, younger than 30, Swiss, skilled, easy to be placed, zero person to support, no past unemployment experience, latent class 1). Type 2 characteristics (women, older than 50, foreign, less skilled, difficult to be placed, one person to support, past unemployment experience, latent class 2). Own calculations.

Figure 5: ***(cont.)***

Figure 5c: Transition into *Up* by type

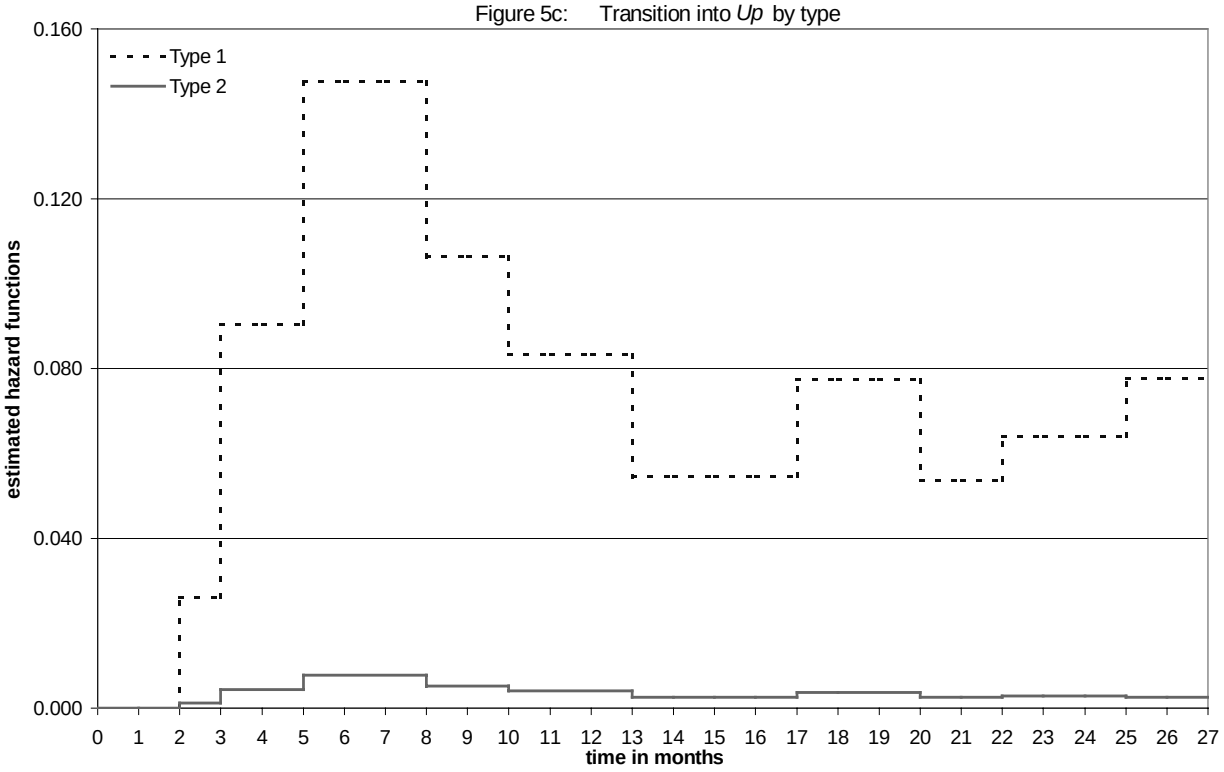
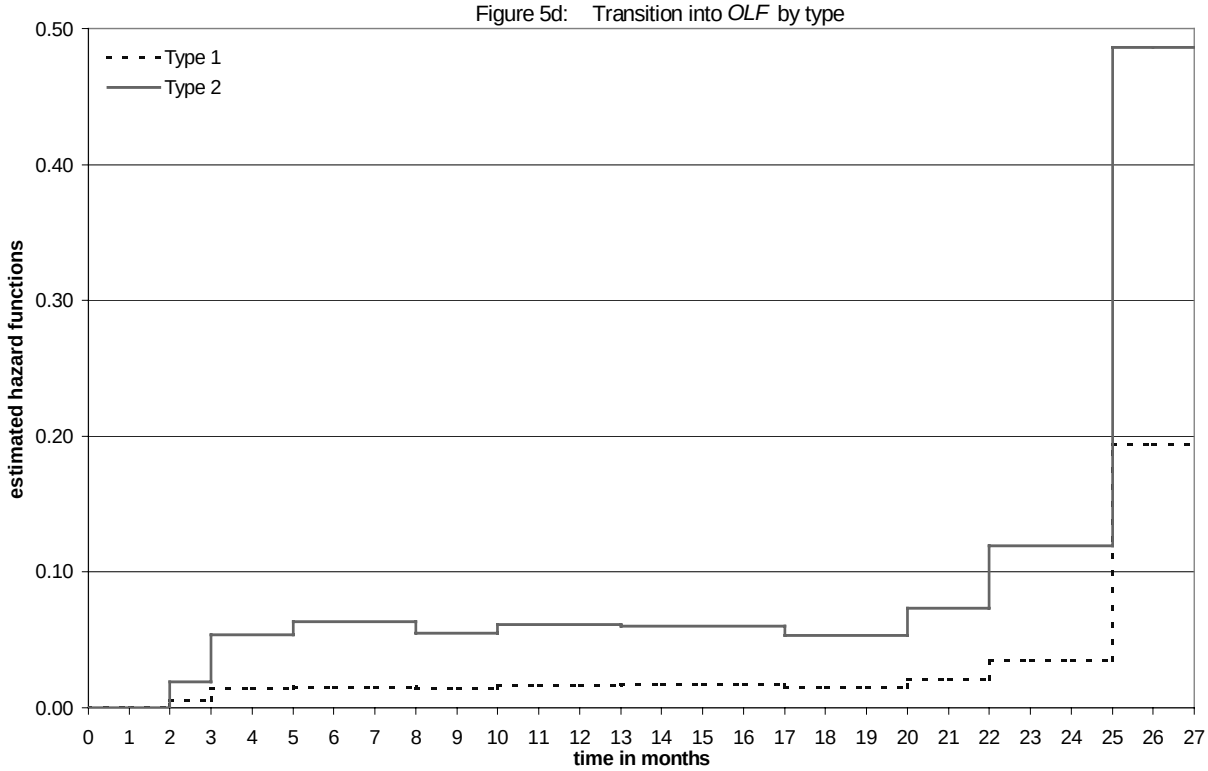


Figure 5d: Transition into *OLF* by type



Notes: see above.

Figure 5c suggests further that workers of type 1 have a higher exit into *Up*, especially for smaller elapsed duration spells[16]. For instance, a probability of 14.7% is observed during the 5th and the 7th month given that unemployment lasted until the beginning of the 5th month. On the contrary, this probability is almost zero for workers of type 2. Moreover, their hazard rate for experiencing earnings gains after an unemployment spell is less than 1% for any time interval observed over the entire period. These findings suggest that better paid employment is reserved to type 1 workers rather than to type 2 workers who tend to remain unemployed or to withdraw from the labor market after the exhaustion of the *UI* benefits (figure 5d). The previous fact of "wait unemployment" is thus unclear: now, the end of eligibility for benefits reduces the unemployed workers' labor force attachment.

To summarize, workers of type 2 rather stay unemployed. Conditional on exit from unemployment, their predicted hazard into employment is 33.9%, and 66.1% into inactivity. Once employed, they are more likely to experience *Down*. On the contrary, workers of type 1 have a probability of 90% of entering employment once they leave unemployment. They are also more likely to experience better employment situations[17].

5.3. Exit from Down

This section introduces the results concerning the exit from *Down*. Results about the specification tests are briefly discussed (see Appendix 6 for more details). First, the different pooling tests indicate that the number of destination states is appropriate: none of the states among *Unemployment*, *Constant*, *Up* and *OLF* can be pooled together with another one to form a single state. Second, the interpretation of the results for the validity of the IIA deserve some attention, in particular when unemployment is omitted. For instance, we can think that the choice between staying in *Down* or moving into *OLF* depends on the potential possibility of returning into unemployment. If we assume that the objective is to find a better paid job, then we can suppose that *Down* is preferred to *OLF* if unemployment is not available. Because the person is not anymore eligible for *UI* benefits, the best way of finding a better paid job is to remain in *Down* i.e. to contribute to the social security and thus to be eligible for

[16] I do not report the transition rate into *Constant* because it shows the same pattern as the transition rate into *Up*.
[17] conditional on transiting into employment, the predicted hazard into *Down* is 76.2% for workers of type 2 and the predicted hazard into *Constant* and *Up* is 86.6% for workers of type 1.The predicted hazard is calculated over the period observed using the estimated coefficients and the characteristics of the types.

unemployment benefits thereafter. If unemployment were available, withdrawing temporarily from the labor market until better times come would be preferable to remaining in *Down.* It is indeed difficult to conduct an efficient job search during employment due to time restrictions. On the contrary, during a temporary leave the persons have more time and once the conditions improve, they can start to search again for a job that suits their aptitudes and qualifications.

Using the Brooks, Fry and Harris (1998) version of the IIA test, less than half of the single tests reject the IIA. I can thus be confident about the specification adopted for the exit from *Down*. The estimation results for the determinants of the exit from *Down* are presented in Table 5. Concerning gender differences, it turns out that women are more likely to remain in *Down* than men, who tend to leave *Down* for better employment perspectives: the effect on the hazard into *Up* and *Constant* is indeed 0.420 for men. This previous result holds also for younger workers who compared to the workers between 30 and 50 succeed to leave *Down* for *Up* and at a lesser extent for *OLF*. This latter fact can explain that younger workers prefer to return to schooling if their employment perspectives are poor. On the contrary, older workers tend to remain in *Down* compared to workers of 30-50.

The marital and family status play a complementary role in explaining the gender differences. For instance, workers having persons to support financially are more attached to the labor force than their counterparts: they return into unemployment rather than staying in *Down* (positive coefficient of 0.338) and if they are not eligible for *UI* benefits, they prefer to work by remaining in *Down* than to move to *OLF* (negative coefficient of 0.349). On the contrary, the effect for married women is negative for the hazard into unemployment (-0.232) and positive for the hazard into *OLF* (0.160). From these results, I can infer that married men having a family to support are more attached to the labor force than married women. It would be interested to examine to what extent the labor attachment of married unemployed women is affected when their husband (often the head of household) becomes unemployed, in particular whether or not this joblessness will trigger the decision of women to participate in the labor market in order to maintain the family income (cf. the added-worker hypothesis, see for instance Filler *et al,* 1996).

Turning to differences in terms of foreign citizenship, the foreign workers tend to return into unemployment (coefficient of 0.435) compared to the Swiss workers who remain in *Down* and to a lesser extent transit into *OLF* (coefficient of 0.156). The higher return into

Table 5: Exit from *Down* (earnings losses)

Variables	***Unempl.*** **Coeff.**	***Constant*** **Coeff.**	***Up*** **Coeff.**	***OLF*** **Coeff.**
Female worker	0.075	**-0.231**	**-0.189**	**-0.133**
Age (ref: between 30 and 50)				
Younger than 30	*0.051*	*0.088*	**0.333**	**0.144**
Older than 50	0.062	**-0.334**	**-0.318**	**-0.202**
Marital status				
Married woman	**-0.232**	**-0.264**	-0.068	**0.160**
At least one person to support	**0.338**	-0.087	**-0.166**	**-0.349**
Foreign citizenship(ref: Swiss)				
Permanent work permanent	**0.212**	0.103	0.042	-0.054
Non permanent work permit	**0.223**	0.013	0.136	-0.102
Qualification (ref: unskilled, semi-skilled)				
Skilled	**-0.129**	0.013	*0.070*	**-0.120**
Previous occupation (ref: others)				
Textile, retail trade	**-0.137**	-0.088	**-0.261**	-0.042
Construction, transportation	-0.052	**-0.144**	-0.043	**-0.194**
Entrepreneur, senior official, justice, architecture, science, news	**-0.172**	-0.129	-0.147	**-0.184**
Office and computer	**-0.222**	0.085	0.037	**-0.267**
Aptitude to be placed (ref: medium)				
Easy	**-0.062**	-0.046	**-0.086**	**-0.303**
Difficult	**0.076**	**-0.267**	**-0.177**	**0.415**
City size (ref: small city, rural region)				
Large city	**-0.161**	0.063	**0.141**	-0.015
Region of residence (ref: north west ,center)				
East	**0.096**	-0.024	**-0.176**	0.037
South west	**0.205**	**-0.179**	0.025	0.041
West	**0.135**	-0.041	0.043	-0.024
Previous employment history				
Unemployment in 1993-1997	**0.227**	**-0.154**	-0.078	**0.225**
Employment in 1993-1997	**-0.349**	0.117	**0.295**	**-0.445**
Out of labor force in 1993-1997	0.047	**-0.191**	0.122	**0.499**
Baseline hazard in months (ref: 2)				
3-4	0.023	**0.863**	**0.634**	**0.500**
5-6	**-0.372**	**0.911**	**0.450**	**0.428**
7-8	**0.302**	**1.023**	**0.431**	**0.537**
9-10	**0.259**	**1.445**	**0.446**	**0.604**
11-13	**-0.717**	**1.473**	**0.251**	**0.354**
14-18	**-1.598**	-0.135	**-0.445**	**-0.374**
19-24	**-1.581**	-0.015	**-0.593**	-0.247
Constant	**-2.948**	**-5.104**	**-4.236**	**-3.697**

Notes: Table 5 to be continued.

Table 5: ***(... cont.)***

Variables	***Unempl.*** **Coeff.**	***Constant*** **Coeff.**	***Up*** **Coeff.**	***OLF*** **Coeff.**
Mass points				
ε_1	**0.191**	-0.009	0.034	**-0.369**
ε_2	-0.186	0.039	-0.149	1.623
Log odds of probabilities[1]	**1.478**			

Notes: log-likelihood: -70 658.22, observations: 156 144. **Bold**: significant at 5% level, *Italics*: significant at 10%., [1] is given by $\ln(\hat{\pi}_1/1-\hat{\pi}_1)$

unemployment for foreign workers can be attributed to financial constraints: the foreign workers are more likely to be less skilled (OECD, 1996) and thus prefer to work full-time than part-time. If they accept part-time jobs, it is only for transitory periods. On the contrary, Swiss workers, especially women, choose voluntarily to work part-time and they can thereafter withdraw form the labor force for childbearing reasons. These previous arguments are confirmed by the results about exit from unemployment. Indeed, I found a negative effect on the hazard into *Down* for the foreign workers, indicating that the Swiss workers are more likely to move into *Down* after unemployment than their foreign counterparts, who remain unemployed. As *Down* can capture such transitions as full-time job – unemployment - part-time job, a particular emphasis should be laid on the question whether or not this pattern is voluntary or due to financial constraints.

Qualification plays a further role: the more skilled are more likely to remain employed than the less skilled, who tend to return into unemployment, and to a lesser extent, to leave the labor force. In addition, they have higher chances to find better paid jobs (coefficient of 0.083 on the hazard into *Constant* and *Up*). Lastly, the less motivated workers tend not to profit from better employment perspectives and to be the least attached to the labor market: their probability of moving into *OLF* after experiencing losses is the highest.

Results concerning unobserved heterogeneity reveal that individuals can be divided into two latent classes[18]. Table 5 shows further that only the locations for unemployment and *OLF* are significant. This implies that a first group has an above average probability of re-

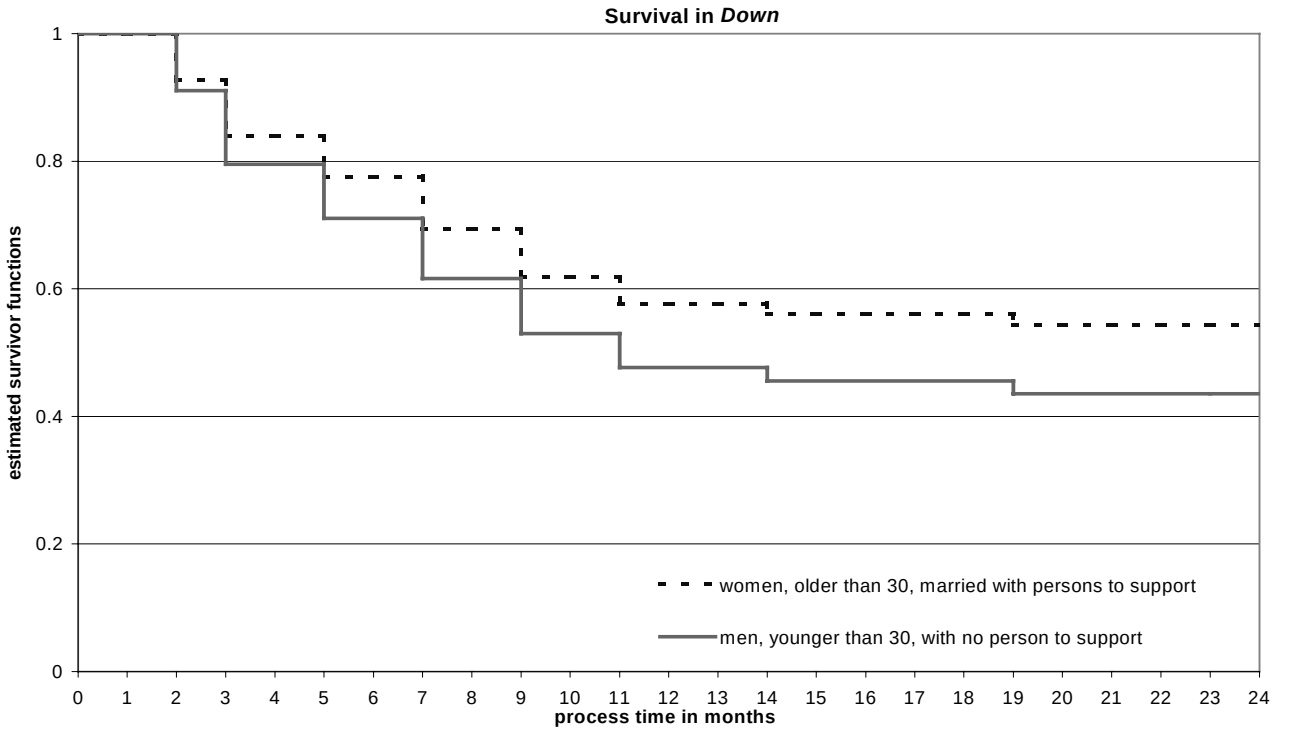
[18] The LR test rejects the model without unobserved heterogeneity in favor of the model with unobserved heterogeneity (see Appendix 6).

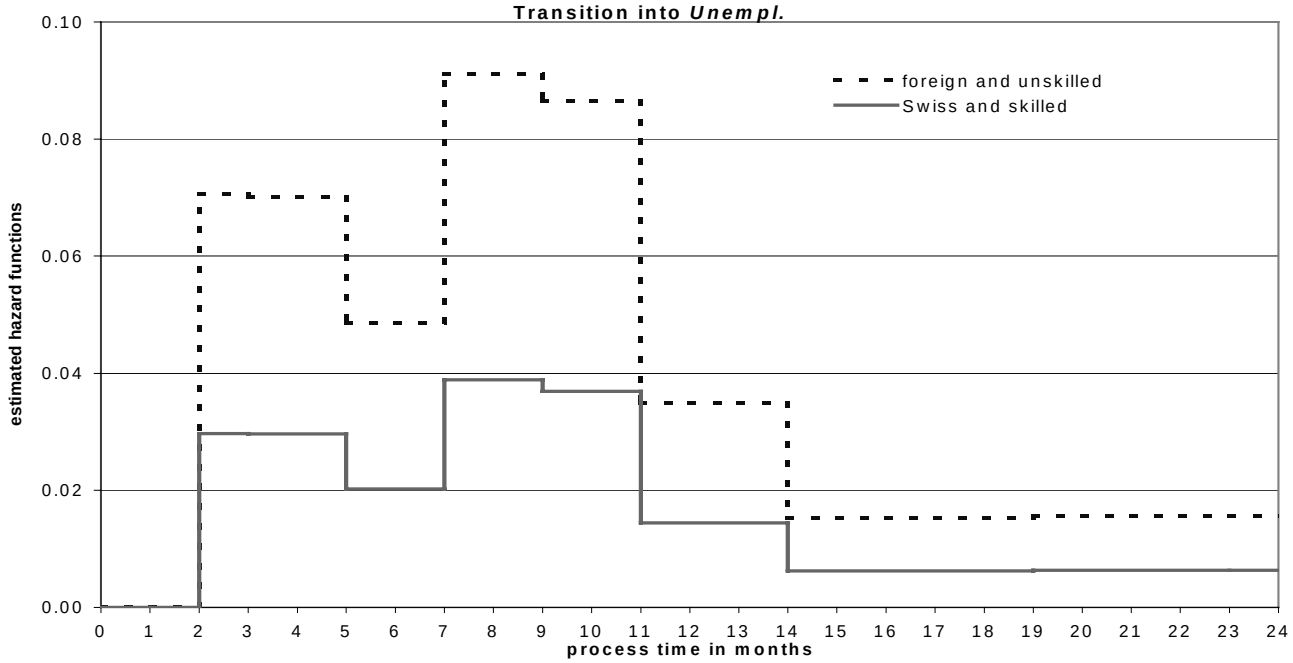
entering unemployment and a below average probability of leaving *Down* for *OLF*. The second group displays the opposite properties. This means that members of class 1 are more attached to the labor market than members of class 2: they are indeed more prone to return into unemployment or to remain employed rather than leaving the labor force as their counterparts in class 2 do. In addition, the log odds of probability indicates that class 1 is in majority in the sample ($\hat{\pi}_1$ = 0.814). These results thus confirm that transitions such as *Unempl. - Down* are more likely to be followed by *Unempl.*. However, a non negligible part of individuals withdraw form the labor market after having experienced unemployment followed by *Down*.

The last results concern the duration dependence pattern. I first find evidence supporting the fact that the previous employment history influences the current one: persons having been previously unemployed are more likely to return into unemployment, while those previously employed tend to remain employed and those being previously inactive are more likely to withdraw from the labor market thereafter. Second, the baseline hazard shows that for small elapsed duration spells in *Down*, the exit from *Down* increases, but as time passes, the probability to exit *Down* diminishes. To illustrate the duration dependence pattern and the estimated results, I again compute the survivor and the hazard functions based on the estimated coefficients from Table 5. Figure 6 shows the differences in the unconditional probability of remaining in *Down* by gender, age and marital status. It turns out that the female, older than 30, married workers with at least one person to support tend to remain in *Down* for longer times compared to the male, younger than 30 workers without any person to support financially[19].

Further investigations concern the re-entry into unemployment. From Table 5, I found that the less skilled seem to encounter repeated unemployment by experiencing such transitions as *Unempl. - Down - Unempl*.. This also holds for the foreign workers, who due to financial constraints, stay in *Down* for temporary periods before returning into unemployment. On the contrary, Swiss workers are more likely to remain in *Down*, which represents in this case voluntary part-time employment. Indeed, Figure 6 indicates that conditional on being in *Down* until the beginning of the 7th month, the probability of returning to unemployment during the 7th and the 8th months is about 4% for the Swiss and the skilled

Figure 6: Exit from *Down*





Source: own calculations.

[19] Unobserved heterogeneity is also accounted for: in addition to be female workers, older than 30 and married with at least one person to support, they belong to the second latent class. It is the contrary for their counterparts.

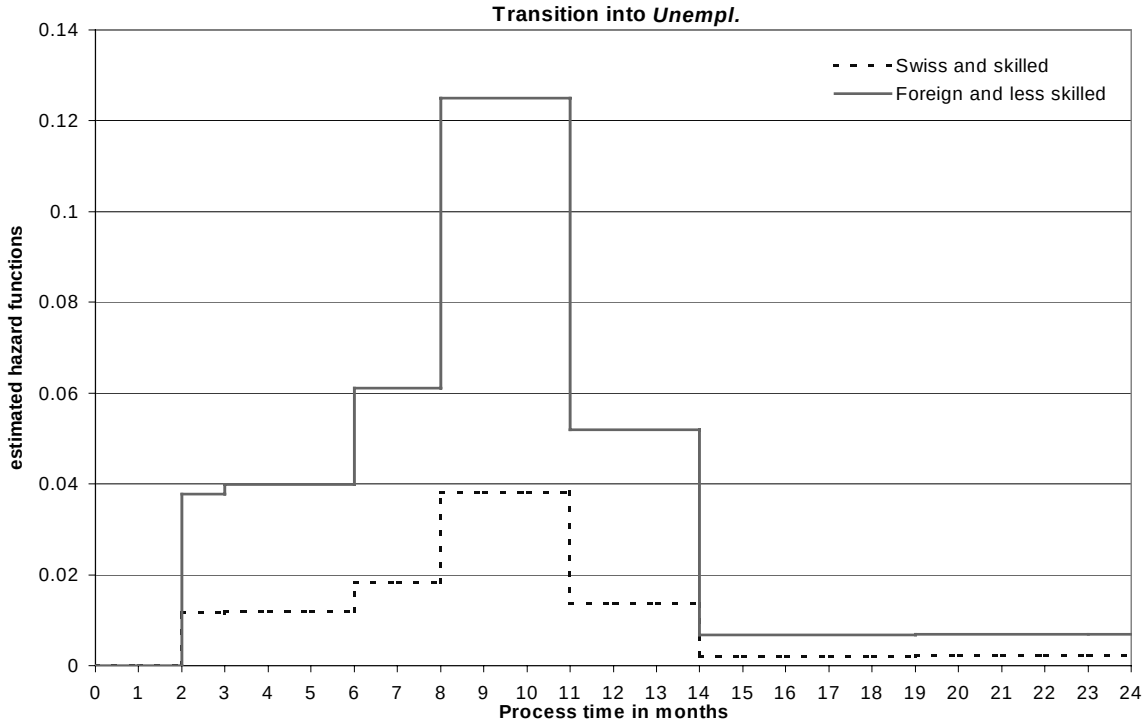
workers and 9% for the foreign and less skilled workers. Appendix 7 presents further results that shed some light on the pattern previously observed in the analysis of exit from unemployment (see section 5.2). According to this, an important part of the male, younger, single, skilled and motivated workers (previously mentioned as type 1 workers) transit into *Down* after having experienced unemployment. However, it turns out that these workers succeed to exit from *Down* for better employment perspectives: given that *Down* lasted until the beginning of the 3th month, the probability of moving into *Up* during the 3th and the 4th month is slightly less than 5% against 2% for the workers of type 2. As a consequence, workers of type 1 who experience earning losses after unemployment do it for transitory periods. On the contrary, workers of type 2 are more likely to withdraw from the labor market than to move to better employment situations (see Appendix 7).

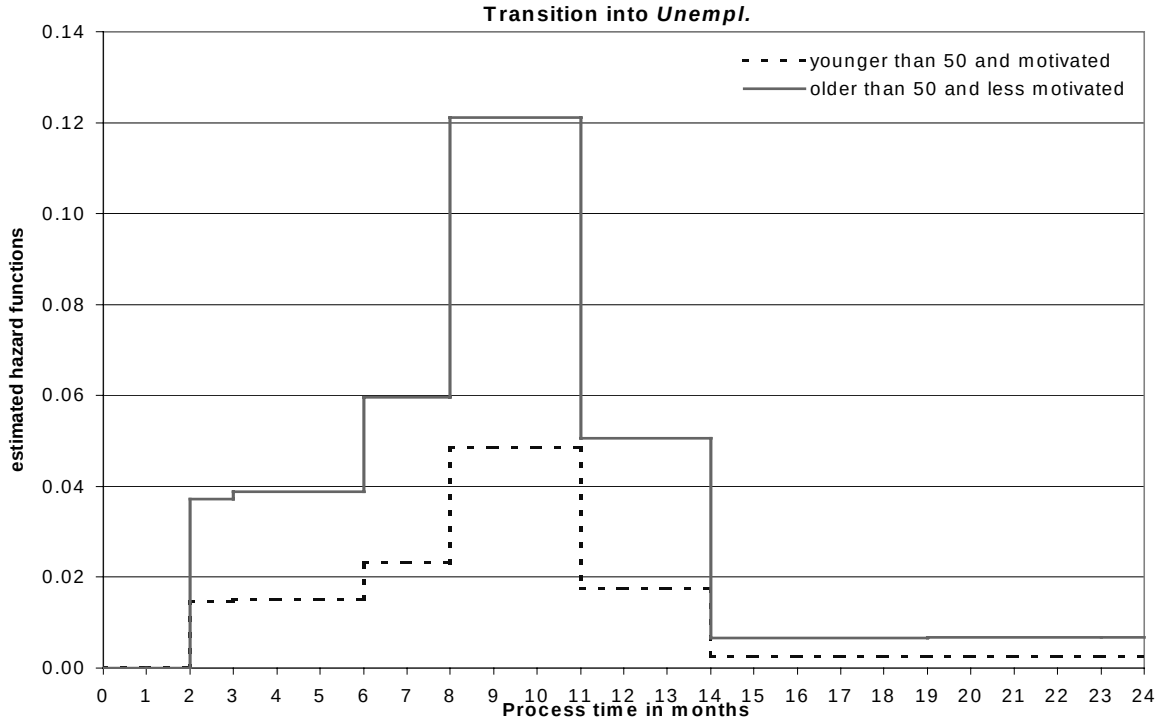
As a summary, I find some evidence supporting the existence of some workers who encounter difficulties on the labor market. First, it turns out that the unskilled and the foreign workers experience repeated unemployment: conditional on exiting *Down*, their predicted hazard into *Unemployment* is 56% compared to 40% for the skilled and Swiss workers. Second, in addition to the less skilled workers, the female, older than 30, married workers are more likely to be confined in bad situations by either remaining in *Down* or by withdrawing from the labor force. An interesting question remains whether or not this is related to voluntary choices, as for women who can for family reasons leave the labor market progressively by first finding a part-time job and then by transiting into inactivity. On the contrary, the elderly workers can feel discouraged by the employment instability and retire earlier. Lastly, I find that workers of type 1, namely the male, younger than 30, single and more skilled workers who accept lower paid employment after unemployment do so for transitory periods, because they expect to find better employment perspectives. Indeed, they succeed in moving up the earnings ladder very quickly.

5.4. Exit from Constant

In this section, I discuss the results for the hazard into unemployment, because it concerns the probability of re-entering unemployment. The specification tests and estimation results are

Figure 7: Exit from *Constant* (earnings differences between –5% and 5%)





Sources: own calculations.

presented in Appendix 8. They show that being a foreign worker, an elderly, less skilled or less motivated worker increases the hazard into unemployment. That means that the elderly workers do not succeed to remain in *Constant* compared to their younger counterparts who profit from better employment perspectives. This also holds for the Swiss and the more skilled workers who either remain in *Constant* or move into *Up*.

Another negative factor for increasing the risk of re-entering unemployment is the previous unemployment experience. Workers having been previously unemployed have indeed greater chances of re-experiencing unemployment and those having previously worked are less likely to move into unemployment. In addition, the duration dependence pattern indicates that for small elapsed duration spells, the hazard rate into unemployment increases while for longer elapsed times in *Constant,* the probability of losing the job decreases.

Concerning results about unobserved heterogeneity factors, it turns out that two latent classes of individuals can be considered. The first class has an above average probability of re-entering unemployment (coefficient of 0.120) while the second class has a below average probability (coefficient of -0.330). The log odds ratio of probability indicates further that the members of the first class are the most numerous (probability of 73%). This implies that a substantial number of workers experiencing *Constant* encounter employment instability by returning into unemployment. To illustrate these results, Figure 7 displays the estimated hazard functions into unemployment by foreign citizenship, age, qualification and motivation. It turns out that being a less skilled and foreign worker decreases the chances of remaining into *Constant*. It also holds for elderly and less motivated workers. As a consequence, they experience employment instability by experiencing repeated unemployment.

5.5. Exit from Up

This section focuses on exit from *Up*. As in the previous section, particular emphasis is laid on the re-entry into unemployment to capture the issue of repeated unemployment. In addition, earnings instability will be investigated to answer the question whether or not some workers succeed to remain in good employment situations. As a consequence, results concerning the hazard into *Unempl.* and the survival in *Up* will be discussed.

I first discuss the results from the specification tests briefly. They are presented in Appendix 9 and they indicate that the data support the choice of the specification: according to the Wald tests, the states cannot be pooled into a single state whereas the Small and Hsiao tests lead to the conclusion that the IIA is valid for any partition of omitted alternatives.

Second, the estimation results for the finally retained specification are presented in Table 7. Concerning gender differences, it turns out that women remain more in *Up* than men who move rather into lower paid employment (negative coefficients for transitions into *Down* and *Constant*). This would imply that women perform better than men once they succeed to move into *Up*. However, we have to keep in mind that this is a relative criterion: the employment states are indeed defined according to the position of the earnings preceding the first unemployment spells. As women are more likely to work part-time than men, women will attain *Up* by transiting from part-time to full-time job. But their earnings can still be lower than the earnings of men. Furthermore, the positive coefficient for the hazard into *OLF* indicates that women are likely to be less attached to the labor market than men. This can be related to family reasons.

Concerning age differences, younger workers succeed to remain in good employment situations while their older counterparts encounter employment instability by either returning to unemployment or by moving into *Down*. Furthermore, being a foreign worker increases the hazard into *Unempl.*. This also holds for workers suffering from a lack of qualification and a lack of motivation: they are more likely to experience repeated unemployment. In addition, even when they find a job, they do not face good employment perspectives: they are indeed more likely to suffer from employment instability by moving into lower paid-employment. These latter facts suggest that the better paid jobs are reserved to a category of workers only.

The previous employment history has a complementary role in explaining the exit from *Up*. Workers having been employed in the past are less likely to experience unemployment or inactivity after *Up*. The opposite pattern is observed for workers having been previously inactive. Turning to results concerning unobserved heterogeneity, individuals can be categorized into two latent groups. Those belonging to the first latent class are more

Table 7: Exit from *Up* (earnings gains)

Variables	***Unempl.*** **Coeff.**	***Down*** **Coeff.**	***Constant*** **Coeff.**	***OLF*** **Coeff.**
Female worker	0.024	**-0.214**	**-0.308**	**0.155**
Age (ref: between 30 and 50)				
Younger than 30	**-0.188**	**-0.159**	0.026	-0.031
Older than 50	**0.443**	**0.191**	0.070	0.100
Marital status				
Single	**-0.190**	**0.285**	-0.077	**0.466**
Foreign citizenship(ref: Swiss)				
Permanent work permanent	**0.202**	-0.091	0.047	-0.005
Non permanent work permit	**0.195**	**-0.276**	-0.185	**0.177**
Qualification (ref: unskilled, semi-skilled)				
Skilled	**-0.278**	0.094	0.117	**-0.290**
Previous occupation (ref: others)				
Textile, retail trade	**-0.328**	**-0.358**	**-0.540**	-0.178
Construction, transportation	**0.143**	*0.109*	**0.273**	-0.026
Entrepreneur, senior official, justice, architecture, science, news	**-0.194**	**-0.617**	**-0.557**	**-0.221**
Office and computer	**-0.413**	**-0.257**	-0.131	**-0.171**
Aptitude to be placed (ref: medium)				
Easy	0.052	-0.025	**0.036**	**-0.140**
Difficult	**0.107**	**0.146**	**-0.418**	**0.303**
City size (ref: small city, rural region)				
Large city	**-0.304**	**0.105**	**0.227**	0.040
Region (ref: west, north west, center)				
East	**0.422**	**-0.172**	-0.122	**0.198**
South West	**0.583**	0.057	-0.086	-0.037
Previous employment history				
Employed in 1993-1997	**-0.441**	**1.006**	**0.214**	**-0.653**
Out of labor force in 1993-1997	*0.083*	**-0.144**	**-0.321**	**0.451**
Baseline hazard in months (ref: 2)				
3-4	-0.042	**-0.425**	**-0.767**	**0.711**
5-6	**-0.292**	**-0.738**	**-1.124**	**0.715**
7-8	**0.778**	**-0.893**	**-1.123**	**1.047**
9-10	**0.823**	**-0.861**	**-0.600**	**1.000**
11-13	**-0.180**	**-1.159**	**-0.724**	**0.639**
14-18	**-1.343**	**-2.298**	**-3.210**	*0.208*
19-24	**-1.354**	**-2.445**	**-2.320**	**0.368**
Constant	**-3.581**	**-4.545**	**-4.385**	**-4.810**
Mass points				
ε_1	**0.484**	**-0.432**	**-0.328**	0.127
ε_2	-1.395	1.246	0.947	-0.368
Log odds of probabilities	**1.059**			

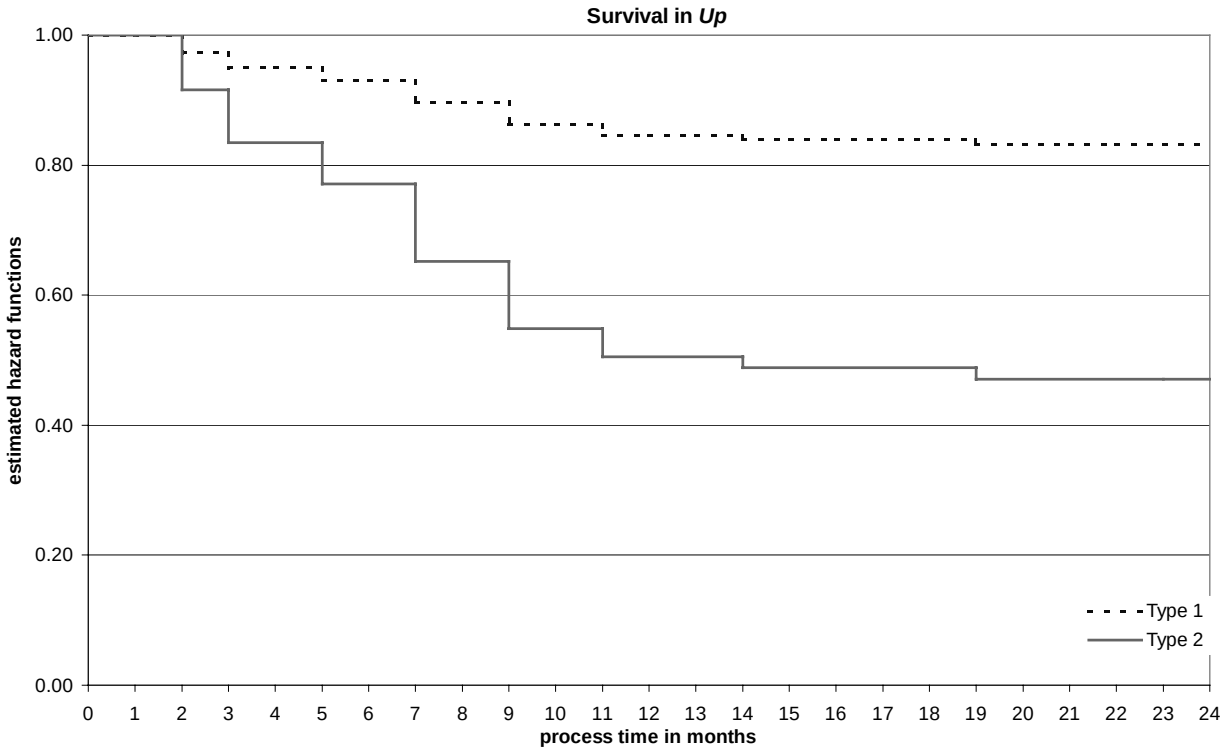
Notes: log-likelihood: -43926.79, observations: 153182. **Bold**: significant at 5% level, *Italics*: significant at 10%.

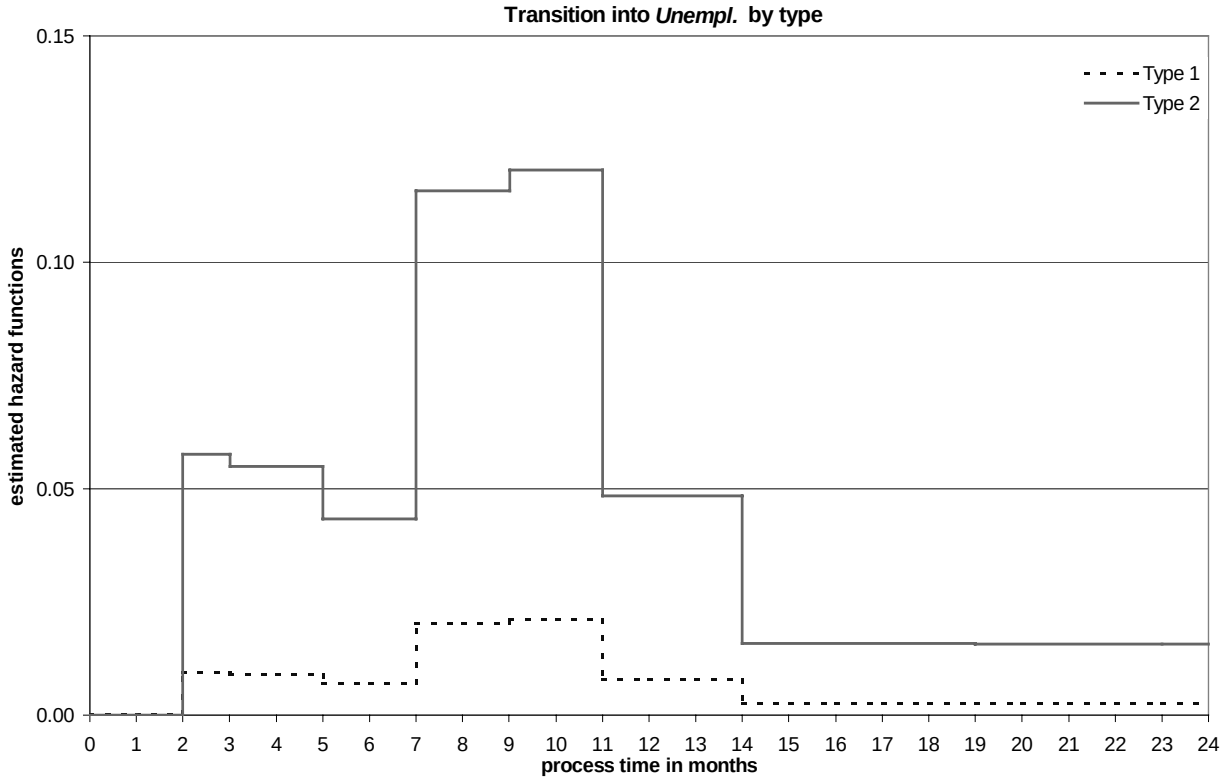
likely to remain in *Up* (coefficient of -0.27 for the hazard out of *Up*) than their counterparts counterparts of the second latent class (coefficient of 0.80 for the hazard out of *Up*) [20]. Lastly, the coefficients for the baseline hazard indicate that the hazard out from *Up* decreases as time passes.

To illustrate the duration dependence pattern, Figure 8 reports the survivor function and the hazard rate into *Unempl.* for some categories of workers. I compare two profiles of workers: workers of type 1 represent the male, younger than 30, single and skilled workers belonging to the first latent class while workers of type 2 contain the female, between 30 and 50, non single and less skilled workers members of the second latent class. It turns out that the better employment perspectives are reserved to type 1 workers who achieve to remain persistently in *Up* with a probability of more than 80%. On the contrary, workers of type 2 experience employment instability: they do not succeed to remain in *Up* and experience repeated unemployment. For instance, given that *Up* lasted until the beginning of the 7th month, the probability to re-enter unemployment is 12% during the 7th and the 8th month. This probability is less than 2% for type 1 workers. In addition, Appendix 9 shows that workers of type 2 have a higher hazard rate into *Down*, *Constant* and *OLF* than workers of type 1. As a consequence, they are more likely to encounter employment instability and thus to be trapped in bad employment situations.

[20] 0.484-0.432-0.328 = -0.276 for the first latent class and -1.395+1.246+0.947 = 0.798 for the second latent class.

Figure 8: Exit from *Up*





Notes: Type 1 represents male, younger than 30, single and skilled workers belonging to the latent class 1 and Type 2 represents female, between 30-50, non single and less skilled workers members of the latent class 2.

5.5. Exit from OLF

Lastly, I consider the estimation results for the exit from *OLF*. In this section, I concentrate on the probability of re-entering unemployment after inactivity and on the probability of finding a job. This would shed some first light on the existence of "non-searchers" who are behaviorally similar in terms of future employment to the "searchers" (see Jones and Riddell, 1999 for the distinction between unemployed and out-of-the labor force) [21]. As a consequence, only the results concerning these points will be discussed.

The specification tests are presented in detail in Appendix 10. They indicate that the choice of the states in the specification seems to be right. The hypothesis that any pair of category can be pooled into a single category is indeed strongly rejected. That means that unemployment and out-of the labor force are distinct states. Second, the Small and Hsiao tests indicate that the data support the multinomial logit specification. Third, a LR test[22] for the null hypothesis that the model without unobserved heterogeneity is valid leads to the conclusion that the preferred specification is the one allowing the presence of some unobserved individual factors.

The estimation results are presented in Table 8. They indicate that women are more likely to return into unemployment than men, who will return to employment (negative coefficient of 0.293 on the total hazard into employment). Marital status plays a complementary role in explaining the gender differences: being a married woman increases the risk of staying inactive. This also holds for elderly and less motivated workers. On the contrary, younger than 30 workers having no person to support financially leave *OLF* quickly for re-entering employment. Furthermore, the foreign workers owning a non permanent work permit are more likely to return to unemployment compared to the Swiss workers and the foreign workers having a permanent permit. They are in addition more prone to exit inactivity for better paid jobs. This latter fact could be evidence for the discouraged workers hypothesis, in the sense that foreign workers withdraw temporarily from the labor market until better time

[21] See the seminal work by Jones and Riddell (1999) about the distinction between unemployed and out of the labor force. The non-searchers are composed of inactive declaring they want to work (defined as "marginally attached" to the labor market by Jones and Riddell) and of inactive not willing to work ("not attached"). Jones and Riddell report evidence that some *OLF* sub-categories, the "marginally attached" are close to the "searchers" (unemployed) in terms of future employment.

[22] The test statistic is –2.(-42740.703 + 42675.357) = 130.73 which is greater than 11.07 (critical value for χ^2_5)

Table 8: Estimation results (exit from *OLF)*

Variables	***Unempl.*** **Coeff.**	***Down*** **Coeff.**	***Constant*** **Coeff.**	***Up*** **Coeff.**
Female worker	**0.176**	**-0.179**	-0.027	-0.087
Age (ref: between 30 and 50)				
Younger than 30	**0.147**	**0.099**	**0.047**	**0.231**
Older than 50	0.069	**-0.463**	**-0.441**	**-0.769**
Marital status				
Married woman	**-0.358**	**-0.156**	**-0.420**	**-0.198**
At least one person to support	**0.438**	**-0.281**	**-0.511**	**-0.159**
Foreign citizenship(ref: Swiss, perm.)				
Non permanent work permit	**0.124**	**-0.150**	**0.313**	**0.239**
Qualification (ref: semi, unskilled)				
Skilled	**-0.163**	**0.170**	-0.037	**.0.154**
Aptitude to be placed (ref: medium)				
Easy	-0.007	**-0.147**	**0.180**	0.058
Difficult	**-0.055**	**-0.214**	**-0.636**	**-0.382**
Previous employment history				
Unemployed in 1993-1997	**0.044**	**-0.196**	0.126	0.008
Baseline hazard in months (ref: 1-2)				
3	**0.110**	**0.628**	**0.533**	**0.339**
4-5	**-0.369**	**0.324**	**0.370**	0.041
6-8	**-0.632**	*0.114*	0.079	*-0.148*
9-10	**-0.855**	0.099	0.184	0.057
11-13	**-1.429**	-0.091	**0.297**	**0.265**
14-17	**-2.825**	**-0.474**	**-1.553**	**-1.447**
18-24	**-2.672**	**-1.219**	**-1.819**	**-1.621**
Constant	**-2.986**	**-3.273**	**-4.608**	**-3.923**
Mass points				
ε_1	**0.214**	**-0.408**	0.100	-0.055
ε_2	-0.598	1.137	-0.279	0.154
Log odds of probabilities[1]	**1.026**			

Notes: log-likelihood: -42 675.34, observations: 99 889. **Bold**: significant at 5% level, *Italics*: significant at 10%.

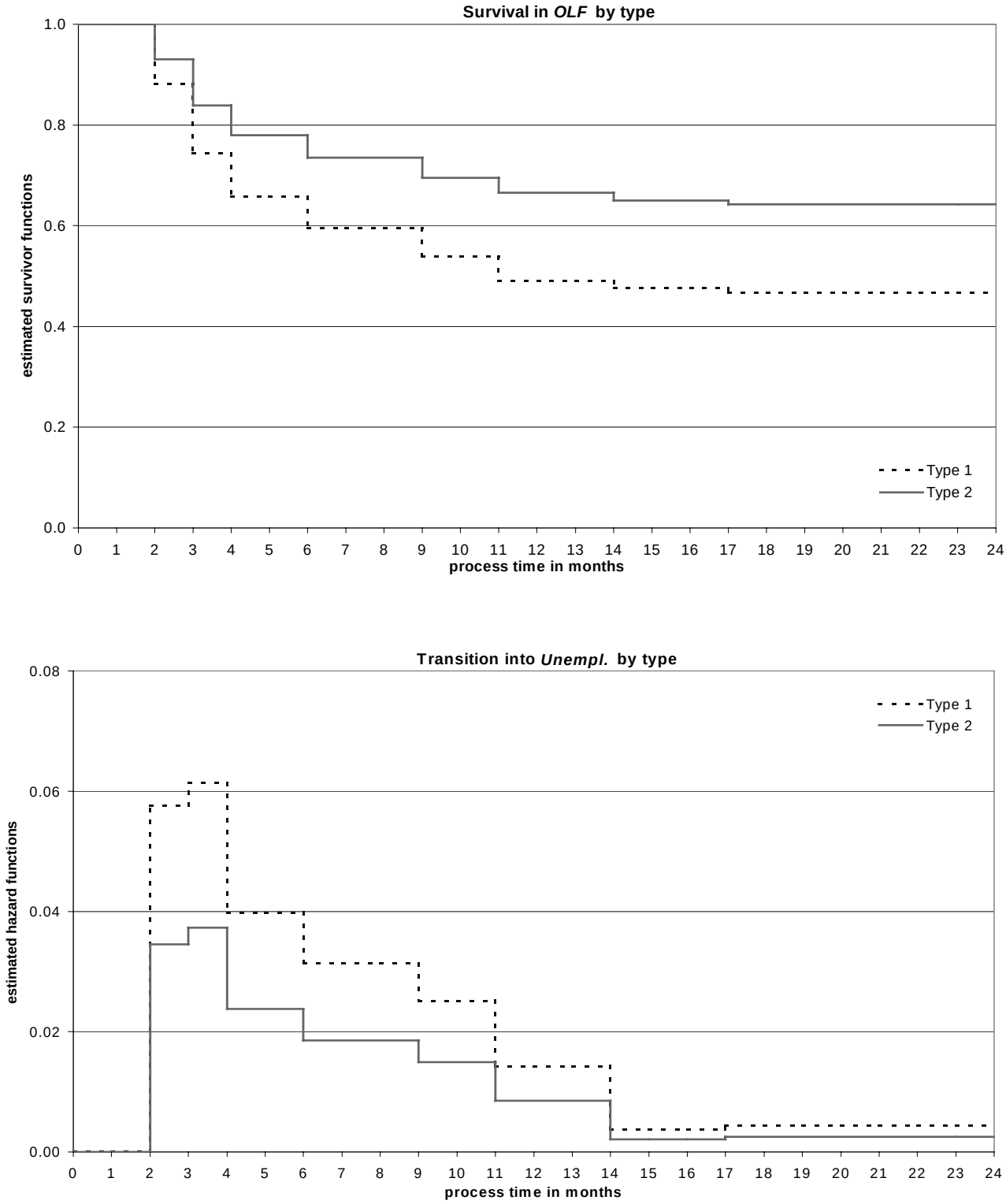
[1] is given by $\ln(\hat{\pi}_1/1-\hat{\pi}_1)$

come. On the contrary, Swiss workers becoming inactive after having experienced unemployed seem to remain inactive. This would mean that they voluntarily stay without a job and live on their relatives' earnings or on their own wealth. It is particularly the case for married women.

These latter statements are also confirmed by the results about the two latent classes. It turns out that the first group displays positive properties towards exiting *OLF* for unemployment. That means that members of class 1 are temporarily inactive. On the contrary, members of class 2 rather stay inactive. That implies that they are true economic inactive individuals. Once they decide to re-enter the labor market, they usually face difficulties by finding jobs with lower earnings. Lastly, the log odds ratio of probability in Table 8 indicates that 73% of the individuals fall into the first class, i.e., there is a substantial risk that the unemployed encounter a long joblessness spell characterized by multiple unemployment spells separated by intervening short out-of-labor force spells. This result would support the discouraged worker hypothesis. As a consequence, I find some results in line with the controversial debate about the necessity of introducing the desire for work in addition to the classical job search criterion in the definition of unemployment (see OECD, 1987, 1995).

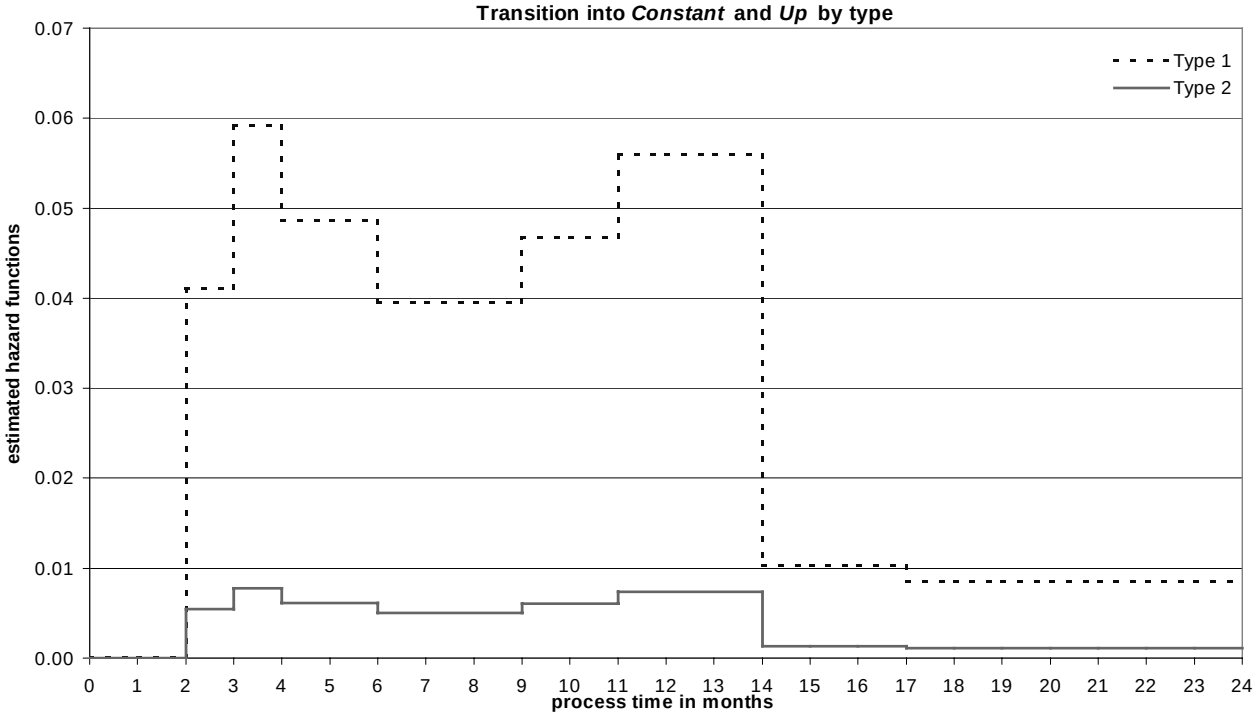
Figure 9 gives the duration dependence pattern for two profiles of workers: workers being highly attached to the labor market (namely male, younger than 50, motivated workers whithout any person to support and belonging to the first latent class) and workers being marginally attached (female, elderly, less motivated workers with persons to support and members of the second latent class). As previously mentioned, the first type of workers withdraw temporary from the labor force and they return quickly to unemployment or employment whereas, workers of the second type remain inactive.

Figure 9: Exit from *OLF*



Notes: Type 1 workers represent the male, younger than 50, motivated workers without any person to support and belonging to the latent class 1 and Type 2 represents the female, older than 50, less motivated workers with any person to support and members of the latent class 2.

Figure 9: ***(… continued)***



Notes: see above.

6 Conclusion

This paper evaluates the effect of unemployment on the subsequent employment history by identifying the determinants of the risk of exiting unemployment, as well as those for re-entering unemployment. This latter aspect of unemployment has received little attention in the literature. To my knowledge, at least for Switzerland, there is no empirical study about this topic. Particular emphasis has been indeed laid on the analysis of long-term unemployment. However, the analysis of the re-entry into unemployment permits to address the question of repeated unemployment. This latter issue is crucial because repeated unemployment can lead to the same socioeconomic problems as long-term unemployment: the marginalisation of some workers categories from the labor market. This paper is thus aimed at filling the gap in this topic.

The econometric analysis focuses on the entry into and the exit out of unemployment by specifying different hazard rate models for the labor market states of interest. The exit from unemployment is first analyzed using multiple destination states composed of employment with different changes in earnings and of inactivity. This permits to distinguish between workers prone to encounter earnings losses and those who are more likely to withdraw from the labor market after an unemployment spell. Second, the entry into unemployment is studied by investigating the exit from the different employment states and from inactivity. Such transitions as unemployment - lower paid employment - unemployment can capture the phenomenon of repeated unemployment. Besides, the analysis of re-entry into unemployment can address the question of the discouraged workers hypothesis: by studying the transitions unemployment - out of the labor force - unemployment, we can figure out whether some unemployed are distressed by the hart conditions, and thus withdraw temporarily from the labor market until better times come. Lastly, the transitions between the different employment states permit to identify the categories of workers prone to accept lower paid jobs for transitory times before moving to better employment situations.

Controlling for observed and unobserved heterogeneity, the estimation results report some evidence for the existence of some disadvantaged workers. First, the past unemployment experience exerts a negative effect on the exit from the current unemployment spell. Turning to the differences in terms of personal characteristics, women are more likely to remain unemployed than men. Being a worker of an advanced age, a foreign or a less skilled worker are additional factors that exert a negative effect on the exit from unemployment into employment. Elderly and less motivated workers are on the contrary more likely to leave unemployment, but for inactivity. As a consequence, the analysis of exit from unemployment shows the existence of two types of unemployed: the “higher-risk” unemployed such as women, foreign and less killed workers and the “lower-risk” unemployed who represent mainly the male, the Swiss, the younger and skilled workers.

The “higher-risk” workers tend to remain unemployed. In addition, they are less attached to the labor force: they are indeed more likely to withdraw from the labor market if they leave unemployment. If they succeed to find a job, they face some difficulties by remaining confined in lower paid jobs that prevent them from climbing up the earnings ladder. For instance, married women with persons to support remain trapped in bad employment situations by either remaining in *Down* for longer times or by withdrawing from

the labor market. Foreign and less skilled workers encounter employment instability: they are hit by repeated unemployment. On the contrary, the “lower-risk” unemployed have better employment perspectives: they leave unemployment quickly for employment. It is possible for them to experience earnings losses, but it is more for transitory periods. They indeed succeed in moving on to better paid jobs and in remaining there for longer periods. These facts show that these workers accept a part-time job or to work at a lower wage rate, because they expect their earnings to increase thereafter.

To conclude, the results seem to indicate that some workers encounter difficulties that may conduct to their progressive exclusion from the labor market. The lack of employment stability seems to be mostly related to a qualification problem. The access to higher education or the completion of vocational qualification should provide better protection against the risk of entering unemployment. In addition, efforts promoting the access to employment for the persons who are constrained to withdraw from the labor market should prove worthwhile.

References

Addison, J.T., and Portugal, P. (1989): Job Displacement, Relative Wage Changes and Duration of Unemployment, *Journal of Labour Economics*, 7(3), 281-302.

Arulampalam, W. (2001): Is Unemployment Really Scarring? Effects of Unemployment Experiences on Wages, *The Economic Journal*, 111, F585-606.

Brooks, R.D., Fry, T.R., and Harris, M. (1998): Combining choice set partition tests for the IIA property: some results in the four alternatives setting, *Journal of Quantitative Economics*, 14(2), 1.9.

Boeri, T., and Steiner, V. (1998): "Wait Unemployment" in Economics of Transition: the Case of Poland, Konjonkturpolitik, 3, 287-311.

Cappellari, L., and Jenkins, S.P. (2003): Transitions between unemployment and low pay, Working Paper 2003-08, Institute for Social and Economic Research, University of Essex, Colchester.

Chesher, A., and Santos Silva, J.M.C. (2002): Taste Variation in Discrete Choice Models, *Review of Economic Studies*, 69, 147-168.

Cramer, J.S., and Ridder, G. (1991): Pooling states in the multinomial logit model, *Journal of Econometrics*, 47, 267-272.

Ehrenberg, R.G., and Oaxaca, R.L (1976): Unemployment Insurance, Duration of Unemployment, and Subsequent Wage Gain, *American Economic Review*, 66, 754-766.

Filler, R.K., Hamermesh, D.S., and Rees, A.E. (1996): *The Economics of Work and Pay*, 6th Edition, Harper Collins College Publishers.

Flinn, C., and Heckman, J.J. (1983): Are Unemployment and Out of the Labour Force behaviourally distinct states?, *Journal of Labour economics*, 1, 28-42.

Flückiger, Y. (1998): The Labour Market in Switzerland: the End of a Special Case?, *International Journal of Manpower*, 19, 369-395.

Gerfin, M. and Lechner, M. (2002): Microeconometric Evaluation of the Active Labour Market Policy in Switzerland, *Economic* Journal, 112, 854-893.

Gerfin, M., Lechner, M., and Steiger, H. (2002): Does subsidised temporary employment get the unemployed back to work? An econometric analysis of two different schemes, *Discussion paper 2002-01*, University of St.Gallen.

Gerfin, M., and Schellhorn, M. (1995): Dauerabhängigkeit der Abgangsrate aus der Arbeitslosigkeit, Eine empirische Untersuchung für die Schweiz, in: V. Steiner und L. Bellmann (Hrsg.): Mikroekonomik des Arbeitsmarktes, Nürnberg: Institut für Arbeitsmarkt- und Berufsforschung.

Gouriéroux, C., and Montfort, A. (1989): *Statistiques et Modèles Econométriques*, Economica.

Gönül, F. (1992): New evidence on whether Unemployment and Out of the Labour Force are distinct states, *Journal of Human Resources*, 27, 329-361.

Gregory, M., and Jukes, R. (2001): Unemployment and Subsequent Earnings: Estimating Scarring among British Men 1984-1994, *The Economic Journal*, 111, F607-625.

Härdle, W. (1989): *Applied nonparametric regression*, Cambridge University Press.

Hausman, J., and McFadden, D. (1984): Specification Tests for the Multinomial Logit Model, *Econometrica*, 52(5), 1219-1240.

Heckman, J.J., and Borjas, G.J. (1980): Does Unemployment Cause Future Unemployment? Definitions, Questions and Answers from a Continuous Time Model of Heterogeneity and State Dependence, *Economica*, 47, 247-283.

Heckman, J.J., and Singer, B. (1984): A Method of Minimizing the Impact of Distributional Assumptions in Econometric Models for Duration Data, *Econometrica*, 52, 271-320.

Houle, M., and van Audenrode, M. (1995): Job Displacement, Wages, and Unemployment Duration in Canada, *Labour Economics*, 2(1), 77-91.

Jacobson, L., Lalonde R., and Sullivan, D. (1993): Earning Losses of Displaced Workers, *American Economic Review*, 83, 685-709.

Jenkins, S.P. (1995): Practitioner's corner – Easy estimation methods for discrete-time duration models, *Oxford Bulletin of Economics and Statistics*, 57(1), 129-138.

Jones, S.R., and Riddell, W.C. (1999): The measurement of unemployment: an empirical approach, *Econometrica*, 67, 147-162.

Judge, G., Hill, C., Griffiths, W., and Lee, T. (1985): *The Theory and Practice of Econometrics*. New York: Wiley.

Kalbfleisch, J.D:, and Prentice, R.L. (1980): *The Statistical Analysis of Failure Time Data*, New York: Wiley.

Kalwij, A.S. (2001): Individuals' unemployment experiences: heterogeneity and business cycle effects, *IZA Discussion Paper*, n°370, September 2001.

Kiefer, N. (1988): Economic Duration Data and Hazard Functions, *Journal of Economic Literature*, 41, 646-679.

Lancaster, T. (1979): Econometric Methods for the Duration of Unemployment, *Econometrica*, 47, 939-956.

Lancaster, T. (1990): *The Econometric Analysis of Transition Data*, Cambridge University Press.

Lauer, C. (2003): Education and Unemployment: A French-German Comparison, *Discussion Paper 03-34*, ZEW.

Layard, R., Nickell, S., and Jackman, R. (1991): *Unemployment: Macroeconomic Performance and the Labour Market*, Oxford University Press.

McFadden, D. (1974): Conditional logit analysis of qualitative choice behaviour, in P. Zarembka, ed., *Frontiers in Econometrics*, Academic Press, New York, 105-142.

Nguyen Phan, V., Kaiser, U., and Laisney, F. (2004): The performance of German Firms in the Business-Related Service Sectors: a Dynamic Analysis, *forthcoming in Journal of Business and Economic Statistics*.

Nickell, S. (1979): Estimating the probability of leaving unemployment, *Econometrica*, 47, 1249-1266.

OECD (1987): On the Margin of the Labour Force: An Analysis of Dicouraged Workers and other Non-Participants, *Employment Outlook*, September, 142-170.

OECD (1995): Supplementary Measures of Labour Market Slack, *Employment Outlook*, July, 43-97.

OECD (1996): Arbeitslosigkeit in der Schweiz, Deutsche Übersetzung der OECD-Studie "Politique du marché du travail en Suisse", *Beiträge zur Arbeitsmarktpolitik*, 7.

Puhani, P. (2002): The Rise and Fall of Swiss Unemployment – Relative Demand Shocks, Wage Rigidities, and Temporary Migrants, *Discussion Paper*, University of St.Gallen.

Rabe-Hesketh, S., Pickles, A., and Skrondal, A. (2001): GLLAMM Manual, Technical Report 2001/01, Department of Biostatistics and Computing, Institute of Psychatry, King's College, University of London.

Rabe-Hesketh, S., Pickles, A., and Skrondal, A. (2001): GLLAMM: A class of models and a Stata program, *Multilevel Modelling Newsletter*, 13(1), 17-23.

Rabe-Hesketh, S., Skrondal, A., and Pickles, A. (2004): Generalized multilevel structural equation modelling, *Psychometrika*, in press.

Ruhm, C. (1991): Are Workers Permanently Scarred by Job Displacement, *American Economic Review*, 81(1), 319-324.

Sheldon, G. (1999): Die Langzeitarbeitslosigkeit in der Schweiz, Diagnose und Therapie, Bern: Staatssekretariat für Wirtschaft (SECO).

Skrondal, A., and Rabe-Hesketh, S. (2003): Multilevel logistic regression for polytomous data and rankings, *Psychometrika*, 68(2), 267-287.

Skrondal, A., and Rabe-Hesketh, S. (2004): Generalized latent variable modeling: Multilevel, longitudinal and structural equation models. Boca Raton, FL: Chapman & Hall/ CRC Press. To appear.

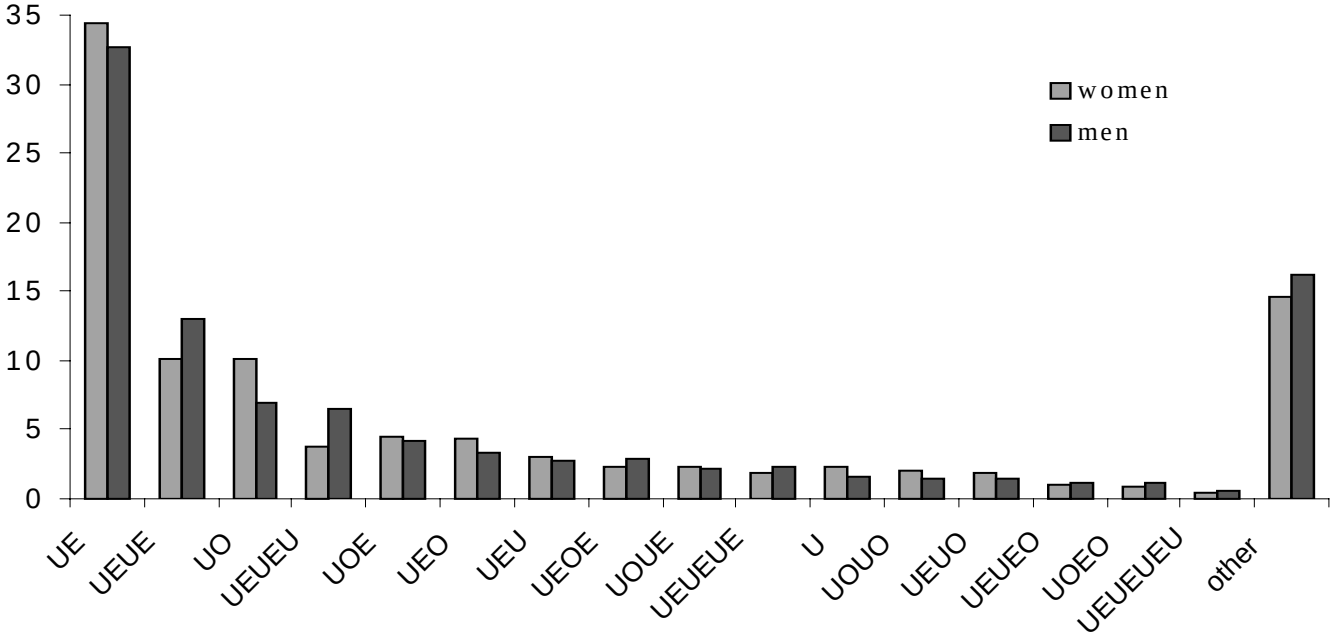
Small, K.A., and Hsiao, C. (1985): Multinomial logit specification tests, *International Economic Review*, 26(3), 619-627.

Steiner, V. (2001): Unemployment persistence in the West German labor market: negative duration dependence or sorting?, *Oxford Bulletin of Economics and Statistics*, 63, 91-113.

Tano, D.K. (1991): Are Unemployment and Out of the Labour Force behaviourally distinct labour force states? New evidence from gross change data, *Economics Letters*, 36, 113-117.

Appendix

Appendix 1: Observed sequences of states, by gender



Notes: sorted by incidence, the category "other" correspond to the other sequences observed in the data such as *UOU*, *UOUEUE*, *UEUEUEUE* and *UOUE* (each of these sequences is represented with a frequency of less than 1%).

Appendix 2: *Analysis of the main transitions by some personal characteristics.*

Type of transitions	Woman	Man
Transitions UE	**Mean/share**	**Mean/share**
Age categories		
Younger than 30	26.4%	26.6%
Between 30 and 50	65.0%	64.9%
Older than 50	8.5%	8.5%
Civil status categories		
Single	30.7%	34.2%
Married	52.2%	58.5%
Widowed	1.5%	0.4%
Divorced	15.6%	6.8%
Foreign citizenship		
Swiss	68.5%	57.5%
Permanent permit	19.1%	26.6%
Non permanent permit	12.2%	14.3%
Previous job position		
High	2.8%	9.0%
Medium	63.8%	61.0%
Low	32.1%	28.3%
Chances to find job		
No information	1.2%	1.5%
Very easy	6.0%	6.7%
Easy	18.0%	21.3%
Medium	63.2%	61.3%
Difficult	11.0%	8.4%
Special case	0.7%	0.9%
Transitions UEUE	**Mean/share**	**Mean/share**
Age categories		
Younger than 30	27.1%	25.6%
Between 30 and 50	63.3%	65.9%
Older than 50	9.7%	8.5%
Civil status categories		
Single	31.0%	32.0%
Married	51.3%	61.3%
Widowed	1.4%	0.1%
Divorced	16.3%	6.6%
Foreign citizenship		
Swiss	62.3%	48.1%
Permanent permit	22.4%	31.1%
Non permanent permit	14.9%	19.2%
Previous job position		
High	2.2%	6.5%
Medium	58.3%	55.5%
Low	37.8%	36.5%

Notes: Appendix 2 to be continued

Appendix 2 *(… continued)*

Type of transitions	Woman	Man
Chances to find job		
No information	0.7%	0.6%
Very easy	7.5%	7.7%
Easy	17.3%	20.2%
Medium	64.6%	61.9%
Difficult	9.5%	8.4%
Special case	0.3%	1.1%
Transitions UO	**Mean/share**	**Mean/share**
Age categories		
Younger than 30	22.2%	15.2%
Between 30 and 50	65.8%	63.0%
Older than 50	12.0%	21.8%
Civil status categories		
Single	14.0%	25.0%
Married	71.5%	63.2%
Widowed	1.6%	0.9%
Divorced	12.9%	11.0%
Foreign citizenship		
Swiss	47.7%	45.7%
Permanent permit	30.0%	37.7%
Non permanent permit	21.1%	13.1%
Previous job position		
High	2.2%	7.9%
Medium	48.5%	55.3%
Low	47.9%	34.8%
Chances to find job		
No information	0.7%	0.4%
Very easy	5.8%	6.6%
Easy	10.0%	11.2%
Medium	59.4%	53.6%
Difficult	21.3%	22.7%
Special case	2.8%	5.5%
Transitions UEUEU	**Mean/share**	**Mean/share**
Age categories		
Younger than 30	19.1%	17.2%
Between 30 and 50	72.2%	73.5%
Older than 50	8.7%	9.3%
Civil status categories		
Single	15.8%	19.6%
Married	72.9%	75.9%
Widowed	2.0%	0.1%
Divorced	9.3%	4.4%

Notes: Appendix 2 to be continued

Appendix 2 *(… continued)*

Type of transitions	Woman	Man
Foreign citizenship		
Swiss	29.1%	34.2%
Permanent permit	30.7%	39.5%
Non permanent permit	40.0%	25.0%
Previous job position		
High	1.3%	2.8%
Medium	36.0%	47.6%
Low	62.4%	49.6%
Chances to find job		
No information	0.0%	0.6%
Very easy	35.3%	14.3%
Easy	20.0%	18.1%
Medium	38.0%	60.0%
Difficult	6.4%	6.2%
Special case	0.2%	0.8%
Transitions UOE	**Mean/share**	**Mean/share**
Age categories		
Younger than 30	28.5%	28.9%
Between 30 and 50	65.4%	64.4%
Older than 50	6.0%	6.7%
Civil status categories		
Single	29.5%	40.2%
Married	54.4%	51.6%
Widowed	1.5%	0.3%
Divorced	14.6%	7.9%
Foreign citizenship		
Swiss	68.2%	59.7%
Permanent permit	17.6%	23.3%
Non permanent permit	14.0%	14.6%
Previous job position		
High	2.1%	8.4%
Medium	56.5%	56.5%
Low	39.9%	33.1%
Chances to find job		
No information	1.1%	0.7%
Very easy	5.9%	3.8%
Easy	20.8%	19.8%
Medium	58.2%	61.8%
Difficult	12.3%	12.2%
Special case	1.7%	1.7%

Notes: Appendix 2 to be continued

Appendix 2 *(… continued)*

Type of transitions	Woman	Man
Transitions UEUEUE	**Mean/share**	**Mean/share**
Age categories		
Younger than 30	22.5%	29.5%
Between 30 and 50	68.3%	61.2%
Older than 50	9.2%	9.4%
Foreign citizenship		
Swiss	63.3%	50.4%
Permanent permit	21.6%	30.2%
Non permanent permit	14.7%	18.0%
Civil status categories		
Single	32.6%	38.8%
Married	50.9%	54.2%
Widowed	1.8%	0.5%
Divorced	14.7%	6.5%
Previous job position		
High	0.9%	3.6%
Medium	59.2%	59.0%
Low	39.0%	34.8%
Chances to find job		
No information	1.4%	0.0%
Very easy	8.7%	5.8%
Easy	15.1%	17.7%
Medium	60.1%	62.8%
Difficult	11.9%	11.3%
Special case	2.8%	2.4%
Transitions U*	**Mean/share**	**Mean/share**
Age categories		
Younger than 30	13.1%	9.3%
Between 30 and 50	71.0%	68.0%
Older than 50	15.9%	22.8%
Civil status categories		
Single	13.8%	24.6%
Married	71.0%	64.4%
Widowed	3.2%	0.7%
Divorced	12.0%	10.3%
Foreign citizenship		
Swiss	50.5%	49.1%
Permanent permit	34.3%	35.6%
Non permanent permit	14.8%	14.6%
Previous job position		
High	4.2%	8.2%
Medium	49.5%	52.3%
Low	45.9%	38.4%

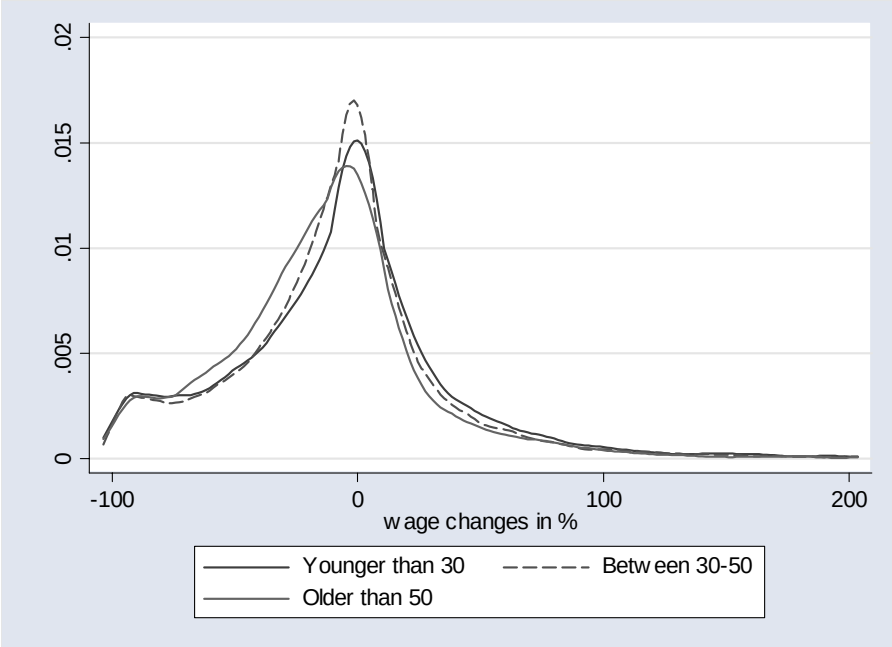
Notes: Appendix 2 to be continued, * corresponds to right-censored spells.

Appendix 2 *(… continued)*

Type of transitions	Woman	Man
Chances to find job		
No information	0.4%	0.4%
Very easy	4.2%	4.3%
Easy	11.7%	11.4%
Medium	68.2%	64.4%
Difficult	14.5%	17.1%
Special case	1.1%	2.5%

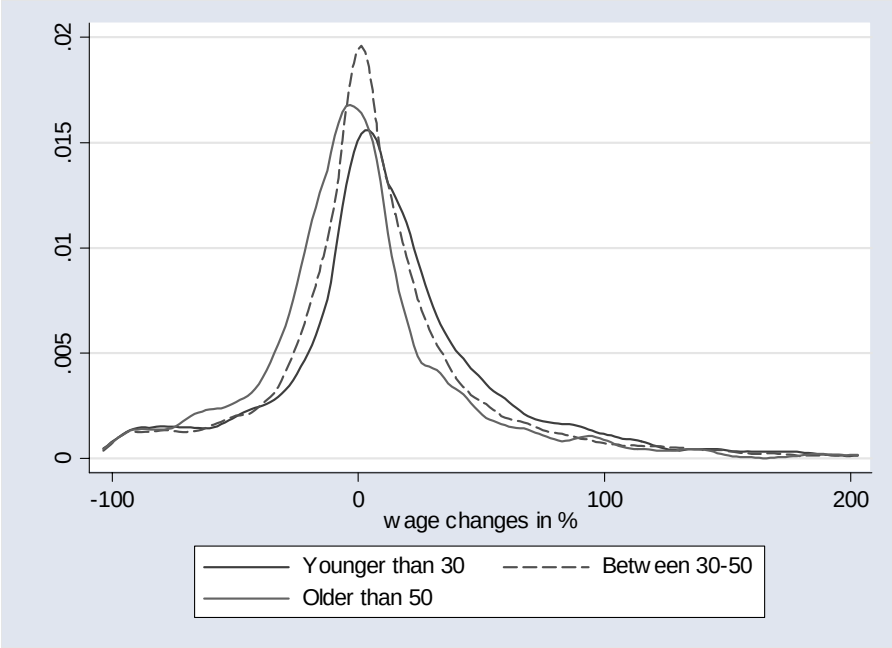
Notes: Appendix 2: finished.
Source: own calculations. These statistics are calculated for the sample of 30 035 persons who enter into unemployment during the period 1997/10-1997/12. Among the sequences of 14 different spells that are observed in this sample, only the main transitions are reported in this table (i.e. for 24 096 persons). The personal characteristics are measured on the 31st, December 1997.

Appendix 3: Kernel densities of earnings changes in % by age *(1st month employed after unemployment)*



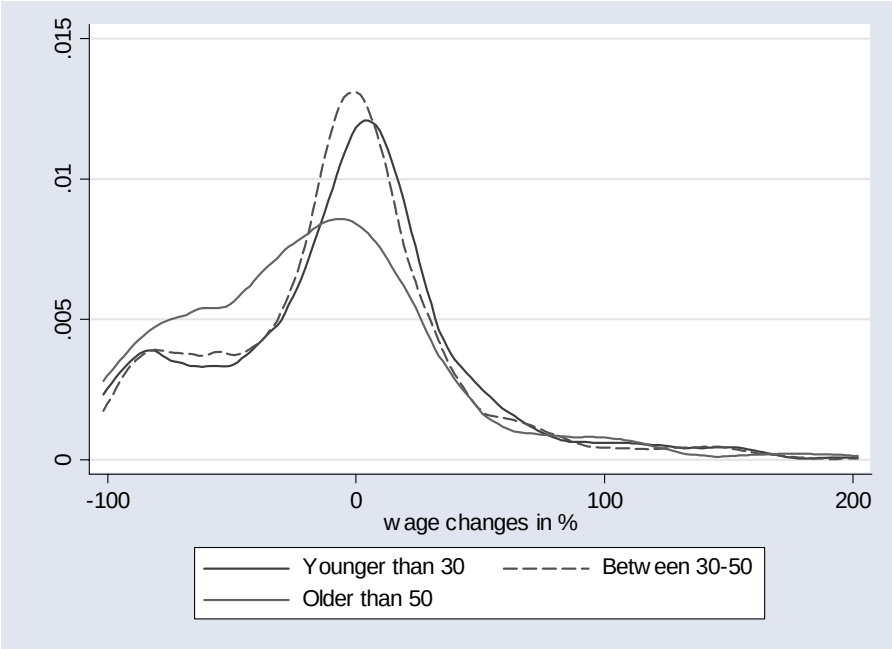
Notes: own calculations.

Kernel densities of earnings changes in % by age *(12 months employed after unemployment)*.



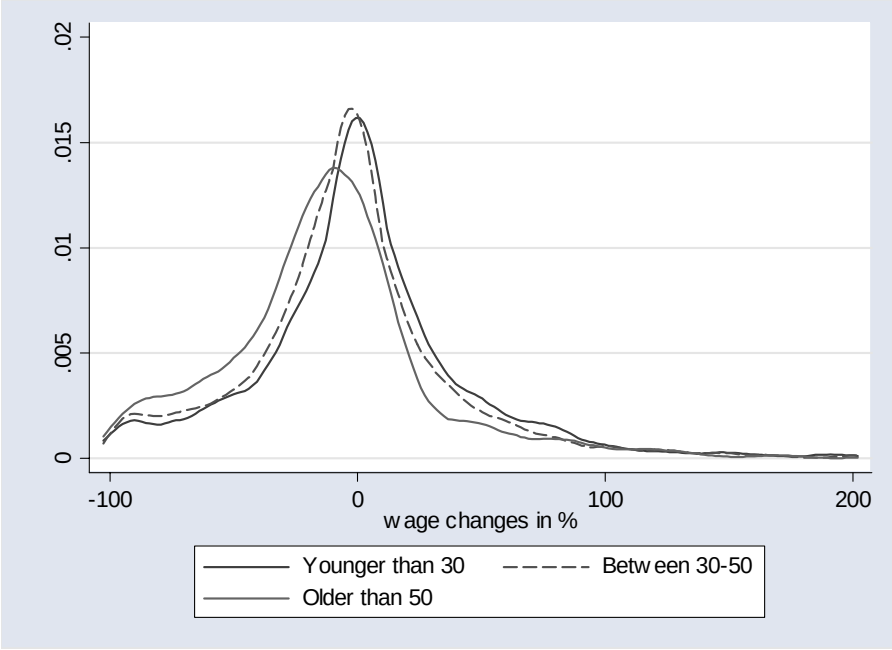
Notes: own calculations.

Appendix 4: Kernel densities of earnings changes in % by age for sequences *UOE*.



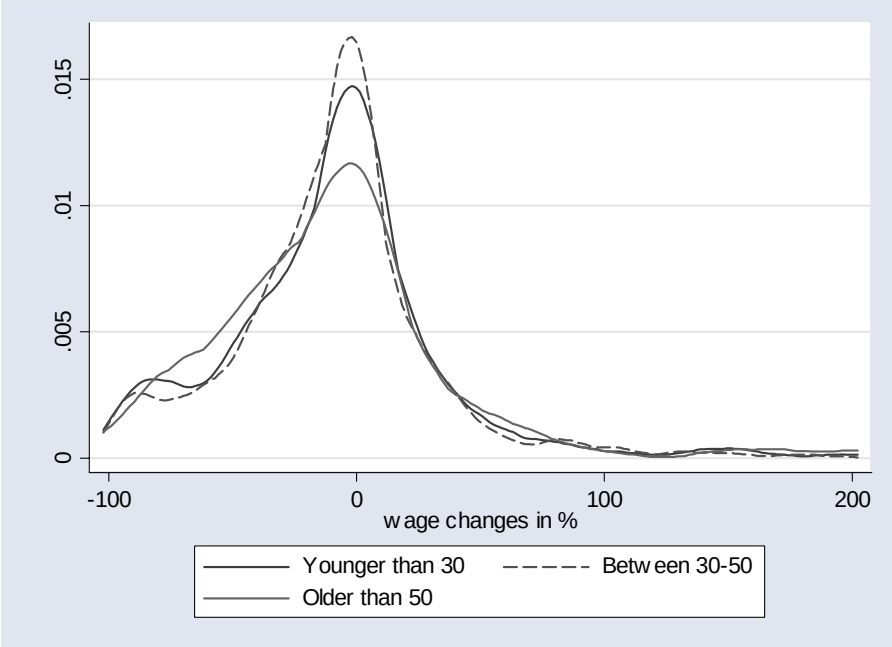
Notes: own calculations.

Kernel densities of earnings changes in % by age for sequences *UE*.



Notes: own calculations.

Kernel densities of earnings changes in % by age for sequences *UEUE*.



Notes: own calculations.

Appendix 5: Specification tests *(Exit from Unemployment.)*

1. Significance tests				
Transition into:	*Down*	*Constant*	*Up*	*OLF*
Individual Wald tests				
Single	0.97 (0.32)	0.85 (0.36)	0.71 (0.40)	2.45 (0.12)
North west	0.83 (0.36)	0.13 (0.29)	0.37 (0.54)	2.79 (0.10)
Joint Wald tests (for the finally selected specification)				
Partial tests[1]	6 125.26 (0.00)	3 307.18 (0.00)	3 707.49 (0.00)	5 086.17 (0.00)
Global test[2]	16 750.21 (0.00)			

2. Wald tests for combining states			
Candidates	χ^2_{30} (*p*-value)	Candidates	χ^2_{30} (*p*-value)
Down – Constant	734.48 (0.00)	*Constant – OLF*	1612.53 (0.00)
Down – Up	740.73 (0.00)	*Constant – Unempl.*	3307.18 (0.00)
Down – OLF	1416.48 (0.00)	*Up – OLF*	1671.54 (0.00)
Down – Unempl.	6125.26 (0.00)	*Up – Unempl*	3707.49 (0.00)
Constant – Up	511.49 (0.00)	*OLF – Unempl*	5086.16 (0.00)

3. Small and Hsiao tests for IIA		
Leaving out 1 state	χ^2_{93}	(*p*-value)
Down	88.35	(0.62)
Constant	87.68	(0.64)
Up	88.59	(0.61)
OLF	91.78	(0.52)
Leaving out 2 states	χ^2_{62}	(*p*-value)
Down & Constant	56.65	(0.67)
Down & Up	58.32	(0.61)
Down & OLF	60.60	(0.53)
Constant & Up	57.80	(0.63)
Constant & OLF	60.37	(0.53)
Up & OLF	61.30	(0.50)
Leaving out 3 states	χ^2_{31}	(*p*-value)
Down, Constant, Up	27.22	(0.66)
Down, Constant, OLF	29.18	(0.56)
Down, Up, OLF	30.79	(0.48)
Constant, Up, OLF	30.78	(0.47)

4. LR test	#parameters	Log-likelihood	*LR* (5)	*p*-value
No unobs. heterog.	124	-45 951.274		
With unobs. heterog.	129	-45 798.486	305.576	0

Notes: The number in the brackets correspond to the *p*-values. Test statistics are for [1] χ^2_{30} and for [2] χ^2_{120}.

Appendix 6: Specification tests *(Exit from Down)*

1. Significance tests				
Transition into:	*Unempl.*	*Constant*	*Up*	*OLF*
Individual Wald tests				
Single	1.30 (0.26)	2.91 (0.09)	3.07 (0.08)	1.61 (0.20)
North west	1.17 (0.28)	0.61 (0.43)	0.36 (0.55)	1.58 (0.21)
Joint Wald tests (for the finally selected specification)				
Partial tests[1]	1458.65 (0.00)	441.14 (0.00)	638.74 (0.00)	750.53 (0.00)
Global test[2]	3254.33 (0.00)			

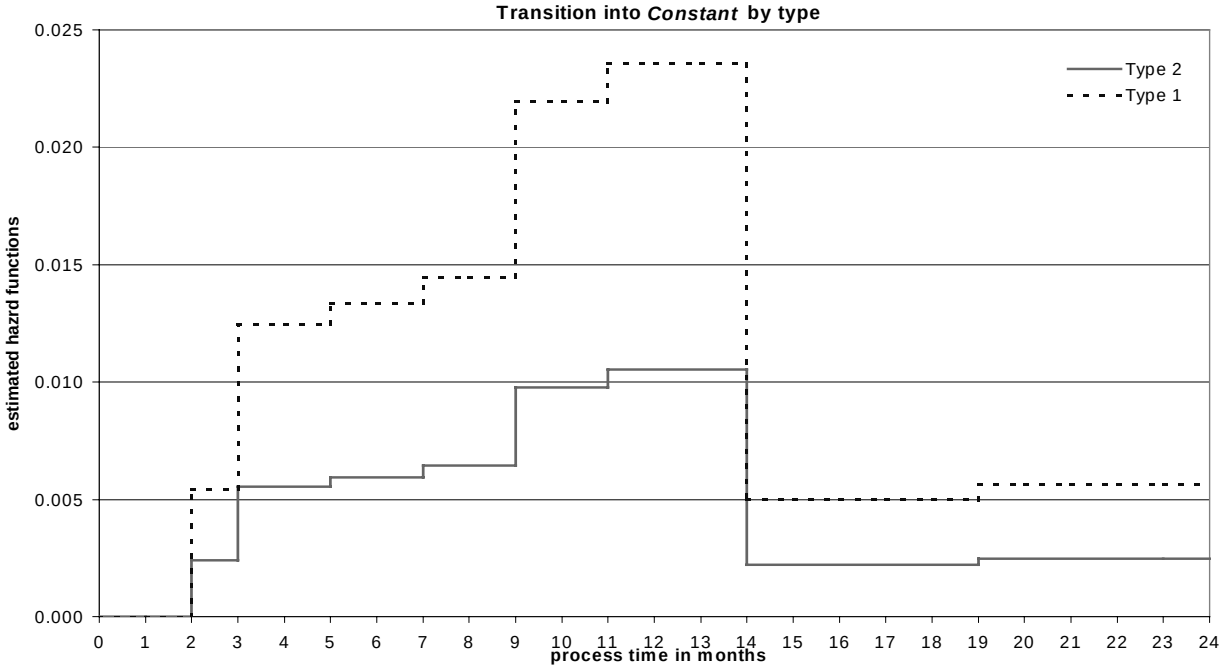
2. Wald tests for combining states	χ^2_{28} (*p*-value)
Unempl. – Constant	679.67 (0.00)
Unempl. – Up	843.43 (0.00)
Unempl. – OLF	728.64 (0.00)
Unempl. – Down	1458.65 (0.00)
Constant – Up	233.11 (0.00)
Constant – OLF	393.54 (0.00)
Constant – Down	441.14 (0.00)
Up – OLF	268.04 (0.00)
Up – Down	638.74 (0.00)
OLF – Down	750.53 (0.00)

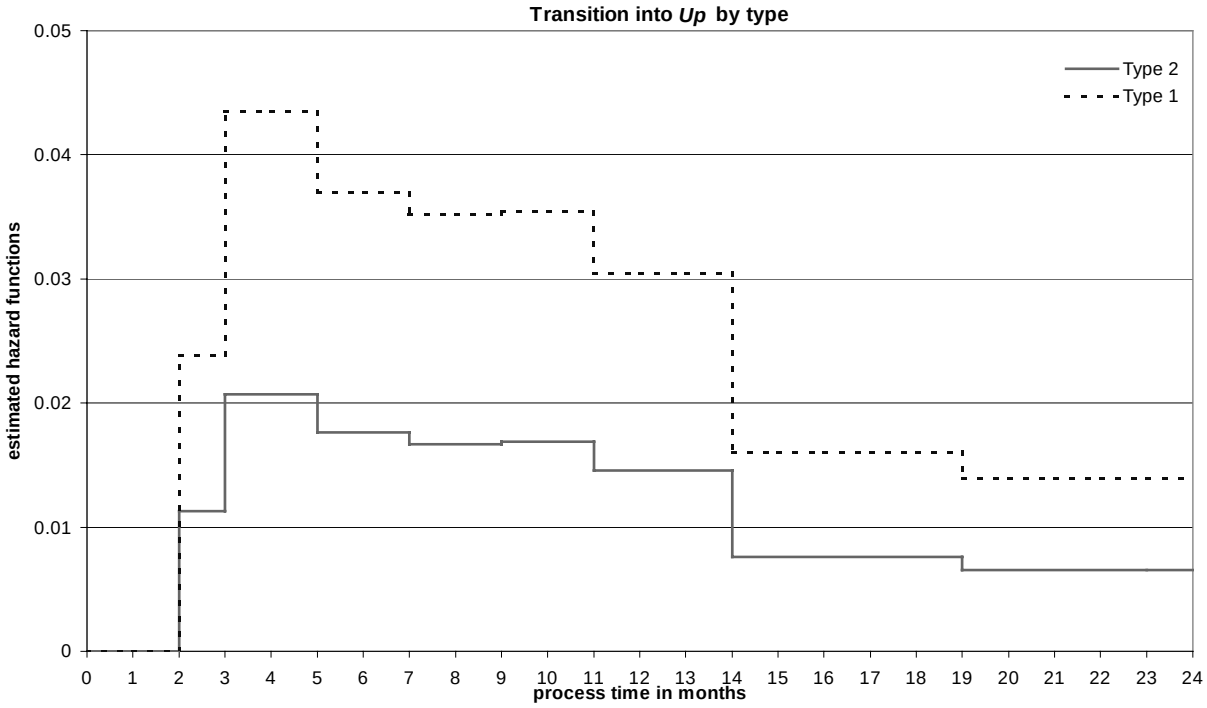
3. Small and Hsiao tests for IIA		
Leaving out 1 state	χ^2_{87}	(*p*-value)
Unempl.	99.38	(0.17)
Constant	94.33	(0.28)
Up	96.79	(0.22)
OLF	81.58	(0.64)
Leaving out 2 states	χ^2_{58}	(*p*-value)
Unempl., Constant	69.79	(0.14)
Unempl., Up	72.12	(0.10)
Unempl., OLF	56.86	(0.52)
Constant, Up	66.68	(0.20)
Constant, OLF	51.39	(0.72)
Up, OLF	54.03	(0.62)
Leaving out 3 states	χ^2_{29}	(*p*-value)
Unempl., Constant, Up	42.52	(0.05)
Unempl., Constant, OLF	27.17	(0.56)
Unempl., Up, OLF	29.70	(0.43)
Constant, Up, OLF	23.81	(0.74)

4. LR test	#parameters	Log-likelihood	*LR* (5)	*p*-value
No unobs. heterog.	116	-70 836.651		
With unobs. heterog.	121	-70 658.222	356.858	0

Notes: The number in the brackets correspond to the *p*-values. Test statistics are for [1] χ^2_{28} and for [2] χ^2_{112}.

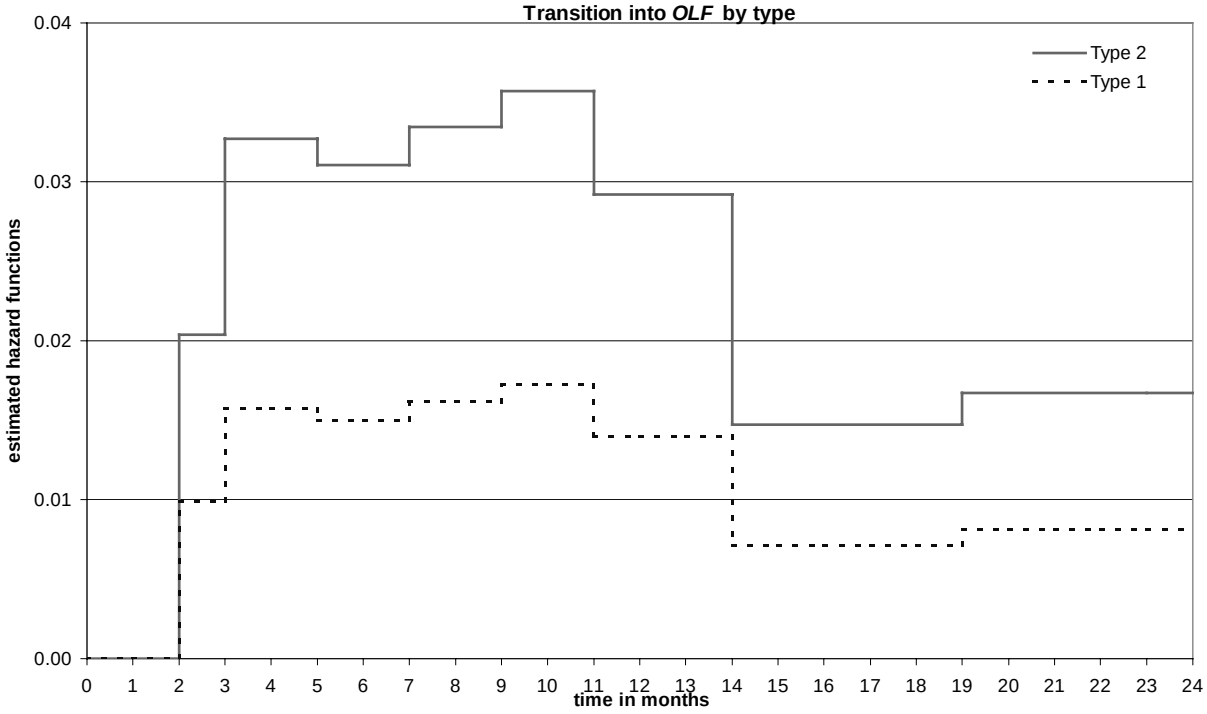
Appendix 7: Exit from *Down*





Notes: Type 1 represents male, younger than 30, single, skilled and motivated workers belonging to the latent class 1 and Type 2 represents female, older than 30, married, less skilled and less motivated workers members of the latent class 2.

Appendix 7: (… *continued*)



Notes: Type 1 represents male, younger than 30, single, skilled and motivated workers belonging to the latent class 1 and Type 2 represents female, older than 30, married, less skilled and less motivated workers members of the latent class 2.

Appendix 8: Exit from *Constant* (earnings differences between -5% and 5%)

Specification tests

1. Significance tests				
Transition into:	*Unempl.*	*Down*	*Up*	*OLF*
Individual Wald tests				
Female and married	0.12 (0.73)	1.26 (0.26)	0.05 (0.82)	0.02 (0.89)
One person to supp.	1.57 (0.21)	0.57 (0.45)	1.89 (0.17)	2.20 (0.14)
Text. and retail	1.34 (0.25)	2.50 (0.11)	0.00 (0.96)	1.55 (0.21)
North west	2.75 (0.10)	2.00 (0.16)	0.25 (0.62)	0.00 (0.96)
West	1.76 (0.18)	0.32 (0.57)	0.88 (0.35)	0.24 (0.63)
Joint Wald tests (for the finally selected specification)				
Partial tests[1]	1 291.28 (0.00)	137.52 (0.00)	546.55 (0.00)	321.42 (0.00)
Global test[2]	2 271.11 (0.00)			

2. Wald tests for combining states			
Candidates	χ^2_{24} (*p*-value)	Candidates	χ^2_{24} (*p*-value)
Unempl. – Down	401.88 (0.00)	*Down – OLF*	145.44 (0.00)
Unempl. – Up	684.93 (0.00)	*Down – Constant*	137.51 (0.00)
Unempl. – OLF	265.72 (0.00)	*Up – OLF*	175.76 (0.00)
Unempl. – Constant	1291.28 (0.00)	*Up – Constant*	546.55 (0.00)
Down – Up	122.98 (0.00)	*OLF – Constant*	321.42 (0.00)

3. Small and Hsiao tests for IIA	
Leaving out 1 state	χ^2_{75} (*p*-value)
Unempl.	89.70 (0.12)
Down	94.64 (0.06)
Up	89.90 (0.11)
OLF	90.25 (0.11)
Leaving out 2 states	χ^2_{50} (*p*-value)
Unempl., Down	50.31 (0.46)
Unempl., Up	73.15 (0.02)
Unempl., OLF	73.22 (0.02)
Down, Up	33.48 (0.96)
Down, OLF	33.31 (0.97)
Up, OLF	73.39 (0.02)
Leaving out 3 states	χ^2_{25} (*p*-value)
Unempl., Down, Up	25.28 (0.45)
Unempl., Down, OLF	25.36 (0.44)
Unempl., Up, OLF	56.69 (0.00)
Down, Up, OLF	16.91 (0.89)

4. LR test	#parameters	Log-likelihood	*LR* (5)	*p*-value
No unobs. heterog.	100	-25 929.547		
With unobs. heterog.	105	-25 884.792	89.51	0

Notes: The number in the brackets correspond to the *p*-values. Test statistics are for [1] χ^2_{24} and for [2] χ^2_{96}

Estimation results

Variables	***Unempl.*** **Coeff.**	***Down*** **Coeff.**	***Up*** **Coeff.**	***OLF*** **Coeff.**
Female worker	0.102	**0.172**	-0.053	**0.213**
Age (ref: between 30 and 50)				
Younger than 30	**-0.143**	0.120	**0.197**	**0.200**
Older than 50	**0.259**	-0.071	**-0.303**	**0.275**
Marital status				
Single	*-0.075*	0.056	**0.148**	**0.265**
Foreign citizenship(ref: Swiss)				
Permanent work permanent	**0.299**	**-0.341**	-0.068	-0.120
Non permanent work permit	**0.282**	**-0.328**	0.043	-0.197
Qualification (ref: unskilled, semi-skilled)				
Skilled	**-0.120**	0.090	*0.128*	-0.138
Previous occupation (ref: others)				
Construction, transportation	-0.001	-0.073	**-0.233**	-0.180
Entrepreneur, senior official, justice, architecture, science, news	**-0.338**	**-0.320**	0.119	-0.107
Office and computer	**-0.233**	**-0.264**	0.043	**-0.472**
Aptitude to be placed (ref: medium)				
Easy	0.053	-0.090	0.026	**-0.158**
Difficult	**0.260**	0.149	0.129	**0.377**
City size (ref: small city, rural region)				
Large city	**-0.347**	**0.369**	**0.396**	0.078
Region (ref: west, north west, center)				
East	**0.303**	*-0.176*	**-0.260**	0.143
South West	**0.505**	**-0.307**	**-0.183**	0.099
Previous employment history				
Unemployed in 1993-1997	**0.440**	0.116	**-0.191**	**0.480**
Employed in 1993-1997	**-0.575**	0.046	-0.219	**-1.046**
Out of labor force in 1993-1997	**0.228**	0.017	**0.303**	**0.727**
Baseline hazard in months (ref: 1-2)				
3-5	0.063	0.075	**0.756**	**0.850**
6-7	**0.518**	0.109	**1.028**	**0.872**
8-10	**1.312**	**0.485**	**1.249**	**1.327**
11-13	**0.367**	**0.844**	**1.994**	**0.976**
14-18	**-1.765**	**-1.828**	**-0.586**	0.079
19-24	**-1.740**	**-2.701**	-0.254	*-0.859*
Constant	**-3.735**	**-4.763**	**-4.708**	**-5.418**
Mass points				
ε_1	**0.120**	**-0.510**	**-0.485**	0.849
ε_2	-0.330	1.404	1.335	-2.336
Log odds of probabilities[1]	**1.012**			

Notes: log-likelihood: -25 884.79, observations: 73 797. **Bold**: significant at 5% level, *Italics*: significant at 10%.

Appendix 9: Exit from *Up*

Specification tests

1. Significance tests

Transition into:	*Unempl.*	*Down*	*Constant*	*OLF*
Individual Wald tests				
Female and married	1.53 (0.22)	1.34 (0.25)	2.19 (0.14)	0.54 (0.45)
One person to supp.	0.56 (0.45)	2.64 (0.10)	0.18 (0.67)	0.16 (0.68)
North west	0.13 (0.71)	0.12 (0.73)	0.59 (0.44)	2.59 (0.11)
West	0.69 (0.41)	2.17 (0.12)	0.69 (0.41)	0.16 (0.69)
Prev. Unempl.	0.88 (0.35)	0.28 (0.60)	0.05 (0.82)	3.02 (0.08)
Joint Wald tests (for the finally selected specification)				
Partial tests[1]	1 977.08 (0.00)	932.83 (0.00)	448.03 (0.00)	347.33 (0.00)
Global test[2]	3 701.50 (0.00)			

2. Wald tests for combining states

Candidates	χ^2_{25} (*p*-value)	Candidates	χ^2_{25} (*p*-value)
Unempl. – Down	1162.10 (0.00)	*Down – OLF*	652.76 (0.00)
Unempl. – Constant	619.52 (0.00)	*Down – Up*	932.83 (0.00)
Unempl. – OLF	541.17 (0.00)	*Constant – OLF*	557.92 (0.00)
Unempl. – Up	1977.08 (0.00)	*Constant – Up*	448.03 (0.00)
Down – Constant	112.39 (0.00)	*OLF – Up*	347.32 (0.00)

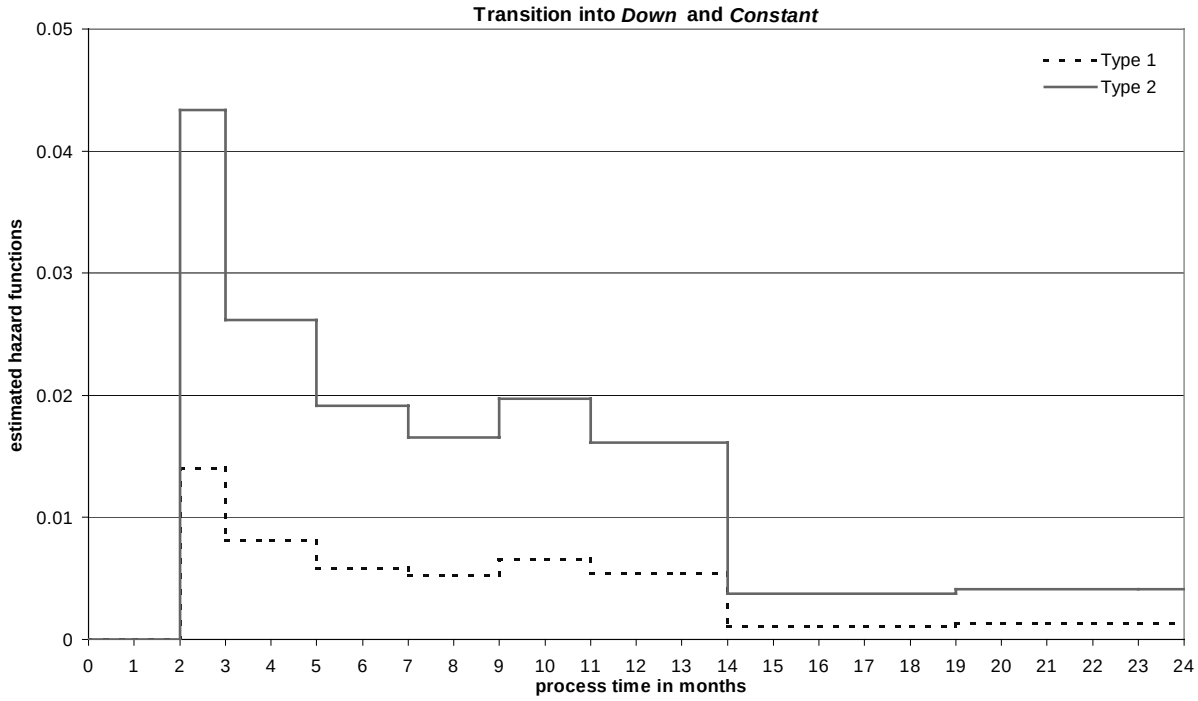
3. Small and Hsiao tests for IIA

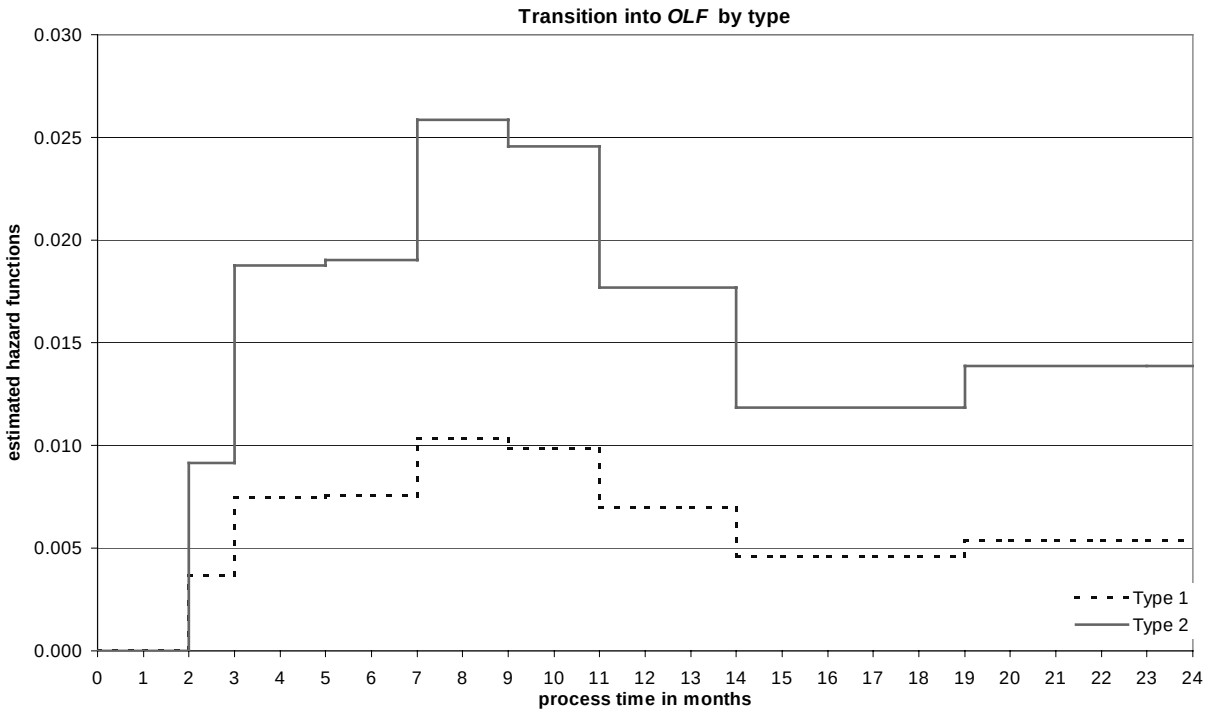
Leaving out 1 state	χ^2_{78} (*p*-value)
Unempl.	73.78 (0.61)
Down	78.11 (0.48)
Constant	73.33 (0.63)
OLF	67.91 (0.79)
Leaving out 2 states	χ^2_{52} (*p*-value)
Unempl., Down	54.11 (0.39)
Unempl., Constant	49.20 (0.58)
Unempl., OLF	44.39 (0.76)
Down, Constant	53.88 (0.40)
Down, OLF	48.43 (0.61)
Constant, OLF	43.39 (0.80)
Leaving out 3 states	χ^2_{26} (*p*-value)
Unempl.,Down,Constant	29.60 (0.28)
Unempl., Down, OLF	24.75 (0.53)
Unempl., Constant, OLF	19.58 (0.81)
Down, Constant, OLF	23.97 (0.58)

4. LR test	#parameters	Log-likelihood	*LR* (5)	*p*-value
No unobs. heterog.	104	-44 035.304		
With unobs. heterog.	109	-43 926.796	217.02	0

Notes: The number in the brackets correspond to the *p*-values. Test statistics are for [1] χ^2_{25} and for [2] χ^2_{100}.

Hazard functions





Notes: Type 1 represents male, younger than 30, single and skilled workers belonging to the latent class 1 and Type 2 represents female, between 30-50, non single and less skilled workers members of the latent class 2.

Appendix 10: Exit from *OLF*

1. Significance tests

Transition into:	*Unempl.*	*Down*	*Constant*	*Up*
Individual Wald tests				
Single	0.39 (0.53)	0.76 (0.38)	0.39 (0.53)	3.49 (0.06)
Text. and retail	0.29 (0.59)	1.37 (0.24)	0.29 (0.59)	0.93 (0.33)
Construction, transp.	0.89 (0.35)	0.42 (0.52)	2.70 (0.10)	0.19 (0.66)
Large city	3.08 (0.08)	0.29 (0.59)	0.15 (0.69)	0.35 (0.55)
East	1.20 (0.27)	3.19 (0.07)	2.02 (0.16)	0.06 (0.81)
South west	1.54 (0.21)	0.38 (0.54)	1.54 (0.21)	3.45 (0.06)
North west	0.29 (0.58)	0.34 (0.56)	1.21 (0.27)	0.50 (0.48)
West	3.79 (0.06)	0.85 (0.36)	1.12 (0.29)	1.88 (0.17)
Prev. empl.	2.08 (0.15)	3.81 (0.05)	0.13 (0.71)	0.41 (0.52)
Prev. OLF.	0.84 (0.36)	0.02 (0.89)	1.82 (0.18)	1.24 (0.27)
Joint Wald tests (for the finally selected specification)				
Partial tests[1]	977.09 (0.00)	599.69 (0.00)	220.26 (0.00)	304.25 (0.00)
Global test[2]	2 073.05 (0.00)			

2. Wald tests for combining states

Candidates	χ^2_{17} (*p*-value)	Candidates	χ^2_{17} (*p*-value)
Unempl. – Down	634.26 (0.00)	*Down – Up*	122.77 (0.00)
Unempl. – Constant	345.72 (0.00)	*Down – OLF*	599.69 (0.00)
Unempl. – Up	428.32 (0.00)	*Constant – Up*	41.25 (0.01)
Unempl. – OLF	977.09 (0.00)	*Constant – OLF*	220.26 (0.00)
Down – Constant	100.63 (0.00)	*Up – OLF*	304.25 (0.00)

3. Small and Hsiao tests for IIA

Leaving out 1 state	χ^2_{54} (*p*-value)
Unempl.	50.69 (0.60)
Down	56.19 (0.39)
Constant	61.37 (0.23)
Up	59.46 (0.28)
Leaving out 2 states	χ^2_{36} (*p*-value)
Unempl., Down	31.03 (0.70)
Unempl., Constant	36.05 (0.47)
Unempl., Up	33.87 (0.57)
Down, Constant	41.47 (0.24)
Down, Up	39.98 (0.30)
Constant, Up	44.51 (0.16)
Leaving out 3 states	χ^2_{18} (*p*-value)
Unempl., Down, Constant	16.47 (0.53)
Unempl., Down, Up	851.34 (0.00)
Unempl., Constant, Up	19.06 (0.40)
Down, Constant, Up	25.10 (0.12)

Notes: The number in the brackets correspond to the *p*-values. Test statistics are for [1] χ^2_{17} and for [2] χ^2_{68}.