Unemployment and Under-Employment: The Case of Switzerland

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1. Introduction

Since the beginning of the 1990s, unemployment has become again 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 analyses unemployment and subsequent employment for the case of Switzerland. The aim of the analysis is twofold: I identify the determinants

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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 labour 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 labour market. However, the existing economic applications usually study the consequences of unemployment on subsequent earnings without considering its impact on non-participation. Most of these studies 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, Lalonde and Sullivan, 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 labour 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 labour 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 labour 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 labour force are behaviorally distinct states. That is why I distinguish three different labour market states: unemployment, employment and out of the labour 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. They examine the extent of state dependence in unemployment and employment, and they find that experience in low paid jobs acts as the main channel for repeated unemployment. 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 modeling 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 labour market states. The exit from unemployment is first analysed 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 labour 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 analysing 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 labour 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 labour 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 analyse unemployment and 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, Lechner and Steiger (2002), and Gerfin and Lechner (2002) evaluate the effects of active labour market programs on different labour market outcomes like the employment probability and the earnings of some potential participants. A study by Lalive, van Ours and Zweimüller (2001) also evaluates the effects of ALMPs but using a hazard rate framework. Puhani (2002) investigates the general labour 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) analyses 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) analyse the duration dependence effect of unemployment. Using a rotating panel of the Swiss Labour 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 labour 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 labour 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 into unemployment until December 1999, that identifies the different labour force states.

The AVAM/ASAL database provides information about the personal characteristics, the labour 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 labour office in charge, unemployment benefits, entitlement period, nature of desired job, retrospective labour 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. Unemployment *(U)* is defined using the positive information from the unemployment insurance *(UI)* system, while the employment *(E)* and the out of the labour 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. It is possible that, within a month,

both *UI* benefits and positive earnings are recorded. Such cases do not arise substantially in the data. The present study deals with these cases by assuming that unemployment prevails for this particular month. The definition of these states thus guarantees that they are mutually exclusive. Besides the distinction between unemployment, employment and out of the labour 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 and Descriptive Statistics

As previously mentioned, the data concern people who were unemployed on December 31st, 1997. The data sampling thus correspond to a stock sampling scheme that affects the duration data distribution (Lancaster, 1990, p. 161). To deal with stock sampling data, I select the entrants into unemployment over the period from the 1st October to the 31st December 1997. This selection reduces the stock sampling problem, but it does not eliminate it. The entrants between October and December have indeed to be still unemployed in order to be included in the initial sample. However, the problem that arises from the remaining stock sampling is minor.[2] With the selection of inflows between October and December, the initial number of 80,000 persons reduces to 30,035. Controlling for some observed and unobserved factors, I find that there is no over-represented or under-represented category after the selection compared to the initial sample.[3]

1 –5% and 5% correspond to the 50th and 60th percentile of the distribution of the earnings changes (conditional on being employed).

2 A sensitivity analysis of the characteristics of the entrants between October and December 1997 on the one hand and of the inflows in December 1997 on the other hand shows that no category is over or under represented.

3 I use subjective valuations of the case workers on the ability of the unemployed to find a job as a proxy for workers' motivation in order to control for unobserved factors. As argued by Gerfin and Lechner (2002), little unobserved heterogeneity should enter the process of selection into unemployment once information about workers' motivation is controlled for. The analysis of observed and unobserved characteristics indicates that there are, for instance, 0.8% less elderly workers, 1.9% more single workers and 1% more unemployed classified as "easy to place" in the selected sample than in the initial sample.

Table 1: Sample Composition

Spells of	Unemployment	Employment	Out of the labour force
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 (100.0%)	26 238 (100.0%)	12 444 (100.0%)
Individuals with 2 spells	12 890 (42.9%)	10 343 (39.4%)	3 114 (25.0%)
Individuals with 3 spells	4 575 (15.2%)	1 957 (7.5%)	628 (5.0%)
Individuals with more than 3	815 (2.7%)	356 (1.4%)	120 (1.0%)
Right-censored spells	4 477 (9.3%)	19 067 (49.0%)	6 491 (39.8%)
Non right-censored spells ending in			
Unemployment		14 011 (70.7%)	4 269 (43.5%)
Employment	33 348 (76.1%)		5 546 (56.5%)
Out of the labour force	10 490 (23.9%)	5 816 (29.3%)	

Note: own calculations.

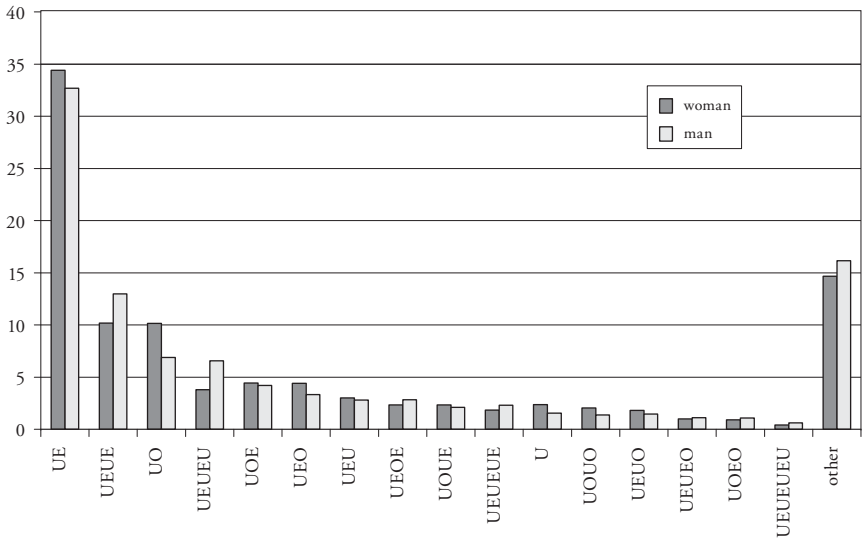
The claim that this selected sample is representative of the population of unemployed in December 1997 thus does not seem exaggeratedly strong.

The data are presented in a person-month format that permits to identify the different *U*, *E* and *OLF* spells. Some descriptive devices are presented in Table 1. 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 labour 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 labour market.

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.[4] Concerning gender differences, both

4 In Switzerland, a person who becomes unemployed is eligible for *UI* benefits for a period of 2 years after her registration at the labour 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 by Gender



Note: sorted by incidence, the category "other" corresponds 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%).

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.

Next, I consider the sequences of states that increase the risk of experiencing earnings losses. Figure 2 reports the differences by age of the kernel density functions of the earnings changes for the sequences *UE*, *UOE* and *UEUE*.

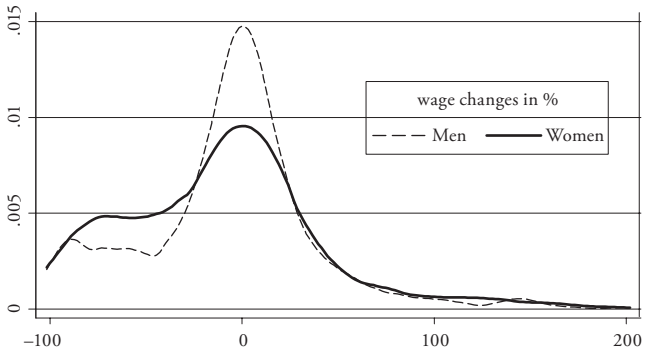
Figure 2a shows first that earnings seem to remain relatively stable for the persons transiting directly from *U* to *E*. There is an exception for the female workers who tend to lose more than their male counterparts. Second, the persons experiencing transitions *UOE* are losing the most (Figure 2b). This suggests that staying without a job for a long time has a strong negative effect on the subsequent earnings.[5] That is why the female workers who tend to be longer non-employed

5 We could also think that these individuals are discouraged about the existence of future perspectives such that the causality can be reverse.

Figure 2a: Kernel Densities of Earnings Changes in % by Gender for Sequences UE

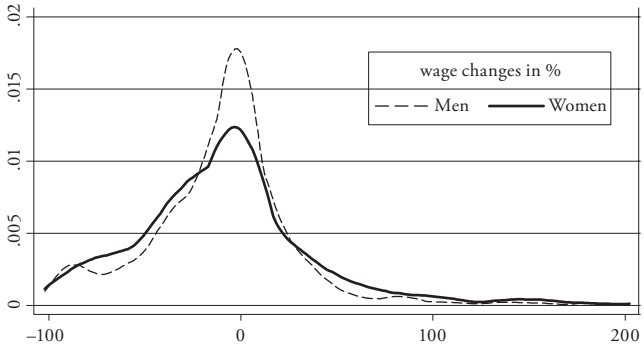
Note: own calculations

Figure 2b: Kernel Densities of Earnings Changes in % by Gender for Sequences UOE



Notes: own calculations. 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 2c: Kernel Densities of Earnings Changes in % by Gender for Sequences UEUE



Note: own calculations

experience more losses than their male 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 2c). This is particularly the case for women 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 report that women belong to the category of disadvantaged workers.[6] They are indeed encountering the main difficulties. They are first 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.

4. Methodological Framework

This study attempts to investigate unemployment and subsequent employment history rather than to evaluate the effect of unemployment on subsequent employment. To estimate the latter effect correctly, the employment history of individuals who entered unemployment has to be compared with the one that would prevailed had these individuals not entered unemployment. The access to a control group is crucial. This has been mainly discussed in the literature on treatment analysis (see for instance Heckman, Lalonde and Smith, 1999). In fact, the difference in earnings before and after the unemployment shock that occurs in December 1997 is not sufficient to recover the true effect of unemployment on subsequent earnings. By doing so, we are implicitly assuming that earnings of individuals who are employed during this unemployment shock remain constant after the shock. This assumption is rather restrictive: according to the human capital theory, the accumulation of firm-specific skills implies that earnings will increase with tenure in the job. As a consequence, the before-after earnings comparison for the unemployed workers will understate the true effect of unem-

6 More statistics on other workers' characteristics are available in the discussion paper under the following URL link (www.siaw.unisg.ch/lechner/djurdjevic). These results show that elderly workers also experience difficulties.

ployment: it fails to consider the wage growth that would have happened had unemployment never occurred. The previously mentioned selection bias problem associated with the absence of a control group is overcome by using data which provide a group of workers with unemployment histories and a sizeable control group of workers with no interruption in their employment experience. In this study, data are available for a sample of individuals who enter unemployment at a given point of time. The main limitation is that these data do not provide any information on individuals who were employed at this reference point. This implies that the counterfactual effect cannot be identified. As a consequence, the present study analyses subsequent employment history for individuals having experienced unemployment.

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 (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.

Modeling a hazard rate for each of the states allows to answer the economic questions of interest. It indeed captures the short-term and the long-term effect of unemployment. First, the analysis of the exit from unemployment enables to figure out how the movements out of unemployment depend on the duration of stay in unemployment. Second, the specification of the exit rates from the employment and inactivity states permits to capture the re-entry into unemployment. In addition, the dynamics of earnings can further be examined by estimating the transitions between the different employment states.

Moreover, it seems that the modeling framework adopted in this study suits to the data I have at my disposal. Each person indeed begins her history 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 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.[7] It is defined as follows:

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

where $i=1, \ldots, N;\ t=1, \ldots, T_{ij}^{s};\ j,k=1, \ldots, K$ 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.

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

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:

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

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 $t-1$.

7 The unobserved effects vary with the individual and with the type of transition. This specification is initiated by Nguyen Van, Kaiser and Laisney (2004, forthcoming in JBES) in their study about performance of German firms.

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

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[8]:

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

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 $\delta_{ijk}^{s}=1$ 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.

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

Equation (4.3) defines a mixed (multinomial) logit model (see TRAIN, 2003). This specification is more flexible than the classical (multinomial) logit one, because it obviates the three limitations of the standard logit. It allows indeed

8 The conditioning variables $x_i(t)$ and ε_{ijk} are omitted temporarily from the notation.

for random taste variation, unrestricted substitution patterns, and correlation in unobserved factors over time in case of longitudinal data. The present study uses panel data. The consequence is that the unobserved factors are correlated within transition rates i.e. between ε_{ijk} and ε_{ijl}. This implies that in the mixed logit model, the property of "Independence of Irrelevant Alternatives" (IIA) has not to hold as in the standard logit model. In addition, equation does not allow for correlation in unobserved factors across transition rates.

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[9], a Stata program written for the estimation of a class of multilevel latent variable models (see RABE-HESKETH *et al.*, 2001a, 2001b, 2004; and RABE-HESKETH and SKRONDAL, 2003).

4.2. Specification Tests

As previously mentioned, one limitation of the classical multinomial logit specification is the property of 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

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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.[10] 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.

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

A brief description of the variables used in the conditional analysis is presented in Table 2. Gender, age, marital and family status and foreign citizenship belong to the sociodemographic variables. 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

10 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).

to characteristics for previous employment history.[11] The meaning of the variables presented in Table 2 is easy to understand. However, some variables deserve some further comments. First, the dummy variable for being a married woman 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 2). 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 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 duration spells.

11 There is a risk of endogeneity for instance for marital status or qualification.

Table 2: 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 10 000 and 100 000 inhabitants), rural region (fewer than 10 000 inhabitants)
Region of residence[12]	5 categories: Ostschweiz, Zentralschweiz, Région Lémanique, Nordschweiz, Espace Mittelland
Previous employment history[13]	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

(➜)

12 Ostschweiz (East: Schaffhausen, Thurgau, 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).

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

Table 2 (continued)

Variables	Description
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 labour 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

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

5.2. Interpretation of the Estimation Results

First, I discuss the results obtained from the specification tests and then I comment on the estimation results.[14] Only the estimation results concerning the transitions of greater interest will be presented. In a first step, I run series of individual Wald tests for each departure state 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. In a second step, I run further Wald tests to test the joint significance of the coefficients for the variables retained in the final specifications. For any departure state, both the partial and global tests reject the null hypothesis that all coefficients can be set to zero. Further specification tests related to the functional form of the hazard rate are conducted. I 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 any pair of potential candidates. Results obtained for the exit from *OLF* deserve some additional attention, because the rejection means that unemployment and out of the labour force are distinct states. These results indicate thus that the choice of the

14 The tests are conducted using estimations of the model without unobserved heterogeneity, because the computation time with the mass points is extremely long (about 6 weeks).

states in the specifications seems to be right. Last results about tests specification concern the validity of the multinomial logit specification, i.e. whether the IIA assumption is fulfilled for each regression. Results of the Small and Hsiao tests indicate that the data support the multinomial logit specification for each departure state.[15]

Next, I discuss the different results obtained after controlling for the personal characteristics presented in Table 2. Concerning gender differences, it turns out that being a woman decreases the risk of exiting unemployment (negative coefficients on the hazard from unemployment, see Table A.2). This is in line with our predictions that women are more likely to remain unemployed than men. In addition, they are prone to remain in *Down* (see Table A.3). On the contrary, if men experience *Down*, it is rather for a transitory period: they indeed tend to leave *Down* for better employment perspectives (positive coefficients on the hazard from *Down* into *Up* and *Constant*, see Table A.3). Last results about gender differences indicate that women are more likely to be less attached to the labour force than men (see the positive coefficient for the transition into *OLF* in Table A.4 and the negative coefficients for the exit from *OLF* in Table A.5). This can be related to family reasons. Women seem thus to be trapped in bad employment situations.

The marital and family status play a complementary role in explaining the gender differences in terms of attachment to the labour force. Workers having persons to support financially have a higher degree of attachment than their counterparts: for instance, they return into unemployment rather than staying in *Down* and if they are not eligible for *UI* benefits, they prefer to work by remaining in *Down* than to move to *OLF* (see Table A.3). On the contrary, being a married woman increases the risk of leaving the labour force (see the positive coefficients for the transitions into *OLF* in Tables A.2 and A.3). It further increases the likelihood of staying inactive (see Table A.5). From these results, I can infer that married men having a family to support are more attached to the labour force than married women. It would be interesting to examine to what extent the labour 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 labour market in order to maintain the family income (cf. the added-worker hypothesis, see for instance Hamermesh and Rees, 1996).

15 I choose to report the specification tests results for the exit from unemployment only (see Table A.1 in Appendix). The interested reader will find detailed results concerning the other states in the discussion paper.

Turning to age differences, elderly workers tend to be the most disadvantaged compared to the other age categories. First, they remain unemployed while their younger counterparts are more likely to exit from unemployment into employment (coefficient of 0.685 in Table A.2).[16] Second, the transitions into the different employment situations indicate that younger workers tend to perform better than their older counterparts in finding better paid jobs compared to their last jobs. In addition, they succeed to remain in this good employment situations while their older counterparts encounter employment instability by either returning to unemployment or by moving into *Down* (see Table A.4). Lastly, being an elderly worker increases the likelihood of staying inactive (see Table A.5).

The differences related to foreign citizenship show that being a foreign worker decreases the chances of leaving unemployment for employment (see Table A.2). In addition, Swiss workers are more likely to move to *Down* (coefficient of 0.279), to remain in *Down* and to a lesser extent to transit into *OLF*. On the contrary, foreign workers will leave *Down* and return into unemployment (coefficient of 0.435 in Table A.3). This propensity to remain unemployed instead of moving into *Down* and similarly to leave *Down* for unemployment may be attributed to financial constraints that they face. Indeed, we have to keep in mind that the data do not allow 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 *Down* captures such transitions as full-time job–unemployment–part-time job. However, a particular emphasis should be laid on the question whether or not this pattern is voluntary or due to financial constraints. According to the OECD (1996) report, foreign workers are more likely to be less skilled and thus prefer to work full-time than part-time. Thus, 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 from the labour force for childbearing reasons.[17] As a consequence, I find evidence that foreign workers experience some difficulties on the labour market. Their financial constraints prevent them from accepting a lower paid job for a transitory period before moving on with a better paid job. There is thus a risk for them to be repeatedly unemployed. In addition, even if they succeed in finding a better paid job, they do not achieve to stay in this good situation:

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

17 The coefficient for the exit from Down into OLF is of $0.023 = 0.054 + 0.102 - 0.133$ for a Swiss woman.

they still are prone to re-enter unemployment. Hence, the financial difficulties or the lack of qualification (both are complementary factors) appear to be the most channel leading to repeated unemployment for the foreign workers.

Qualification exerts a positive effect on leaving unemployment. According to Table A.2, the less skilled tend to remain trapped in unemployment or to withdraw from the labour force compared to the more skilled. In addition, being easy (resp. difficult) to place exerts a positive (resp. negative) effect on the hazard into employment compared to the reference category (medium). This can be interpreted in terms of motivation: motivation increases the chances of moving out of unemployment into employment, whereas the lack of motivation is a factor facilitating the discouragement and thus the withdrawal from the labour market (coefficient of 0.273). Further results show that the less skilled and less motivated tend not to profit from better employment perspectives: after experiencing *Up*, they are indeed more likely to either return into unemployment or to leave the labour force (see Table A.4). Thus, they do not succeed in keeping a better paid job. As for foreign workers, the lack of qualification and the lack of motivation seem thus to contribute in increasing the risk of experiencing repeated unemployment.

Next results report 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. Past unemployment experience increases also the likelihood of leaving the labour force (see Tables A.2 and A.3). Similarly, people having been previously employed are more likely to return into employment after unemployment (see Table A.2) or to remain employed when they find a job (see Tables A.3 and A.4). On the contrary, those with little experience in employment are more prone to be trapped in bad employment situations by either returning into unemployment or by leaving the labour force.[18] The last point about withdrawal from the labour market also holds for individuals who are less attached to the labour force (see Tables A.2 and A.3).

Turning to the point concerning the duration dependence pattern, I find that there is a significant duration dependence even if unobserved heterogeneity is controlled for. This holds for the analysis of exit from any departure state. For example, Table A.2 shows that the effect of the elapsed duration spells is positive, indicating that the unemployed exit from this state as time passes. In addition, the baseline hazard of Table A.3 indicates that for small elapsed duration

18 Coefficients of 0.228 for the transitions *Unempl.-OLF*, of 0.445 for the transitions *Down-OLF* and of 0.653 for transitions *Up-OLF*.

spells in *Down*, the exit from *Down* increases, but as time passes, the probability to exit *Down* diminishes. This implies that there is a chance for individuals who recently ocupy a lower paid job to exit from this situation. On the contrary, individuals who experience earnings losses for a long period will remain confined in this bad situation. Furthermore, the decreasing time pattern for the hazard out from *Up* suggests that individuals who succeed in finding a better paid job will keep it for a while.

The last results concern the individual unobserved heterogeneity. Accounting for unobserved heterogeneity by specifying two mass points improves the fit of the model.[19] For each departure state, the LR test rejects the null hypothesis that the model without unobserved heterogeneity is valid. That means that the preferred model is the mixed multinomial logit model allowing the presence of some unobserved individual factors.[20] The presence of two mass points indicates that individuals can be divided into two latent classes.

The analysis of the coefficients for the exit from unemployment (Table A.2) shows that a first group of unemployed 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 the 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 displays 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 ratio of probabilities indicates that $\hat{\pi}_1 = 0.36$ and $\hat{\pi}_2 = 1 - \hat{\pi}_1 = 0.64$. This means that for some unmeasured factor, 64% of persons fall into the second class, i.e. that the majority of the unemployed encounter difficulties after the first spell of unemployment in 1997.

The analysis of the unobserved individual factors for the exit from *Down* indicate that some individuals fall in a "first class" having an above average probability of re-entering unemployment (positive coefficients of 0.191 for the exit from *Down*, see Tables A.3), while the other individuals enter another class, say a "second class", having a below average probability of re-entering unemployment (negative coefficients of -0.186 for the exit from *Down*). For convenience,

19 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).

20 For each state, the classical logit model is rejected against the mixed one. This somehow contradicts the previous finding that the IIA is fulfilled.

these classes will be called "first" and "second" class, but they are different from the previous classes obtained in the analysis of exit from unemployment. Furthermore, the log odds ratio of probability reports that members of the "first" class are the most numerous ($\hat{\pi}_1 = 0.81$ for exit from *Down*). This implies that a substantial number of individuals experiencing *Down* encounter employment instability by returning into unemployment.

Additional results concerning the analysis of exit from *Up* shows that there is a group of individuals having an above average probability of exiting *Up* (positive coefficient of 0.798 = –1.395 + 1.246 + 0.947), while the other group is more likely to stay in *Up* (negative coefficient of –0.276). In addition, the log odds of ratio reports that this latter group is the most numerous (probability of 74%). This puts the previous results about employment instability into perspective: individuals who succeed in finding a better paid job are more likely to keep it.

Lastly, I focus on findings about unobserved heterogeneity for the exit from *OLF*. Again, two different latent classes are observed: members of, say the "first group" display positive properties towards exiting *OLF* for unemployment. That means that members of class 1 are temporarily inactive. On the contrary, members of say "class 2" rather stay inactive with a negative coefficient of 0.598 for the hazard into unemployment (see Table A.5). This implies that they are true economic inactive individuals. In addition, if they decide to re-enter the labour market, they usually face difficulties by finding jobs with lower earnings (coefficient of 1.137 for *Down*). Lastly, the log odds ratio of probability in Table A.5 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 characterised by multiple unemployment spells separated by intervening short out of the labour 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).

To summarise these previous results and to illustrate the duration dependence pattern, I have computed the survivor and the hazard functions for two types of individuals. For the analysis of exit from unemployment, the first profile possesses positive properties towards exiting unemployment, for instance, being a male, younger than 30, skilled and Swiss worker. The second profile owns negative properties such as being a woman, older than 50 and a less skilled worker. 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.

Table 3: Expected Duration in Each State for Each Type

Type of workers	Duration in months
Unemployment	
Type 1: men, younger than 30, Swiss, skilled, easy to be placed without any person to support, any past unemployment experience, belonging to the latent class 1	11.72
Type 2: women, older than 50, foreign, less skilled, difficult to be placed having one person to support, with past unemployment experience, members of the latent class 2	16.29
Down	
Type 1: men, younger than 30, not married without any person to support	13.53
Type 2: women, older than 30, married with at least one person to support	15.58
Foreign and less skilled	13.11
Swiss and skilled	16.52
Up	
Type 1: men, younger than 30, single and skilled workers, belonging to the latent class 1	20.96
Type 2: women, between 30–50, non single and less skilled workers, members of the latent class 2.	17.09
Foreign and less skilled	17.21
Swiss and skilled	18.66
Out of the labour force	
Type 1: men, younger than 50, motivated workers without any person to support and belonging to the latent class 1	13.44
Type 2: women, older than 50, less motivated workers with any person to support and members of the latent class 2	17.53

Note: own calculations.

First, workers of type 2 remain longer unemployed (see Figure 3a and Table 3). Their expected duration in unemployment is of 16.3 months against 11.72 months for their counterparts. Further results indicate that both types are almost similar towards exiting unemployment for *Down*, i.e. both are experiencing earnings losses after unemployment (see Figure 3b). This raises the question whether or not workers of type 1 "accept a lower paid job" for a transitory period, because they expect their earnings will increase thereafter. Figure A.1 in Appendix shows indeed that their employment perspectives in *Up* are better than those for workers of type 2: they succeed indeed to leave *Down* quickly for *Up*. On the contrary,

Figure 3: Exit from Unemployment

Figure 3a: Survival in Unemployment by Type

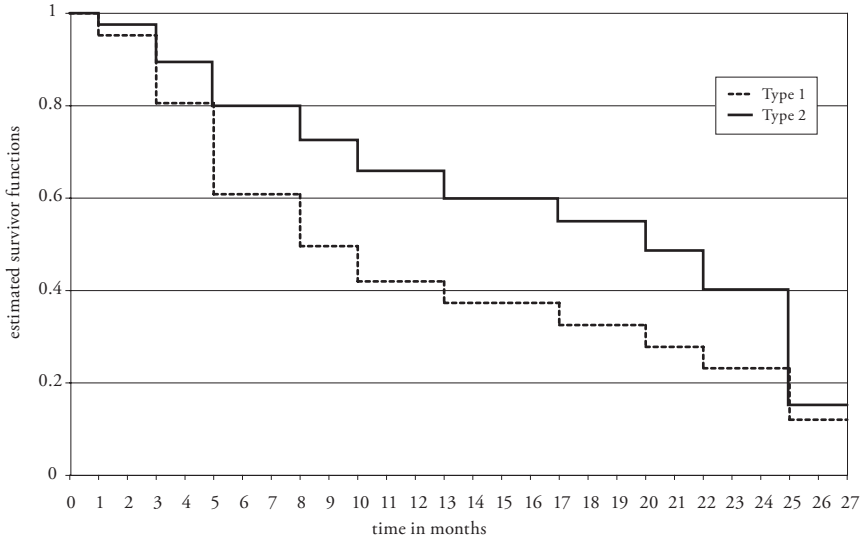


Figure 3b: Transition into Down by Type

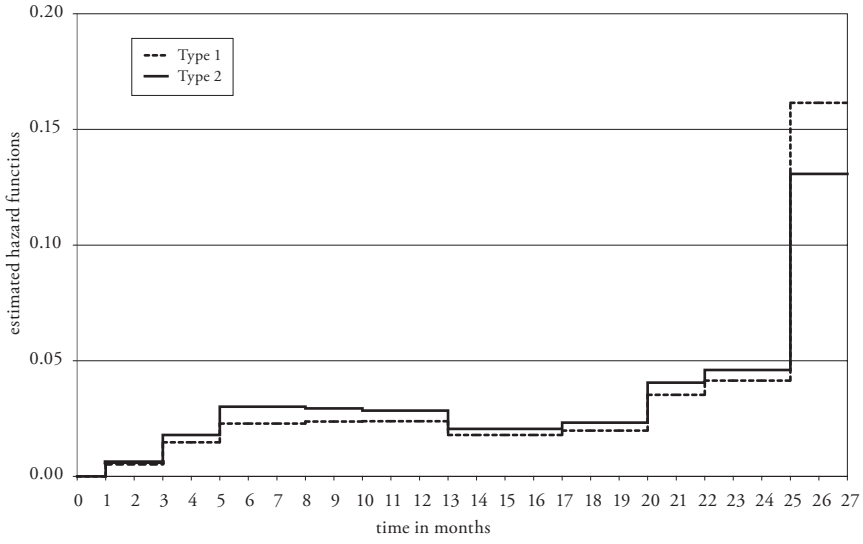


Figure 3c: Transition into Up by Type

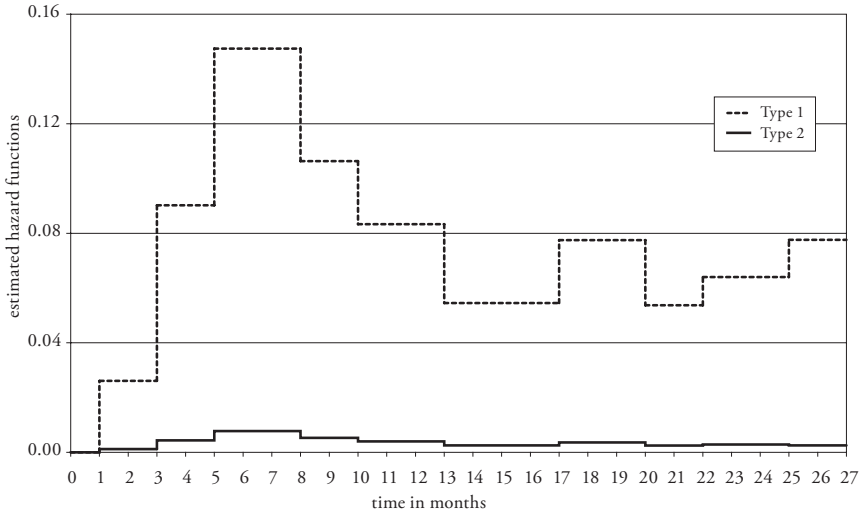
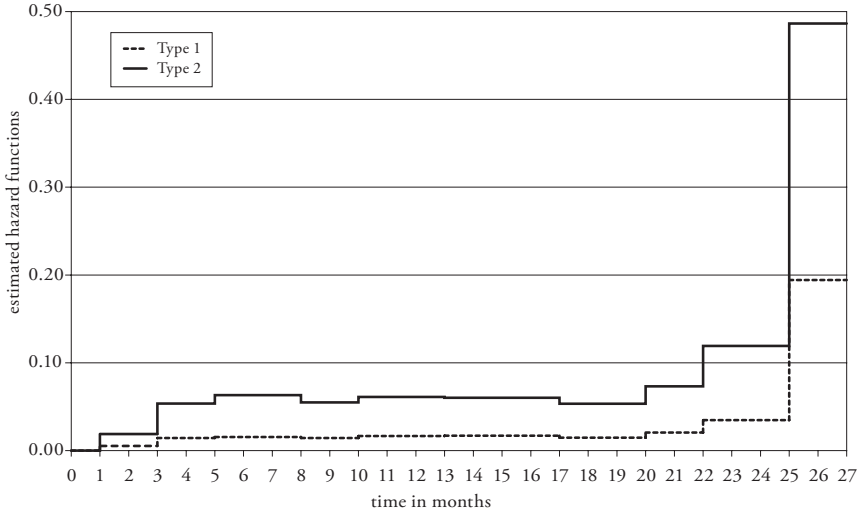


Figure 3d: Transition into OLF by Type



Notes: the jump observed from the 25th month corresponds to the unemployed having exhausted *UI* benefits and leaving 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.

the jump observed in the transition from unemployment into *Down* from the 25th 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. Meyer (1990) for spikes observed in the exit from unemployment, and Boeri and Steiner (1998) for "wait unemployment").

Additional results show that workers of type 1 have a higher exit from *Unempl.* into *Up* than workers of type 2 suggesting that better paid jobs are reserved to them (see Figure 3c). Moreover, once they succeed in moving into *Up*, they remain in this good employment situation for longer periods (see Figure 4a). On the contrary, workers of type 2 do not succeed to move to better employment situations and to remain there. Their expected duration in *Up* is indeed of 17.1 months against 21 months for workers of type 1 (see Table 3). In addition, workers of type 2 are more likely to feel discouraged by the hart conditions and thus to withdraw from the labour market after the exhaustion of the *UI* benefits (see Figure 3d). The previous fact of "wait unemployment" is thus unclear: now, the end of eligibility for benefits reduces the unemployed workers' labour force attachment.

Next, I discuss the results related to the phenomenon of repeated unemployment by considering the duration dependence patterns for the exits from *Down*, *Up* and *OLF*. They show evidence that workers of type 2 tend to encounter employment instability by returning into unemployment. For instance, Figure 5b 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 workers and 9% for the foreign and less skilled workers.

As a summary, I find some evidence supporting the existence of some workers who encounter difficulties on the labour market. To assess which labour market state contributes to the disadvantaged position of type 2 vs type 1 workers, Table 3 provides information about the expected duration in each state for each type. It turns out that workers of type 2 spend, on average, a longer time in unemployment, *Down* and *OLF* while workers of type 1 have a higher expected duration in *Up*. Furthermore, the foreign and the less skilled workers seem to encounter repeated unemployment by experiencing such transitions as *Unempl.–Down–Unempl.* 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* (see Figure 5a) or by withdrawing from the labour force. An interesting question remains whether or not this is related to voluntary choices, as for women who can for family reasons leave the labour market progressively

Figure 4: Exit from Up

Figure 4a: Survival in Up by Type

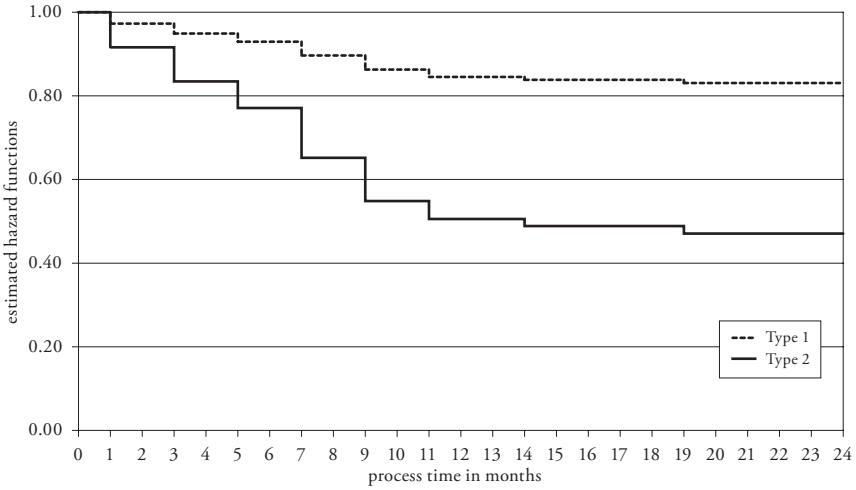
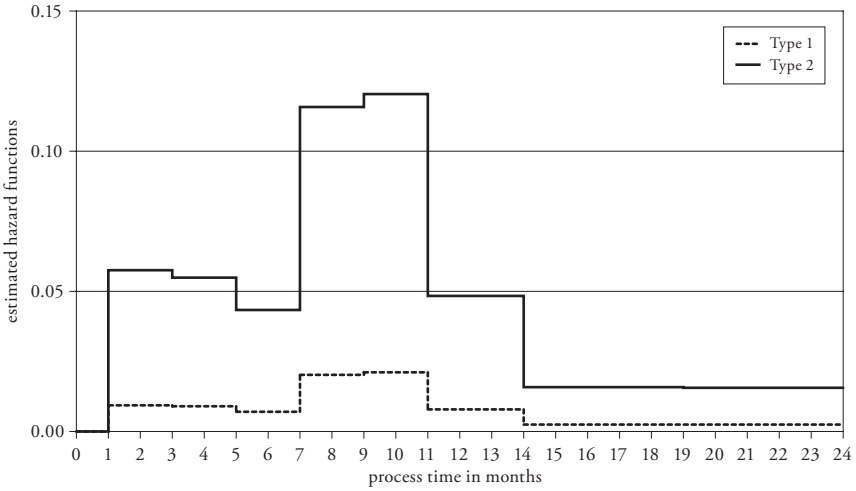


Figure 4b: Transition into Unemployment by Type



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.

Figure 5: Exit from Down

Figure 5a: Survival in Down

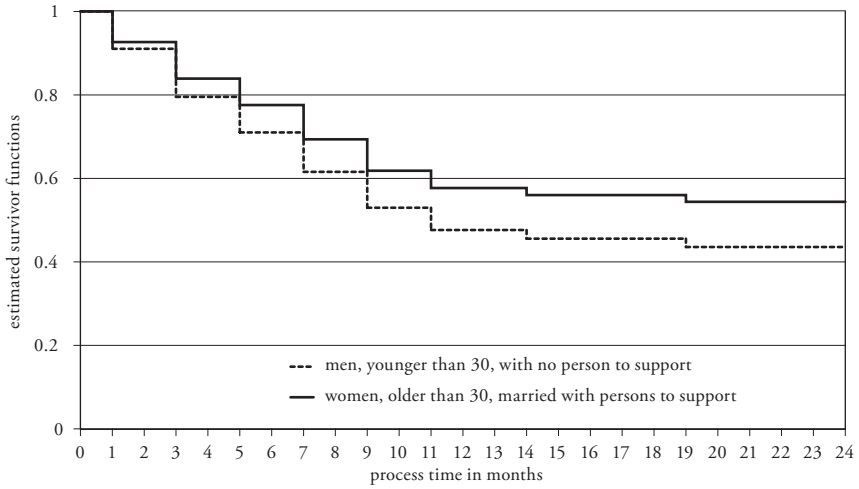
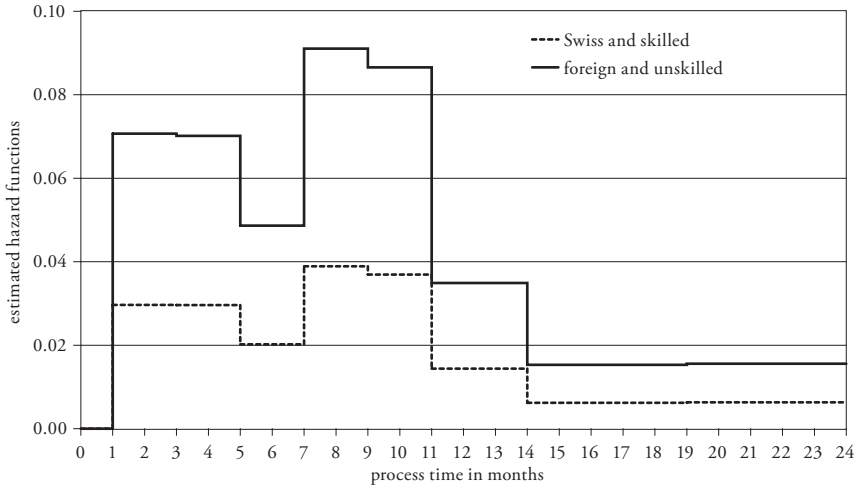


Figure 5b: Transition into Unemployment



Note: own calculations.

Figure 6: Exit from OLF

Figure 6a: Survival in OLF by Type

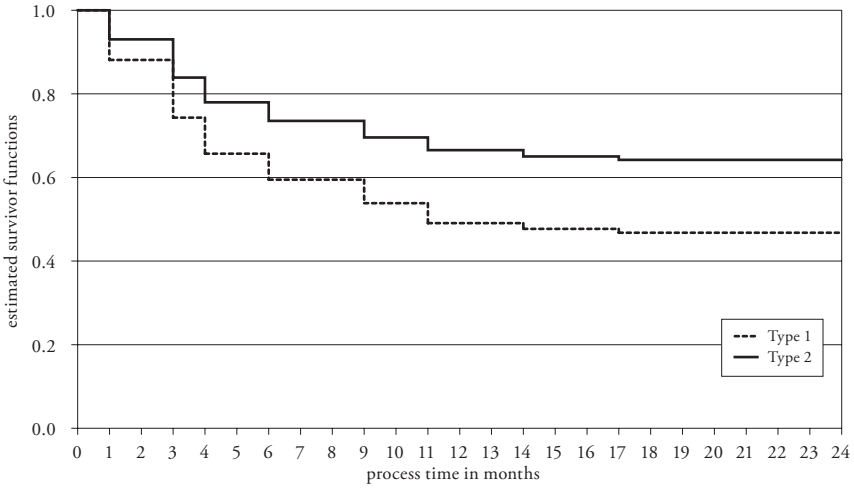


Figure 6b: Transition into Unemployment by Type

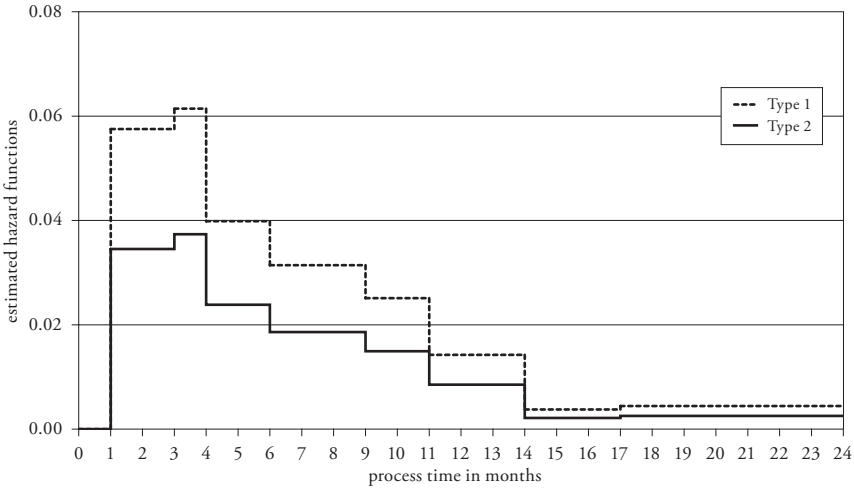


Figure 6c: Transition into Constant by Type

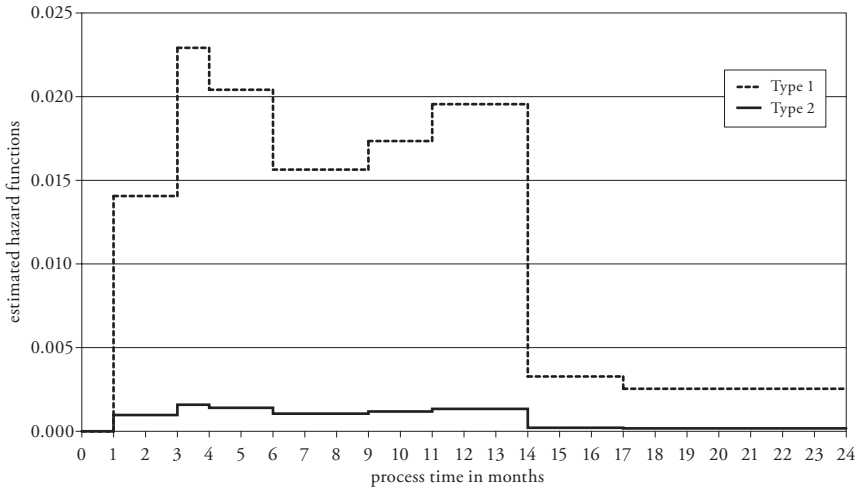
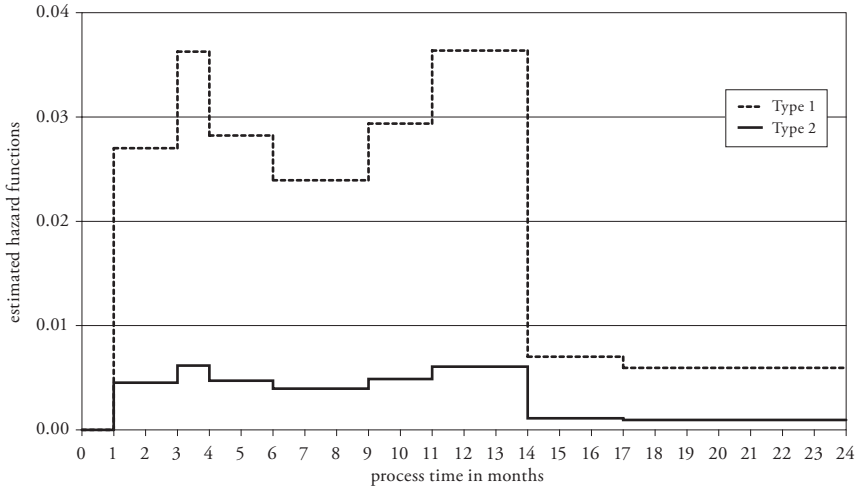


Figure 6d: Transition into Up by Type



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.

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. Then, the more or less constrained withdrawal from the labour force raises the question whether the concerned individuals remain inactive for a while or return to the labour force thereafter. Some light about this question can be shed by looking at the duration dependence pattern in the analysis of the exit from *OLF*. It turns out that workers of type 1 are highly attached to the labour market, whereas workers of type 2 are marginally attached. Indeed, the first type of workers withdraw temporarily from the labour force and re-enter quickly the labour force by either returning into unemployment or employment, whereas workers of the second type remain inactive (see Figure 6).

To conclude, it seems that the lack of qualification and foreign citizenship are the main factors among those explaining repeated unemployment. According to the OECD report (1996), foreign workers are more likely to be less skilled than Swiss workers. From this, we can infer that employment instability is mostly related to a qualification problem. As a consequence, promoting the access to higher education and to vocational qualification should prevent the individuals from re-entering unemployment and protect them against the risk of moving to the margins of the labour market.

6. Conclusion

This paper analyses unemployment and 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 labour 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 labour market states of interest. The exit from unemployment is first analysed 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 labour 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 labour force–unemployment, we can figure out whether some unemployed are distressed by the hart conditions, and thus withdraw temporarily from the labour 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 labour force: they are indeed more likely to withdraw from the labour 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 labour 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 labour 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 labour market should prove worthwhile.

Appendix

Table A.1: 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[a)]	6 125.26 (0.00)	3 307.18 (0.00)	3 707.49 (0.00)	5 086.17 (0.00)
Global test[b)]	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	1 612.53	(0.00)
Down – Up	740.73	(0.00)	Constant – Unempl.	3 307.18	(0.00)
Down – OLF	1 416.48	(0.00)	Up – OLF	1 671.54	(0.00)
Down – Unempl.	6 125.26	(0.00)	Up – Unempl.	3 707.49	(0.00)
Constant – Up	511.49	(0.00)	OLF – Unempl.	5 086.16	(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 a) χ^2_{30} and for b) χ^2_{120}. Further results for the other specification equations are available under www.siaw.unisg.ch/lechner/djurdjevic

Table A.2: Determinants of the Hazard 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**

(➜)

Table A.2 (continued)

Variables	Down Coeff.	Constant Coeff.	Up Coeff.	OLF Coeff.
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 labour 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**

Variables	Down Coeff.	Constant Coeff.	Up Coeff.	OLF Coeff.
Constant	**–5.198**	**–5.710**	**–5.298**	**–4.261**
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[a)]		**–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%, a) is given by $\ln(\pi_1 / 1 - \pi_1)$.

Table A.3: Determinants of the Hazard 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**

(➜)

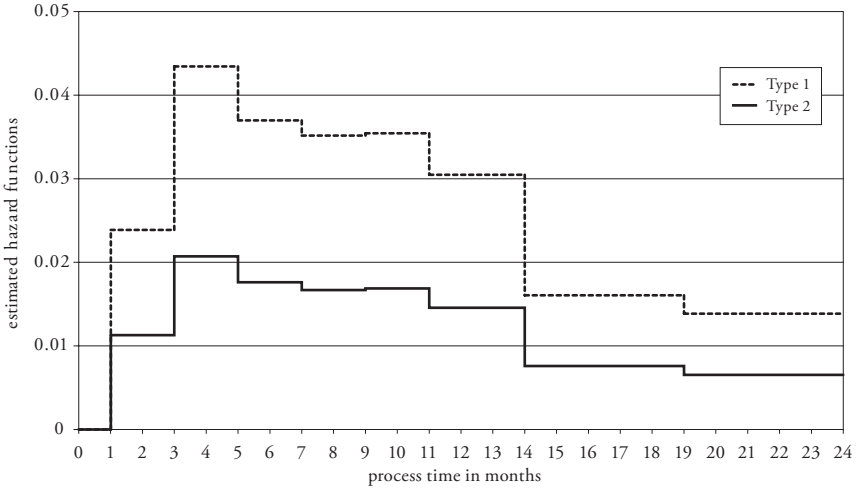
Table A.3 (continued)

Variables	Unempl. Coeff.	Constant Coeff.	Up Coeff.	OLF Coeff.
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 labour 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**
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[a)]		**1.478**		

Notes: log-likelihood: –70 658.22, observations: 156 144. **Bold**: significant at 5% level, *Italics:* significant at 10%, a) is given by $\ln(\pi_1 / 1 - \pi_1)$.

Figure A.1: Exit from Down

Transition into Up by Type



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.

Table A.4: Determinants of the Hazard from Up (Earnings Gains)

Variables	Unempl. Coeff.	Constant Coeff.	Up 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**

(➜)

Table A.4 (continued)

Variables	Unempl. Coeff.	Constant Coeff.	Up Coeff.	OLF Coeff.
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 labour 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%.

Table A.5: Determinants of the hazard 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		**1.026**		

Notes: log-likelihood: -42 675.36, observations: 99 889. **Bold**: significant at 5% level, *Italics:* significant at 10%.

References

Addison, John T., and Portugal, Pedro (1989), "Job Displacement, Relative Wage Changes and Duration of Unemployment", *Journal of Labour Economics*, 7(3), pp. 281–302.

Arulampalam, Wiji (2001), "Is Unemployment Really Scarring? Effects of Unemployment Experiences on Wages", *The Economic Journal*, 111, F585–606.

Boeri, Tito, and Steiner, Viktor (1998), "Wait Unemployment in Economies in Transition: The Case of Poland", *Konjunkturpolitik*, 3, pp. 287–311.

Brooks, Robert D., Fry, Tim R., and Harris, Mark (1998), "Combining Choice Set Partition Tests for the IIA Property: Some Results in the Four Alternatives Setting", *Journal of Quantitative Economics*, 14(2), pp. 1–9.

Cappellari, Lorenzo, and Jenkins, Stephen P. (2003), "Transitions between Unemployment and Low Pay", Discussion Paper 2003-08, Institute for Social and Economic Research, University of Essex, Colchester.

Chesher, Andrew, and Santos Silva, Joao MC. (2002), "Taste Variation in Discrete Choice Models", *Review of Economic Studies*, 69, pp. 147–168.

Cramer, Jan S., and Ridder, Geert (1991), "Pooling States in the Multinomial Logit Model", *Journal of Econometrics*, 47, pp. 267–272.

Ehrenberg, Ronald G., and Oaxaca, Ronald L. (1976), "Unemployment Insurance, Duration of Unemployment, and Subsequent Wage Gain", *American Economic Review*, 66, pp. 754–766.

Flinn, Christopher, and Heckman, James J. (1983), "Are Unemployment and Out of the Labour Force Behaviourally Distinct States?", *Journal of Labour Economics*, 1, pp. 28–42.

Flückiger, Yves (1998), "The Labour Market in Switzerland: The End of a Special Case?", *International Journal of Manpower*, 19, pp. 369–395.

Gerfin, Michael and Lechner, Michael (2002), "Microeconometric Evaluation of the Active Labour Market Policy in Switzerland", *Economic Journal*, 112, pp. 854–893.

Gerfin, Michael, Lechner, Michael, and Steiger, Heidi (2002), "Does Subsidised Temporary Employment Get the Unemployed Back to Work? An Econometric Analysis of Two Different Schemes", forthcoming in *Labour Economics*.

Gerfin, Michael, and Schellhorn, Martin (1995), „Dauerabhängigkeit der Abgangsrate aus der Arbeitslosigkeit: eine empirische Untersuchung für die Schweiz", in: V. Steiner und L. Bellmann (Hrsg.), *Mikroekonomik des Arbeitsmarktes*, Nürnberg.

Gönül, Füsun (1992), "New Evidence on whether Unemployment and Out of the Labour Force are Distinct States", *Journal of Human Resources*, 27, pp. 329–361.

Gouriéroux, Christian, and Montfort, Alain (1989), *Statistiques et Modèles Econométriques*, Paris.

Gregory, Mary, and Jukes, Robert (2001), "Unemployment and Subsequent Earnings: Estimating Scarring among British Men 1984–1994", *The Economic Journal*, 111, F607–625.

Hamermesh, Daniel S., and Rees, Albert E. (1996), *The Economics of Work and Pay*, 6th Edition, New York.

Hausman, Jerry, and McFadden, Daniel (1984), "Specification Tests for the Multinomial Logit Model", *Econometrica*, 52(5), pp. 1219–1240.

Heckman, James J., and Borjas, George J. (1980), "Does Unemployment Cause Future Unemployment? Definitions, Questions and Answers from a Continuous Time Model of Heterogeneity and State Dependence", *Economica*, 47, pp. 247–283.

Heckman, James J., Lalonde, Robert, and Smith, Jeff (1999), "The Economics and Econometrics of Active Labor Market Programs", in: O. Ashenfelter and D. Card (eds.), *Handbook of Labor Economics*, vol. 3A, Amsterdam: North-Holland, pp. 1865–2097.

Heckman, James J., and Singer, Burton (1984), "A Method of Minimizing the Impact of Distributional Assumptions in Econometric Models for Duration Data", *Econometrica*, 52, pp. 271–320.

Houle, Mario, and van Audenrode, Marc (1995), "Job Displacement, Wages, and Unemployment Duration in Canada", *Labour Economics*, 2(1), pp. 77–91.

Jacobson, Louis, Lalonde, Robert, and Sullivan, Daniel (1993), "Earning Losses of Displaced Workers", *American Economic Review*, 83, pp. 685–709.

Jenkins, Stephen P. (1995), "Easy Estimation Methods for Discrete-time Duration Models", *Oxford Bulletin of Economics and Statistics*, 57(1), pp. 129–138.

Judge, George, Hill, Carter, Griffiths, William, and Lee, Tsoung-Chao (1985), *The Theory and Practice of Econometrics*, New York.

Kalbfleisch, John D., and Prentice, Ross L. (1980), *The Statistical Analysis of Failure Time Data*, New York.

Kalwij, Adriaan S. (2001), "Individuals' Unemployment Experiences: Heterogeneity and Business Cycle Effects", IZA Discussion Paper, n° 370.

Kiefer, Nicholas (1988), "Economic Duration Data and Hazard Functions", *Journal of Economic Literature*, 41, pp. 646–679.

LALIVE, RAFAEL, VAN OURS, JAN, and ZWEINÜLLER, JOSEF (2001), "The Impact of ALMP on the Duration of Unemployment", IEW Discussion Paper, n° 41.

LANCASTER, TONY (1979), "Econometric Methods for the Duration of Unemployment", *Econometrica*, 47, pp. 939–956.

LANCASTER, TONY (1990), *The Econometric Analysis of Transition Data*, Cambridge.

LAUER, CHARLOTTE (2003), "Education and Unemployment: A French-German Comparison", Discussion Paper 03-34, ZEW.

LAYARD, RICHARD, NICKELL, STEPHEN, and JACKMAN, RICHARD (1991), *Unemployment: Macroeconomic Performance and the Labour Market*, Oxford.

MEYER, BRUCE (1990), "Unemployment Insurance and Unemployment Spells", *Econometrica*, 58, pp. 757–782.

NGUYEN, VAN PHU, KAISER, ULRICH, and LAISNEY, FRANÇOIS (2004), "The Performance of German Firms in the Business-Related Service Sectors: A Dynamic Analysis", forthcoming in *Journal of Business and Economic Statistics*.

NICKELL, STEPHEN (1979), "Estimating the Probability of Leaving Unemployment", *Econometrica*, 47, pp. 1249–1266.

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

OECD (1995), "Supplementary Measures of Labour Market Slack", *Employment Outlook*, July, pp. 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, PUHANI (2002), "The Rise and Fall of Swiss Unemployment – Relative Demand Shocks, Wage Rigidities, and Temporary Migrants", Discussion Paper 2002-29, University of St. Gallen.

RABE-HESKETH, SOPHIA, PICKLES, ANDREW, and SKRONDAL, ANDERS (2001a), *GLLAMM Manual*, Technical Report 2001/01, Department of Biostatistics and Computing, Institute of Psychatry, King's College, University of London.

RABE-HESKETH, SOPHIA, PICKLES, ANDREW, and SKRONDAL, ANDERS (2001b), "GLLAMM: A Class of Models and a Stata Program", *Multilevel Modelling Newsletter*, 13(1), pp. 17–23.

RABE-HESKETH, SOPHIA, SKRONDAL, ANDREW, and PICKLES, ANDERS (2004), "Generalized Multilevel Structural Equation Modelling", *Psychometrika*, in press.

Ruhm, Christopher (1991), "Are Workers Permanently Scarred by Job Displacement", *American Economic Review*, 81(1), pp. 319–324.

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

Skrondal, Anders, and Rabe-Hesketh, Sophia (2003), "Multilevel Logistic Regression for Polytomous Data and Rankings", *Psychometrika*, 68(2), pp. 267–287.

Skrondal, Anders, and Rabe-Hesketh, Sophia (2004), *Generalized latent Variable Modeling: Multilevel, Longitudinal and Structural Equation Models*, Boca Raton, FL: Chapman & Hall/ CRC Press. To appear.

Small, Kenneth A., and Hsiao, Cheng (1985), "Multinomial Logit Specification Tests", *International Economic Review*, 26(3), pp. 619–627.

Steiner, Viktor (2001), "Unemployment Persistence in the West German Labor Market: Negative Duration Dependence or Sorting?", *Oxford Bulletin of Economics and Statistics*, 63, pp. 91–113.

Stewart, Mark (2002), "The Inter-related Dynamics of Unemployment and Low Pay", Discussion Paper, January 2002, University of Warwick.

Tano, Dobi K. (1991), "Are Unemployment and Out of the Labour Force Behaviourally Distinct Labour Force States? New Evidence from Gross Change Data", *Economics Letters*, 36, pp. 113–117.

Train, Kenneth E. (2003), *Discrete Choice Methods with Simulation*, Cambridge.

SUMMARY

I analyse unemployment and subsequent employment history for Switzerland. Using administrative panel data, I estimate a discrete time hazard model for the exit from different labour market states. I find that having previously experienced unemployment increases the risk of persistent unemployment. A further analysis shows that the "higher-risk" unemployed (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.

ZUSAMMENFASSUNG

In diesem Betrag wird Arbeitslosigkeit und die weitere Einkommensentwicklung der Arbeitslosen analysiert. Auf Basis von informativen administrativen Panel-Daten wird ein diskretes Hazard Modell für den Austritt von verschiedenen Erwerbszuständen geschätzt. Die geschätzten Ergebnisse belegen die Existenz sozialer Randgruppen. Beispielsweise befinden sich Frauen, Ausländer und Geringqualifizierte verstärkt in schlechten Arbeitssituationen oder sind in besonderem Masse von Erwerbsinstabilität betroffen. Diese Erwerbsinstabilität scheint hauptsächlich mit einem Mangel an Qualifikation verbunden zu sein. Im Gegenteil haben Männer, Jüngere und Hochqualifizierte mehr Chancen eine Beschäftigung wieder zufinden. Falls sie schlecht bezahlt (im Vergleich zu ihrem vorherigen Lohn) sind, ist es hauptsächlich für vorübergehende Perioden.

RÉSUMÉ

Cet article examine l'aspect du chômage et de l'emploi futur en Suisse. Les résultats, issus de l'estimation d'un modèle de hazard à temps discret pour la sortie de différents états du marché du travail, indiquent l'existence de goupes à risque. Les femmes, les étrangers et les travailleurs les moins qualifiés sont durement frappés par le chômage en restant confinés dans des situations d'emplois précaires et instables. Cette instabilité dans l'emploi semble être essentiellement due à un manque de qualification. Les hommes, les jeunes et les travailleurs les plus qualifiés ont, au contraire, de fortes chances de sortir du chômage et de retrouver une activité. Ces derniers peuvent subir des pertes de salaire après une période de chômage, mais ce n'est que transitoire.