School-to-work transitions in Europe: Speed of convergence to permanent employment

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Abstract:

In a context of intensive and global economic competition, European countries are growingly concerned with the consequences of increasing numbers of young people temporarily or permanently prevented from entering the job market and the difficulties faced by college and university graduates to find adequate employment. This study is concerned with analyzing the speed of transition of students to permanent employment as a proxy of professional stability, and by identifying possible discriminatory effects in selected countries. The research questions are addressed with a Cox survival model and a continuous-time Markov chain model where each individual can transit non-sequentially between the following Markov states: (1) education; (2) inactivity; (3) unemployment; (4) fixed-term/temporary employment; and (5) permanent employment (the 5th state being a non-absorbing steady state). The model is tested using the longitudinal ECHP data in thirteen EU member countries, over the period 1994-2001, controlling for individual and household characteristics and labour market characteristics (e.g., youth employment rate and share of temporary contracts).

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1. Introduction

In a context of intensive and global economic competition, Europe is growingly concerned with the consequences of increasing numbers of young people temporarily or permanently prevented from entering the job market and the difficulties faced by college and university graduates to find adequate employment. The transition from school to work represents a central stage in the lives of individuals and a key policy topic in many Countries.

Two aspects of the transition process from school to permanent employment are relevant at an individual level as well as at a policy level: the labour market status of young people (i.e. in education, inactive, unemployed, in fixed-term employment or in permanent employment) and the time spent at each state. The first aspect is of interest because it provides static information about the occupational stability of a person after he/she has left the educational system while the second one gives a dynamic description of the transition process from school to permanent occupation.

Quintini et al. (2007) estimated the length of transition (number of months) from school to the first occupation and from school to permanent employment using a longitudinal dataset obtained from successive waves of the ECHP over the seven year period 1994-2001. The estimates reported in table 1 highlight three main findings. First, it often takes quite a long time – between 1 and 2 years and even more in the case of Finland, Italy and Portugal – for young people to find their first occupation after leaving the educational system. Second there are significant differences in the average transition speed across countries. Third, it takes much longer for young people to find a permanent occupation – generally less than 3-4 years, especially in the case of Greece, Portugal and Spain.

[Table 1 approximately here]

These estimates represent just a raw indication of the length of transition between school to permanent employment because it does not specify if the transition path is different for persons with different socio-economic characteristics (i.e. low skilled vs. high skilled, male vs. female, immigrants vs. natives) and for countries with different institutional characteristics (i.e. occupational labour markets system (OLM) vs. institutional labour markets (ILM)).

Hence, the first aim of this paper is to understand mobility dynamics on the European labour market by analyzing the speed of transition of students to permanent employment as a proxy of professional stability, and by identifying possible discriminatory effects. Among school leavers, who transits faster to permanent employment? Is the transition faster for highly skilled workers than for lower skilled workers? Is it faster for men than for women? Is it faster for participants to vocational programmes?

These research questions are addressed with a Cox survival model, which estimates the average number of years taken to reach a first permanent position, controlling for individual and country-specific market characteristics, including, among other things, gender, education level and training, need to look after children, marital status, etc. As a second step, this paper aims also at investigating the differences in transition paths as a potential explanation of the differences in transition duration across groups. More concretely, the paper estimates the number of steps taken before reaching permanent employment and the time spent at each intermediate state. A continuous-time Markov chain model is applied where each individual can transit non-sequentially between the following Markov states: (1) education; (2) inactivity; (3) unemployment; (4) fixed-term/temporary employment; and (5) permanent employment (the 5th state being a non-absorbing steady state). The use of the Markov chain method aims at guaranteeing the random characteristic of individual decision-making processes in continuous-time settings with no memory of past decisions and with a finite set of 'states'. The model is tested using the longitudinal ECHP data in thirteen EU member countries, over the period 1994-2001.

This paper contributes to the debate on labour market transitions by proposing a dynamic mobility model depicting the sequential path trends towards permanent employment as a complement to the traditional survival model and by analyzing a large number of countries.

The reminder of the paper proceeds as follow. The next session summarizes the main literature on the determinants of the transition process. While section 3 displays the econometric models (the Cox survival model and the continuous-time Markov chain) retained for our analysis, section 4 describes the data and the sample identification procedures. Section 5 presents overall results while section 6 concludes the paper.

2. The determinants of the transition process

It takes time and effort for a school leaver to find a suitable occupation with a suitable pay that provides fertile grounds for his/her future occupational or professional development. Although the transition from school to work is only the initial step into the labour market, many studies have emphasized that a smooth transition may minimize experiences of unemployment and inactivity, as well as accelerate the speed of convergence to a permanent employment (e.g., Schmelzer, 2011; Wolbers, 2007; Korpi et al., 2003; Eckstein and Wolpin, 1995). Moreover, as shown by Couppié and Mansuy (2003), job instability declines as labour marked experience increases. Thus, according to these findings – and more generally to the job-search/matching theory –, the probability to hold a permanent occupation is higher for senior workers than for junior workers. The transition to a permanent employment is a milestone for the building of an independent household (OECD, 2000, p. 26); hence, family formation decisions result directly from the success of this transition.

In 2000, Eurostat launched an additional retrospective questionnaire to the cross-sectional labour force survey (LFS) on the school to work transition in 20 European countries[1] targeting young people aged 15 to 35 who had left continuous education or training for the first time 5-10 years before (EU LFS 2000 ad hoc module). In all the countries, young people experienced the most serious difficulties in finding a job shortly after leaving continuing education, but their employment situation improved over time. Overall, the employment rates were positively correlated with the level of education of the school leavers: graduates from tertiary education found an occupation shortly after entering the labour market more likely than persons with upper secondary or post-secondary non-tertiary education, which in turn had less difficulties in finding employment than graduates from primary or lower secondary education. Finally, considering the job stability at the entrance on the labour market, the information collected with the EU LFS 2000 ad hoc module shows that the proportion of young school leavers with a precarious employment[2] generally decreased as the duration since leaving education increased. Moreover, highly educated and low educated young job entrants were equally exposed to these forms of

[1]All the European Union member countries with the exception of Germany, Hungary, Latvia, Lithuania, Romania, Slovakia and Slovenia.

[2]The EU LFS 2000 ad hoc module defines involuntary fixed contracts or involuntary part time jobs as precarious form of employment.

precarious employment in the early stages of their careers (Eurostat, 2003). However, as expected, their respective school to work transition patterns differed significantly across countries reflecting different institutionalizations of the education and labour systems. Youth unemployment rates were particularly low in Austria, Germany, Denmark, the Netherlands (countries with a dual system of education and training), while they were high in Greece, France, Italy, Romania, Slovenia, Spain and especially in Slovakia. On the other hand, relatively low levels of involuntary part-time and temporary employment among youth were observed in Austria and in Italy, while the transition to a precarious occupation proved more common in others European Countries (Couppié and Mansuy, 2003; Eurostat, 2003).

In comparative education research it has become common place to distinguish between two different school-to-work transitional regimes: the occupational labour markets system (OLM) and institutional labour markets (ILM) (see the seminal works of Marsden 1986 and 1999). The former regimes are characterized by highly standardized education and training systems providing occupationally specific skills that are recognized on the labour market as a reliable measure of individual skills. This is a key feature of the dual system operating in countries like Germany where vocationally qualified school leavers, profiting from substantial advantages compared to school leavers with general education only, enter into the labour market faster and tend to reach stable employment positions more quickly. In ILM systems, education is largely school-based and decoupled from the labour market, being in consequence more general and less tailored to task-specific skills. The coordination between education and work in countries adopting this later school-to-work transition regime – such as Great Britain or France – is particularly loose; hence, these countries tend to be characterized by a slow and instable integration of junior workers in employment during the entry period (e.g., Wolbers, 2007; Korpi et al., 2003; Gangl, 2000; Brauns et al., 1999).

The empirical results of a study conducted by Gangl (2003) suggest the presence of a third school-to-work transitional regime characterizing the three southern European countries investigated in his study, namely Italy, Greece and Portugal. In fact, there is evidence that the entry path in these countries shows a peculiar combination of elements present in both ILM and OLM systems – strong qualification and strong experience affect youth occupability and the speed of convergence to stable employment. Moreover, Gangl's work finds a large degree of cross-national variation within each transitional regime, suggesting the existence of important cross-national differences in the factors affecting the labour market transition. Among these, labour market regulation is certainly an institutional feature of central importance in shaping the pattern of labour market integration of young job entrants.

On this point, Wolbers (2007) empirically proves that the type of employment protection legislation explains significantly the cross-national differences in labour market entry pattern. Furthermore, he finds that its impact varies considerably by level of education of the school leavers. In his work, Wolbers analyses three main aspects of the labour market entry process: its speed, its quality and its stability[3]. With regard to the speed of entrance into the labour market, Wolbers shows that in countries with highly regulated labour markets, in which employers are restricted in their freedom to dismiss redundant workers, entry into a first significant job[4] is delayed, especially among highly educated school leavers. With regard to the stability of the labour market entry process, there is empirical evidence that the employment protection legislation has a negative impact on the likelihood of becoming unemployed or inactive, once reached a first significant job. With regard to the likelihood of becoming unemployed (inactive), the negative effect of employment protection legislation is weaker (stronger) for higher educated school leavers. Finally, concerning the quality of first employment, Wolbers demonstrates that the strictness of employment protection legislation has a positive impact on the occupational status attained by school leavers and that this effect is stronger the higher the level of educated.

Other factors that cannot be neglected when analysing cross-country differences in the school-to-work transition process are the role played by the family (Cavalli and Galland, 1995, Gangl, 2003a), by the youth cohort sizes (Scherer, 2005; Gangl, 2003b) and by labour market conditions (Wolbers, 2007; Scherer, 2005; Gangl, 2003b). Cavalli and Galland (1995) propose a "Mediterranean model" for school-to-work transition where, because of extensive family support, young people tend to study longer and to postpone the entrance into the labour market until they find an adequate occupation. Gangl (2003) and Scherer (2005) find weak evidence for a negative relationship between youth cohort size and chances of finding a first employment. Wolbers (2007), Scherer (2005) and Gangl (2003b) empirically show that there is a clear positive correlation between aggregate economic conditions and employment rates among young labour

[3]Entry speed refers to the duration of job search before obtaining a first significant job, while job stability concerns the risk of being unemployed after having entered a first significant job. Finally, job quality involves the occupational status – determined on the basis of the International Socio-Economic Index (ISEI) – of the first significant job.
[4]Significant jobs include all non-marginal jobs of at least about 20 hours per week lasting for at least 6 months.

market entrants. As aggregate economic conditions worsen, the speed of transition from school unemployment rates and job instability tend to rise among young school leavers.

Finally, most of the literature controls for other micro-level factors – e.g. gender and education attainment – when analysing the factors that condition directly or indirectly the school to work transition process and the speed of convergence to a stable occupation. However, despite its potential interest for policy makers, migrants are generally excluded from the analysis because their job search process and labour market outcomes are quite peculiar. Moreover, their educational degrees and social background are not comparable with the ones of non-immigrant school leavers (Gabel, 2010).

3. Econometric model

Most of recent econometric studies of the labour market based on search theory concentrate on investigating the presence and the nature of duration dependence in (un)employment (Devine and Kiefer, 1991). While our survival model aims at investigating the presence of duration in accessing permanent contracts, we apply a Markovian approach to examine the nature of that duration dependence. This section explicates the construct of these two models.

3.1 Survival model

As presented in the previous section, a large share of the literature on transitions from education to the labour market applies duration models. These techniques were primarily developed in the medical and biological sciences, but they are also widely used in the social and economic sciences, as well as in engineering (reliability and failure time analysis).

In our case, we are interested in the time (measured in terms of number of years) taken for an individual to obtain a permanent contract after leaving education for the last time, which is proxied as the year in which the individual completed its highest ISCED level. Our period of observation is 4 years (1994-1997 and 1997-2001), which means that at the end of the study period there will be individuals who did not reach any stable position. We do not want to exclude all of those individuals from the analysis by declaring them to be missing data, since most of them are “survivors” and, therefore, they reflect on the failure of labour market to provide for stability and security of employment to newly graduates). Those observations, which contain only partial information, are called “censored” observations (Hald, 1949).

The first step to describe the survival in a sample is to compute the “Life Table”, which is one of the oldest methods for analyzing survival (failure time) data (e.g., see Berckson& Gage, 1950; Cutler &Ederer, 1958; Gehan, 1969). This table can be sought of as an “enhanced” frequency distribution table. The distribution of survival times is divided into a certain number of intervals. For each interval we compute the number and proportion of cases or objects that entered the respective interval “alive” (i.e. “not yet in permanent employment”), the number and proportion of cases that failed in the respective interval (i.e. number of terminal events, or number of cases that did obtain a permanent contract), and the number of cases that were lost or censored in the respective interval (i.e. number of cases that did not obtain a permanent contract by the end of the interval period).

Moreover, we estimate the survival function directly from the continuous survival or failure times, applying a Kaplan-Meier (1958) product-limit estimator. Intuitively, it consists in multiplying the survival probabilities across all the “intervals” assuming that each time interval contains exactly one case. The survival function is then:

$$S(t) = \prod_{j=1}^{t} \left[(n-j)/(n-j+1)\right]^{\delta_j}$$

where $S(t)$ is the estimated survival function, n is the total number of cases, and j is a constant that is either 1 if the j^{th} case is uncensored (complete) or 0 if it is censored.

Given the differences across the structures of the labour markets and education and training institutions in each of the countries composing our sample, it is impossible to assume any homogeneous shape of the survival function. Therefore, we complement the Kaplan-Meier estimator with a non-parametric Cox proportional hazard model assuming that the underlying hazard rate (rather than hazard time) is a function of the independent variables (covariates), with no assumptions made about the nature or shape of the hazard function. The Cox hazard function is defined as:

$$\lambda(t \mid z) = \lambda_0(t)\exp(z\beta)$$

where $\lambda(t \mid z)$ denotes the resultant hazard, given the values of the *m* covariates for the respective case $(z_1, z_2, ..., z_m)$ and the respective survival time (*t*). The term $\lambda_0(t)$ is called the baseline hazard and is the unspecified hazard for the respective individual when all independent variable values are equal to zero. We can linearize this model by dividing both sides of the equation by $h_0(t)$ and then taking the natural logarithm of both sides:

$$\log\left[\lambda(t \mid z) / \lambda_0(t)\right] = z\beta$$

This model specifies a multiplicative relationship between the underlying hazard function and the log-linear function of the covariates (i.e. proportionality assumption). This means that, given two observations with different values for the independent variables, the ratio of the hazard functions for those two observations does not depend on time and there is a log-linear relationship between the independent variables and the underlying hazard function.

The covariates include external and internal covariates (Kalbfleisch and Prentice, 1980). While external covariates are not directly involved with the failure mechanisms, internal covariates are measurements taken directly from the subject and require the survival of the subject to their existence. External covariates can be fixed, defined or ancillary. A fixed external covariate is measured in advance and fixed for the duration of the study, i.e. they are time independent. In this model, examples include the gender, the highest level of education and training attained and the completion of vocational programme. They refer to the vector **z** in the above equation. In turn, a defined covariate has its covariate path determined in advance for each subject and varies over time (e.g., age[5]). Finally, an ancillary covariate is the output of a stochastic process which is external to the subject under study. In our model, we use annual employment rates of 15-24 years old at the country level and the share of temporary contracts among workers (both extracted from Eurostat's *lfsi_emp_a* variable). On the other hand, an

[5] As a consequence, the number of years of experience is considered as a defined covariate because they are measured as the difference between the current age of the respondent and the age at which he/she entered the labour market.

internal covariate is the output of a stochastic process which is generated by the subject and observed only while the subject is alive (e.g., health status, marital status, household wealth, responsibility of children, etc.).

Assuming that z can be a function of time dependent covariates yields the following hazard model:

$$\lambda\left[t|z(t)\right] = \lambda_0(t)\exp\left[z(t)\beta\right]$$

where $z(t)$ is a vector of time dependent covariates.

Suppose $t_1 \le t_2 \le ... \le t_u$ are the uncensored failure times and d_i , $i = 1,2,...,u$ are the number of 'deaths' at time t_i, Cox (1972) suggests the following partial likelihood function for estimating the vector of unknown parameters β in the proportional hazards model:

$$L = \prod_{i=1}^{u} \left[\frac{\exp(z_i(t_i)\beta)}{\left\{ \sum_{j \in R_{d_i}(t_i)} \exp(z_j(t_i)\beta) \right\}^{d_i}} \right],$$

where z_i is the sum of the covariates associated with deaths at time t_i, and $R_{d_i}(t_i)$ is the set of all subsets of d_i individuals chosen from the risk set $R(t_i)$ without replacement. The log-likelihood function associated with it is:

$$\log L = \sum_{i \in D} \left[z_i(t_i)\beta - d_i \log\left\{ \sum_{j \in R(t_i)} \exp(z_j(t_i)\beta) \right\} \right].$$

We compare the results of the log-likelihoods for various strata in order to identify potential differences of behaviour across sub-groups. For instance, we compare the fit of our Cox model to estimate the time to obtain a permanent contract when considering highly educated vs. medium educated vs. low educated; VET vs. no VET (i.e. completion of a vocational education or training programme or not); and men vs. women. Results are presented in section 5.1.

3.2 Markov process

While the survival analysis aims at estimating the time between the end of education and the first permanent contract, it does provide any information on the nature of the path(s) between these two events. Moreover, by looking specifically at the time from the completion of the highest educational degree and the first permanent contract, it does not consider the fact that some individuals may enter the labour market before completing their highest degree and may, therefore, accumulate several working spells, interrupted by education spells, inactivity spells or unemployment spells, before exiting the education and training system.

In order to capture the movements between different states and estimate the number of spells needed for an individual to reach a permanent contract, we, therefore, apply a Markov chain approach at country level describing transition paths between the five states traditionally linking education attainment and permanent employment, namely: education; inactivity; unemployment; fixed-term/temporary employment; and permanent employment[6]. Indeed, most of the studies investigating the nature of duration dependence in the access to a certain activity status assume that individual labour market histories are governed by a Markov process (e.g., Belzil, 1995; Bosch and Maloney, 2007; Fougère and Kamionka, 1992; Lollivier, 1994; Voicu, 2005).

More specifically, in our model, we assume that individuals transit independently between k states, according to a continuous-time Markovian process. Let $X(t)$ be the state occupied at instant t by a given individual. Our continuous-time chain is defined as t[7] and its associated Markov random process is denoted by $(X_t)_{t\geq 0} = (X_t : 0 \leq t < \infty)$ which is right-continuous. During each cycle, each member of the population under study can make only one

[6]Self-employment is arbitrarily not considered in this analysis.

[7] $t \in \Re^{+} = [0,\infty)$.

transition from one state to another. The probability to transit from a state to another during each cycle is called transition probability. We denote p_{ij}^{n} the probability of moving from state *i* to state *j* after *n* steps.

The probabilistic behavior of a right-continuous Markov process $(X_t)_{t\geq 0}$ is determined by its finite-dimensional distributions, i.e. from the probabilities

$$\begin{aligned}&\text{Prob}\left\{X(t+\Delta t) = j/X(t) = i, X(u) = x(u), 0 \leq u < t\right\}\\ &\quad = \text{Prob}\left\{X(t+\Delta t) = j/X(t) = i\right\} = p_{ij}(t, t+\Delta t)\end{aligned}$$

This means that the probability to move from a state to another depends only upon the present state. In other words, the process has no memory of earlier cycles. This assumption is quite strong: knowing the present state of a member of the population under study is possible and is sufficient to predict the transition path among future states.

Let $\tau = \Delta t$ denote a period of observation and $p_{ij}(t, t+\Delta t)$ the probability that a transition occurs from state *i* to state *j* in the interval $\left[t, t+\Delta t\right)$, where

as $\Delta t \rightarrow O$, $p_{ij}(t, t+\Delta t) \rightarrow 0$ for $i \neq j$; and

as $\Delta t \rightarrow O$, $p_{ii}(t, t+\Delta t) \rightarrow 1$;

then the rate of transition $q_{ij}(t)$ from state *i* to state *j* at time *t* is

$$q_{ij}(t) = \lim_{\Delta t \rightarrow 0}\left\{\frac{p_{ij}(t, t+\Delta t)}{\Delta t}\right\}, \quad \text{for } i \neq j,$$

i.e., from conservation of probability,

$$q_{ii}(t) = -\sum_{j \neq i} q_{ij}(t). \tag{1.1}$$

The transition rates of our continuous-time Markov chain are obtained by computing a *Q-matrix* of which the $k \times k$ elements are the $q_{ij}(t)$. Let Λ be a countable set in which the Markov process has values, i.e. $X_t : \Omega \rightarrow \Lambda$. Each $x \in \Lambda$ is called a *state* and Λ is called the *state-space*. A *Q-matrix* on Λ is a matrix $Q = (q_{ij} : i, j \in \Lambda)$ satisfying the following conditions:

(i) $0 \leq -q_{ii} < \infty$ for all i;

(ii) $q_{ij} \geq 0$ for all $i \neq j$;

(iii) $\sum_{j \in I} q_{ij} = 0$ for all i (Norris, 2007).

Note that in our case, since Λ is a finite set, $P(t)$ is simply the matrix exponential e^{tQ}, i.e.

$$P(t) = P(0,t) = e^{tQ} = \sum_{h=0}^{\infty} \frac{Q^h t^h}{h!}$$

Hence, the transition intensity matrix (or infinitesimal generator matrix) can be defined as

$$Q(t) = \lim_{\Delta t \rightarrow 0} \left\{ \frac{P(t, t+\Delta t) - I}{\Delta t} \right\},$$

where $Q(t)$ is a $k \times k$ matrix with entries $q_{ij}(t)$, $P(t, t+\Delta t)$ is the transition probability matrix, its ij^{th} element is $p_{ij}(t, t+\Delta t)$ and I is the identity matrix. This process can then be specified as follows:

$$q_{ij}(t) = \lim_{\Delta t \rightarrow 0} p_{ij}(t, t+\Delta t) / \Delta t, \; i \neq j,$$

and

$$q_{ii}(t) = -\sum_{j \neq i} q_{ij}(t),\ i = 1,...,k.$$

In this paper we are concerned with a time-homogeneous Markov process in which $q_{ij}(t) = q_{ij}$ independent of t. In this case, the process is stationary, which implies

$$P(t) = P(s, s+t) = P(0,t)$$

and $Q = (q_{ij})$, denoting the transition intensity matrix, where $q_{ij} \geq 0$ for $i \neq j$ and $\sum_{j=1}^{k} q_{ij} = 0.$

The "probability that a transition occurs from a given source state depends, not only on the source state itself, but also on the length of the interval of observation" (Stewart, 1994, p.18). Markov chains impose that each path $t \mapsto X_t(\omega)$ remains constant for a while in each new state. In our case, the path makes finitely many jumps before getting stuck in the non-absorbing state (i.e. permanent employment). The average duration of a stay in each state is $-q_{ii}^{-1}$.

The available data provide the states of individuals for each year between 1994 and 2001. The theoretical probability of being in state *j* starting from state *i* after *t* years is p_{ij}, i.e. element (i, j) of the matrix e^{tQ}. Let n_{ij} be the empirical number of individuals having completed such a transition, then in the time-homogeneous case, the log-likelihood for θ yields

$$\text{LogL}(\theta) = \sum_{l=1}^{m} \sum_{i,j=1}^{k} n_{ij} \log p_{ij}(w_l)$$

with $w_1 = t_l - t_{l-1},\ l = 1,...,m.$ W is the jump matrix, which estimates the probability of moving from state *i* to state *j* in one jump. Throughout, we suppress the dependence of $p_{ij}(w_l;\theta)$ on θ. The model estimation consists in the determination of the elements q_{ij} $(j \neq i)$ maximizing that log-likelihood. An elegant method is the one by Kalbfleisch and Lawless (1985) as applied by

Lollivier (1994). Given the matrix Q with k distinctive Eigen values $(d_1,\ldots,d_k)$ and A a $k\times k$ matrix of which the i^{th} vector is d_j, then

$$Q = A\mathrm{Diag}(d_1,\ldots,d_k)A^{-1}$$

and

$$P(t) = e^{tQ} = A\mathrm{Diag}(e^{d_1 t},\ldots,e^{d_k t})A^{-1}. \qquad (1.2)$$

The initial value is determined from the Q_0 matrix:

$$Q_0 = (P_e - I) - \frac{(P_e - I)^2}{2} + \frac{(P_e - I)^3}{3} - \frac{(P_e - I)^4}{4}.$$

The matrix P_e is the transition probabilities matrix of which the $k\times k$ elements are the p_{ij}^{n}. Moreover, derivatives are obtained as

$$\frac{\partial \mathrm{P(t)}}{\partial \theta_u} = AV_u A^{-1}, u = 1,\ldots,b \qquad (1.3)$$

where V_u is a $k\times k$ matrix of which the (i,j) element can be written:

$$\begin{cases} g_{ij}^{u}(e^{d_i t} - e^{d_j t})/(d_i - d_j), & i \neq j, \\ g_{ii}^{u} t e^{d_i t}, & i = j. \end{cases}$$

Note that g_{ij}^{u} is the (i,j) element of the matrix $\mathrm{A}^{-1}\dfrac{\partial Q}{\partial \theta_u}A$. This quasi-Newton procedure yields the following algorithm:

from (1.1) we get

F.O.C.: $S_u(\theta) = \dfrac{\partial \log L}{\partial \theta_u} = 0 \Leftrightarrow S_u(\theta) = \sum_{l=1}^{m} \sum_{i,j=1}^{k} n_{ijl} \dfrac{\partial p_{ij}(w_l)/\partial \theta_u}{p_{ij}(w_l)}$, $u = 1,...,b$,

S.O.C.: $\dfrac{\partial^2 \log L}{\partial \theta_u \partial \theta_v} = \sum_{l=1}^{m} \sum_{i,j=1}^{k} n_{ijl} \times \left\{ \dfrac{\partial^2 p_{ij}(w_l)/\partial \theta_u \partial \theta_v}{p_{ij}(w_l)} - \dfrac{\partial p_{ij}(w_l)/\partial \theta_u \partial p_{ij}(w_l)/\partial \theta_v}{p_{ij}^2(w_l)} \right\} > 0.$

Let $N_i(t_{l-1}) = \sum_{j=1}^{k} n_{ijl}$ represent the number of individuals in state i at time t_{i-1}, then the second order derivatives can be estimated by[8]

$$M_{uv}(\theta) = \sum_{l=1}^{m} \sum_{i,j=1}^{k} \frac{N_i(t_{l-1})}{p_{ij}(w_l)} \frac{\partial p_{ij}(w_l)}{\partial \theta_u} \frac{\partial p_{ij}(w_l)}{\partial \theta_v}.$$

Finally, the mean sojourn time in state i, $-q_{ii}(\theta)^{-1}$, is estimated by replacing θ by $\hat{\theta}$. In turn, the asymptotic variance is estimated from the multivariate delta theorem (see Rao, 1973, p. 388). Hence, if the mean sojourn time in state i is estimated as $-q_{ii}(\hat{\theta})^{-1}$, then its estimated asymptotic variance is $q_{ii}(\hat{\theta})^{-4}$ times

$$\sum_{u=1}^{b} \sum_{v=1}^{b} \frac{\partial q_{ii}(\theta)}{\partial \theta_u} \frac{\partial q_{ii}(\theta)}{\partial \theta_v} M^{uv}(\theta) \Big|_{\theta = \hat{\theta}},$$

where $M^{uv}(\theta)$ is the u, v element of $M(\theta)^{-1}$. The results for Italy, Germany and the United Kingdom are reported in section 5.2[9].

[8] See Kalbfleisch et Lawless, 1985, for details.
[9] Results for the other countries are available upon request to the authors.

4. Data

In analysing the school-to-work transition in Europe and the speed of convergence to permanent employment, this paper fully exploits the longitudinal feature of the European Community Household Panel (ECHP) provided by Eurostat. The dataset we use results from the merge of waves 1 to 8 of the ECHP and covers 13 EU member states across the years 1994-2001. Beside a wide range of socio-economic background variables, the ECHP provides a monthly activity calendar and a set of occupation-specific variables from which school to permanent occupations transitions can be reconstructed.

In order to make sure that the first school-to-work transition is captured, we restrict our analysis to individuals aged 15 to 30 in 1994 or in 1998 that could be followed for four consecutive years and that, by the end of the observation period, had left the educational and training system. From this selection strategy we obtain two fully balanced panels: the first covers the period 1994-1998 and includes 18,887 individuals (75,508 observations); the second covers the period 1998-2001 and includes 17,759 individuals (71,036 observations). Moreover, for the computation of the duration model, we restricted our attention to the subsample of individuals that declared to have completed their highest level of education maximum one year before the beginning of the observation period (respectively, 8,015 individuals in the 1994-1998 panel and 7,792 individuals in the 1998-2001 panel). Tables 2a and 2b present weighted summary statistics for the variables used in our estimates for sample 1994-1997 and 1998-2001, respectively.

[Tables 2a and 2b approximately here]

The time taken to reach a permanent position is our variable of interest. Among the explanatory variables we include a dummy for gender, a set of socio-economic factors (a dummy equal to one if the respondent lives with someone – husband/ wife/or companion –, a dummy equal to one if the respondent has one or more children looked after on a regular basis), a set of variables capturing the level and the type of the education (a dummy equal to one if the respondent holds a vocational degree and a categorical variable ranging from 1 to 3 according to the highest level of education completed, ISCED 0-2, ISCED 3 and ISCED 5-6, respectively), and three variables indicating the self-perceived satisfaction with health, work or main activity and financial situation. These variables are measured on a 1 to 6 Likert scale, where 1 is the lowest level of satisfaction and 6 the highest. Moreover, we measured the respondent's experience on the labour market calculating the difference between her/his age and the year he/she entered into the labour market. Finally, in an order to account for the demonstrated correlation (Wolbers, 2007; Scherer, 2005; Gangl, 2003b) between youth (un)employment rate and job (in)stability, as well as for the negative effect of employment protection legislation (Wolbers, 2007), we added two country specific contextual variables, namely the youth employment rate (15 to 24 years old) and the percentage of workers employed on a temporary contract. Both indicators are extracted from the annually aggregated variable *lfsi_emp_a* collected by Eurostat.

5. Results

5.1 Survival model estimates

From the descriptive life table, without controlling for any covariates, we observe a reduction in the overall duration between the time of exit of the education and training system and the acquisition of a permanent contract between our two cohorts. While the 1994-1997 cohort took on average 3 years (s.d. = 0.815343) to reach a stable occupation, the 1998-2001 cohort took 2.44 years (s.d. = 1.091376)[10].

After controlling for a set of internal and external (fixed, defined and ancillary) covariates[11], we find that the baseline duration of an individual transition from education to permanent employment is affected significantly by the country in which the individual is living. Indeed, as illustrated by Figure 1, while the UK, Denmark and Ireland are the countries where the transition is the fastest, Spain, Greece and Italy are the countries where young graduates struggle the most with a survival probability remaining above 0.5 4 years after having left education.

[Figure 1 approximately here]

Moreover, Table 3 reports the results of the Cox estimates and shows that the baseline duration of the transition is statistically significantly altered only by very few covariates. On the one hand, it is positively affected by a higher number of years of experience, *ceteris paribus*. On the other hand, it is negatively altered by the fact that the individual is living in a country with low employment protection regulations, i.e. with a high share of temporary contracts among workers.

[10] See variable *time* in Tables 2a and 2b.
[11] See section 3.1 and section 4 for details.

Furthermore, it is interesting to highlight the presence of significant gender discrimination[12] for the first panel in the Cox model with no interaction effects, which is then dissolved when introducing gender-related interaction effects, such as woman and years of experiences, woman with a companion, and mother with no child care support. Hence, it is not the fact of being a woman, nor the fact of having no child care support as a parent, that alone has a negative effect on the probability to transit to permanent employment. Rather, it is the fact of being a single woman, a mother without any child care support or a woman with low labour market experience that can affect negatively the speed of transition to a stable occupation.

In the second panel, this gender discrimination is not significant anymore, except in Germany where being a woman has a significant negative impact when considering no interaction. When including interaction effects, it appears that the gender discrimination is not related to lack of child care facilities but instead to the fact of being single.

[Table 3 approximately here]

Despite the lack of statistical significance of gender in the Cox estimates of the second panel, Figure 2 reveals for both panels the presence of a steeper slope (equivalent to a faster transition) and a lower survival probability at the end of the observation period for men than women (equivalent to a higher probability to transit to a stable occupation).

[Figure 2 approximately here]

Another interesting finding is the statistically significant positive effect of a vocationally oriented diploma on the speed of transition to a permanent employment only for the second panel (Table 3 and Figure 4). The increasing role of VET is supported by an increasing role of

[12] In Table 3, this gender discrimination is reflected in the statistically significant effect on the transition time of the covariates *Female* and *Children looked after on regular basis*.

professional experience, which together highlight a shift in the nature of the demand for skills across European countries during the very last years of the 1990s[13]. Similarly, the negative significant effect of the youth employment rate at the national level for the second panel may reflect the perception of the young graduates of a lower need for immediate stability (in terms of a permanent contract) thanks to the overall increase in youth employment of their age cohort after 1997.

Finally, despite the lack of statistically significant effect of the level of educational attainment from the Cox models (Table 3), estimations conducted at the country level reveal the presence of a positive effect of the level of educational attainment in most EU countries (see Figure 3).

[Figure 3 approximately here]

[Figure 4 approximately here]

5.2 Continuous-time Markov chain estimates

After having estimated the average time of transition through the duration model, we use the continuous-time Markov chain approach to estimate the average number of jumps between the time of leaving education and a permanent contract. We find that, on average, an individual had to pass through 1.47 states and 1.16 states if he was from the 1994-1997 cohort or the 1998-2001 cohort, respectively. Table 4 resumes this result by country. It reveals that Austria is the country in which the transition is the most direct with less than 1 jump on average[14] (0.75 jumps). It is closely followed by the UK with 1.2 jumps for the 1994-1997 panel and 0.74 for the 1998-2001 panel. At the other end of the distribution, for the 1994-1997 panel we find that Denmark was the country with the highest number of movements between states before stabilizing in a permanent occupation (1.33 jumps), replaced by Spain for the 1998-2001 panel (1.19 jumps).

[13] As explained by Katz (1999), skill-biased technological change (broadly interpreted to be associated with both new production technologies and organizational innovations) is a natural possibility for the growth in the demand for skill within detailed industries at the end of the 1990s.
[14] Results for Austria are only available for the 1998-2001 panel due to a late participation to the ECHP survey.

[Table 4 approximately here]

Beyond this very descriptive information on the nature of the path towards permanent employment, our Markovian chain approach also provides us with a detailed picture of the probability of getting trapped in one state on the way to a permanent contract, through the computed W-matrix (jump matrix) and the computed Q-matrix (which estimates the average duration of a stay in each state). After having computed the Q and W matrices for each of the countries of our sample, we found significant convergences in our results among countries according to their type of school-to-work transitional regimes. Therefore, in this paper, we only present the results for the UK, Germany and Italy, as representative of the three main school-to-work transitional regimes defined in section 2, namely the ILM (institutional labour market regime), the OLM (occupational labour market regime) and the Mediterranean regime, respectively.

Table 5 presents the Q-matrix and W-matrix of the UK by educational attainment level for both panels. From the Q-matrix, we can estimate the average duration of a stay in each state as $-q_{ii}^{-1}$ (Table 8). With regard to the lowest educated, we find that an individual that was in education at the beginning of the observation period (i.e., in 1994 for the 1st panel and in 1998 for the 2nd panel), will remain on average 2.03 years (2.2 years respectively) in that state. The probability to move from that state to any other state is 0.45. From the jump matrix W, we see that for those who actually moved from the state of education, the probability of reaching the final state of permanent contract in one jump (i.e. within a period of 1 year) improved from 0.25 for the first panel to 0.27 for the second panel. Then, the overall time spent in permanent employment is 11.6 years[15]. The most likely jump that a low educated young British may do when leaving education is towards temporary employment (p_{13}=0.39 for the 1st panel and p_{13}=0.46 for the second panel). Moreover, the probability of jumping directly to unemployment

[15] The average duration of a stay in permanent occupation ranges from 11.6 years for both low and medium educated and 14.2 years for the high educated.

improved between the 2 panels, decreasing from 0.17 to 0.05, and the average time spent in unemployment reduced from 2.36 years to 1.93 years.

With regard to the higher educated, their likelihood of transiting directly from education to permanent employment increased from 0.39 in 1994-1997 to 0.43 in 1998-2001. The average time spent in permanent employment is then 14.2 years. While their probability to jump directly to a temporary position decreased from 0.27 to 0.20 and their probability to jump directly to unemployment decreased from 0.19 to 0.10, their probability to jump out from the labour market and enter directly into an inactivity spell increased from 0.16 to 0.26.

Now, looking closely at the German case, which is representative of the OLM regime, we see from Table 9 that the duration of a stay at a permanent position ranges from 6 years for the lowest educated to 10.6 years for the higher educated and reaches 12.8 years for those with a vocational oriented education or training (see the Q-matrix in Table 6), which reveals a much less stable pattern than the one we observed in the UK. In the German case, it appears that the first transition after education is most likely to occur towards a temporary contract, whatever the level of education (cf. W-matrix, Table 6). The only exception can be observed within the first panel, for young adults with a vocational degree, whose highest likelihood is to make a first jump directly from school to a permanent occupation (p_{14}=0.44). Another interesting result is the fact that the probability of jumping directly to unemployment increases with the level of education (ranging from 0.12 to 0.23 in the 1st panel and 0.07 to 0.17 in the 2nd panel) and is highest for those with a VET degree (0.30 in 1994-1997 and 0.21 in 1998-2001). While the duration of the stay in unemployment is not correlated to the level of education, it is still worth noticing that it is a bit lower for those with VET, especially in the 2nd panel (1.6 years vs. overall 2 years for the non-VET).

Finally, Table 7 presents the results for Italy, which is our representative of the southern European regime. It reveals the existence of an alarming path between school and unemployment at all levels of education. The W-matrix shows that the probability for a young graduate from higher education to jump directly to unemployment was 0.43 in 1994-1997 and increased to 0.51 in 1998-2001. It ranges respectively between 0.66 and 0.55 for the low educated and 0.55 and 0.39 for the medium educated. At all levels of educational attainment, it constitutes the most likely first move after leaving education and lasts, on average, 3 years before transiting most probably towards a temporary contract, which lasts, on average, between 3 and 4 years (cf. Table 10). At the end of that spell, young Italian adults have finally a high probability to transit towards a permanent occupation. Hence, although it takes on average ‘only’ 1.4 jumps to reach a stable occupation in Italy, it can take up to 6 years to complete these jumps. This result confirms Gangl’s (2003) argument of the existence, in countries such as Italy, Portugal and Greece, of a peculiar combination of elements from the ILM and OLM systems that explain the extreme length of the duration of the transition from school to permanent employment despite relatively few intermediate jumps.

6. Conclusions

This paper has attempted to answer the popular question of the speed of transition from school to work by exploring the international longitudinal survey ECHP using two complementary, yet rarely combined, methodological approaches: the static duration model and the dynamic Markov chain approach.

From the duration model estimates, we find that, overall, the time to transit from education to a permanent occupation decreased between the two panels (taking up to 3 years for the 1994-97 panel vs. 2.46 years for the 1998-2001 panel). Moreover, our estimates reveal that the UK, Denmark and Ireland are the countries where the transition is the fastest and Spain, Greece and Italy are the countries where young graduates struggle the most. The speed of transition to permanent occupation is overall positively correlated with the number of years of experience and negatively altered by the fact that the individual is living in a country with low employment protection regulations. Estimations conducted at the country level confirm the presence of a positive significant effect of the level of educational attainment in most EU countries for both panels, as well as a strong positive effect of the completion of a vocational degree for the 1998-2001 panel. Last but not least, while female where significantly disadvantaged on the labour market in the 1994-97 panel, that disadvantage was no longer significant in the 1998-2001 panel.

From the Markov chain estimates, we then find that, on average, the path from education to permanent position was more direct for the second panel than for the first one. An individual had to pass through, respectively, 1.47 states and 1.16 states if he belonged to the 1994-1997 panel or the 1998-2001 panel. Austria, closely followed by the UK, is the country in which the transition is the most direct with less than 1 jump. At the other end, while Denmark was the country in the first panel with the highest number of movements between states before stabilizing in a permanent occupation (1.33 jumps on average), it was replaced by Spain in the second panel (1.19 jumps on average). Similar paths characteristics were observed for countries belonging respectively to the institutional labour market regime (ILM), to the occupational labour market regime (OLM) and to the Mediterranean regime across panels, which confirms the existence of institutional trends across Europe that could help defining coordinated transition policies.

For instance, while in the UK (which is our representative country of the ILM regime) the probability to get a contract directly after leaving school (temporary or permanent) is higher than in other regimes (with a longer average stay in permanent occupations), the probability to fall into an inactivity spell after an unemployment spell is higher than in any other regime. In OLM countries (as represented by Germany), unless they have a vocational degree, young graduates are more likely to transit directly to a temporary employment than to permanent employment. Moreover, while the probability of transiting directly from education to unemployment increases with the educational attainment, the duration of the stay in unemployment is lowest for the VET graduates. Finally, the Mediterranean countries (as represented by Italy) reveal an alarming high likelihood to transit directly from education to unemployment and to remain stuck there on average for 3 years before transiting most probably to a temporary job and eventually to a permanent position. Hence, the most hazardous transition to the labour market is observed for the southern European countries, followed by the OLM countries where the transition is more direct towards temporary contracts and the ILM countries, which appear as the most stable countries.

Overall, in ILM and Mediterranean regimes, the main differences observed across educational attainment levels do not lie in the nature of the paths; rather they lie in the intensity of the likelihood of each movement, where the higher the educational level, the faster and the smoothest is the transition. In OLM countries, the nature of the educational diploma (i.e. vocational or general) is more significant to explain the nature of the transition paths than the level of the diploma.

Although this analysis is based upon obsolete data, and can therefore not inform directly on the current status of the transition from education to stable employment, its main added value to the broad literature on the topic lies on its rich methodology that allows to identify clearly the most probable pitfalls in each transition regime a young graduate may face on his way to a stable career. Provided new longitudinal panel data, it would be interesting to compare these findings with the more recent situation to see whether a permanent occupation still constitutes a steady state and whether the nature and speed of movements between states have changed in each of the three regimes.

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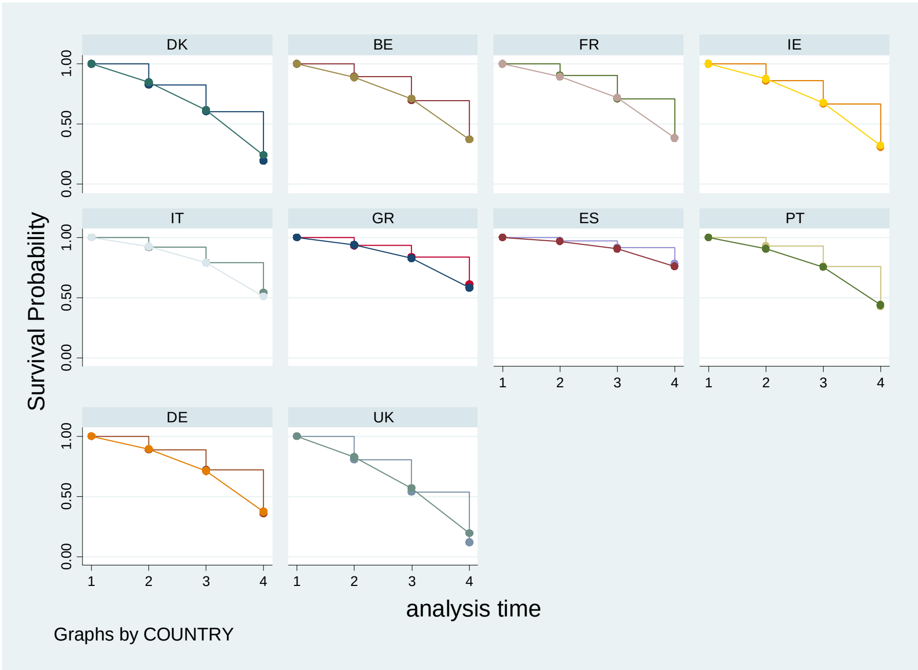
Annexes

Figure 1. Comparison Kaplan-Meier estimations and Cox proportionate hazard, by country (Weighted)

a. Panel 1994-1997



b. Panel 1998-2001

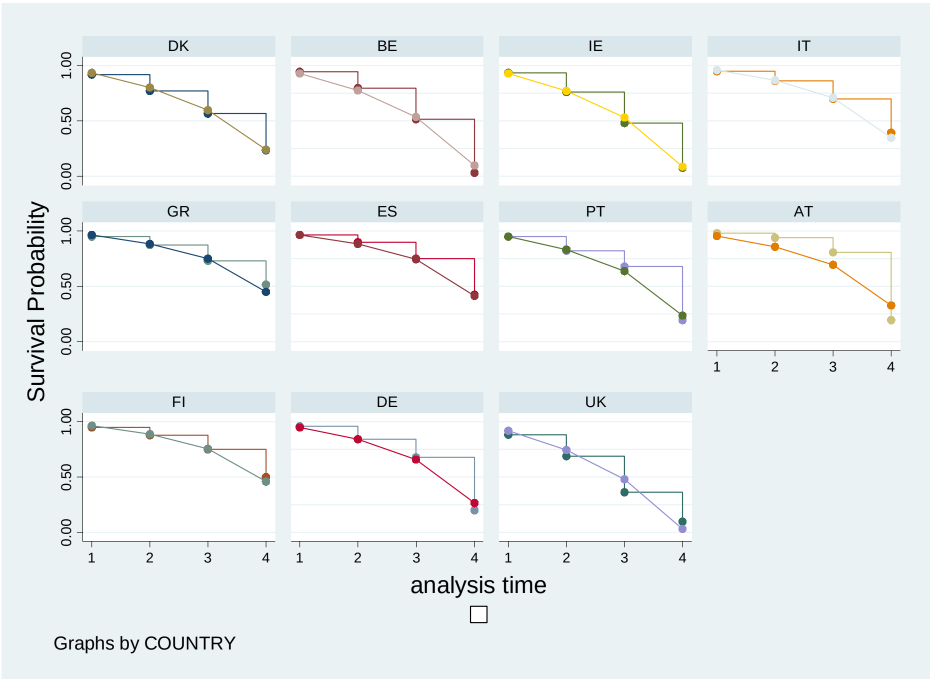
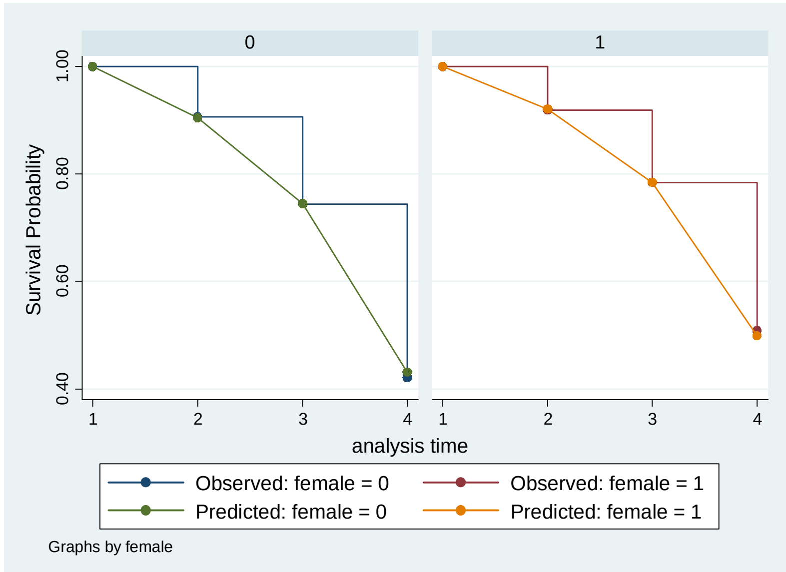


Figure 2. Comparison Kaplan-Meier estimations and Cox proportionate hazard, by gender (Weighted)

a. Panel 1994-1997



b. Panel 1998-2001

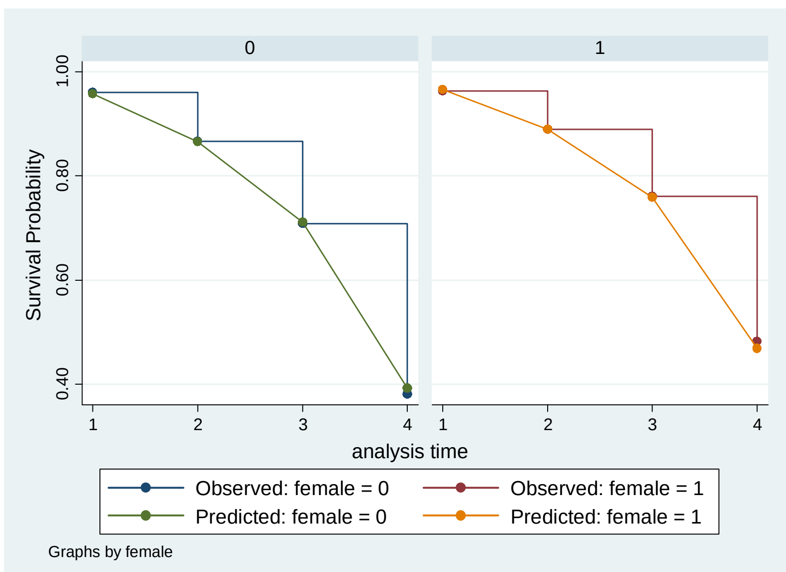
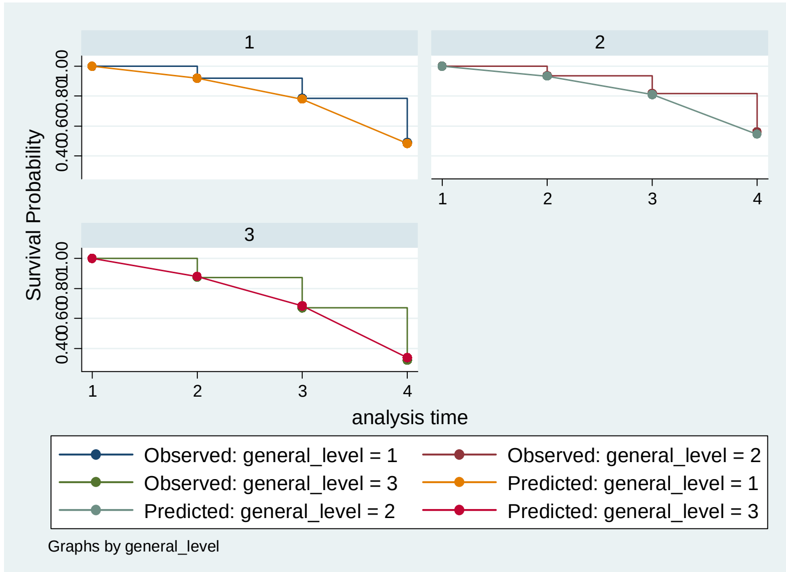


Figure 3. Comparison Kaplan-Meier estimations and Cox proportionate hazard, by educational level (Weighted)

a. Panel 1994-1997



b. Panel 1998-2001

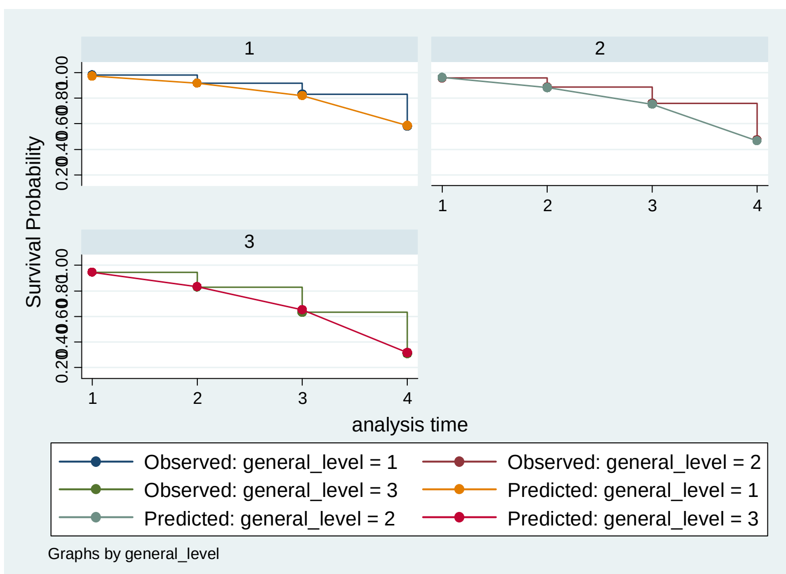
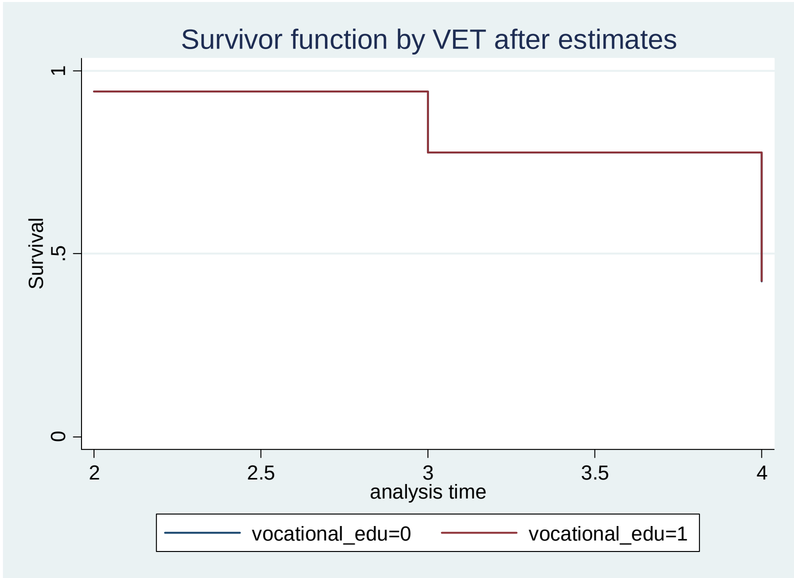


Figure 4. Cox estimates, by vocational education and training (Weighted)

a. Panel 1994-1997



b. Panel 1998-2001

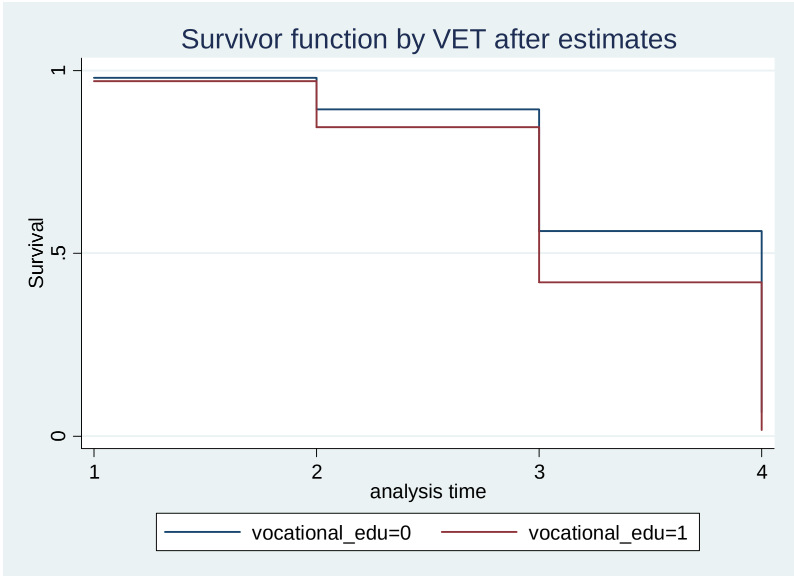


Table 1.Average duration of school to permanent occupation transition in Europe, 1994-2000[(a),(b)]

	Duration in months	
	Time spent to find any job	Time spent to find a permanent job
Austria	19.9 *(23.2)*	33.0 *(25.1)*
Belgium	20.4 *(23.4)*	45.0 *(25.0)*
Denmark	14.6 *(22.7)*	21.3 *(28.7)*
Finland	27.6 *(24.5)*	44.3 *(24.9)*
France	24.3 *(21.6)*	40.7 *(25.9)*
Germany	18.0 *(18.0)*	33.8 *(22.3)*
Greece	21.3 *(19.2)*	51.5 *(25.6)*
Ireland	13.2 *(22.6)*	28.7 *(30.1)*
Italy	25.5 *(20.6)*	44.8 *(24.9)*
Portugal	22.6 *(21.8)*	51.5 *(24.2)*
Spain	34.6 *(22.4)*	56.6 *(17.4)*
United kingdom	19.4 *(20.0)*	36.1 *(24.1)*

Values within parenthesis are the standard deviations of the estimates.

a) 1995-2000 for Finland.

b) "Short jobs", i.e., those with 15 hours or less per week, are excluded from the calculations.

Source: Quintini et al. (2007, p. 34). Estimates based on the ECHP (waves 2 and 8)

Table 2.a Summary statistics (1994-1997 sample) - Weighted

	Variable	Obs	Mean	Std.Dev.	Min	Max
Markov states	state	1113	3.513926	1.318802	1	5
	state_move	1113	1.437556	0.8680532	0	3
	time	1113	3.001797	0.8135523	2	4
	education	1113	0.0925427	0.2899208	0	1
	inactive	1113	0.1662174	0.3724431	0	1
	unemployed	1113	0.1761006	0.381077	0	1
	unstable occupation	1113	0.2650494	0.4415579	0	1
	stable occupation	1113	0.3000898	0.4585028	0	1
Individual characteristics	female	1113	0.5786164	0.4940028	0	1
	age	1113	23.96316	4.28099	18	33
	age entered labour market	1012	16.35079	7.802994	0	29
	experience	1113	3.787062	4.47641	0	18
	experience^2	1113	34.36208	59.88967	0	324
	general_education	1113	1	0	1	1
	vocational_education	1113	0.2003594	0.4004492	0	1
	education_level	1113	0.3791554	0.8277974	0	3
	migrant	1113	0.0260557	0.1593726	0	1
	companion	1113	0.4519317	0.4979078	0	1
	child responsibility	1113	0.7367475	0.4405962	0	1
	year_highest education	1113	1993.339	0.4734887	1993	1994
	health1	1113	0.0053908	0.0732571	0	1
	health2	1113	0.0242588	0.1539206	0	1
	health3	1113	0.115903	0.3202524	0	1
	health4	1113	0.5462713	0.4980782	0	1
	health5	1113	0.3081761	0.4619473	0	1
	edulevel1	1113	0.3000898	0.4585028	0	1
	edulevel2	1113	0.4357592	0.4960789	0	1
	edulevel3	1113	0.2641509	0.4410782	0	1
	sat_job1	887	0.1285231	0.3348602	0	1
	sat_job2	887	0.096956	0.2960648	0	1
	sat_job3	887	0.1555806	0.3626618	0	1
	sat_job4	887	0.253664	0.435353	0	1
	sat_job5	887	0.2514092	0.434068	0	1
	sat_job6	887	0.113867	0.3178288	0	1
	sat_money1	898	0.1826281	0.3865766	0	1
	sat_money2	898	0.1592428	0.3661062	0	1
	sat_money3	898	0.2750557	0.4467912	0	1
	sat_money4	898	0.2538976	0.4354822	0	1
	sat_money5	898	0.1057906	0.3077409	0	1
	sat_money6	898	0.0233853	0.1512081	0	1
Interaction effects	female_exp	1113	2.074573	3.717885	0	17
	female_comp	1113	0.2821204	0.4502339	0	1
	female_chid	1113	0.4213836	0.4940028	0	1
	edu_vet	1113	1.964061	0.7506367	1	3

Country variables	DK	1113	0.0395328	0.1949464	0	1
	BE	1113	0.0260557	0.1593726	0	1
	FR	1113	0.1060198	0.3080013	0	1
	IE	1113	0.1051213	0.3068475	0	1
	IT	1113	0.1545373	0.3616255	0	1
	GR	1113	0.0682839	0.2523459	0	1
	ES	1113	0.178796	0.3833537	0	1
	PT	1113	0.1302785	0.3367609	0	1
	DE	1113	0.1698113	0.3756357	0	1
	UK	1113	0.0215633	0.1453181	0	1
	share_temporary contract (M)	1113	13.68814	9.175245	3.8	33.5
	share_temporary contract (F)	1113	16.15975	9.869133	7.7	38.3
	share_temporary contract (T)	1113	14.69533	9.345871	5.4	35.2
	empl_youth(M)	1113	38.33792	10.48017	27.4	68.5
	empl_youth(F)	1113	30.64753	11.90049	19.5	64.2
	empl_youth(T)	1113	34.51339	11.21182	24.1	66.6
Weights	base_weight	1113	13538.96	8787.919	1843.379	27524.89
	pweight	1113	1.003339	0.8718367	0	7.72042

Note: The covariates on the satisfaction to job and satisfaction to money were not collected in Germany.

Table 2.b Summary statistics (1998-2001 sample) – Weighted (N=1460)

	Variable	Mean	Std.Dev.	Min	Max
Markov states	state	3.470548	1.43197	1	5
	state_move	1.158904	0.9465258	0	3
	time	2.440411	1.091376	1	4
	education	0.1568493	0.3637832	0	1
	inactive	0.1260274	0.331994	0	1
	unemployed	0.110274	0.3133383	0	1
	unstable occupation	0.3034247	0.4598946	0	1
	stable occupation	0.3034247	0.4598946	0	1
Individual characteristics	female	0.5609589	0.4964401	0	1
	age	22.77055	4.56798	15	33
	age entered labour market	17.32082	6.62159	0	31
	experience	3.393151	4.387371	0	21
	experience^2	30.74932	56.64564	0	441
	general_education	1	0	1	1
	vocational_education	0.2575342	0.4374259	0	1
	education_level	1.899315	0.7312656	1	3
	migrant	0.0130137	0.1133717	0	1
	companion	0.3979452	0.4896417	0	1
	child responsibility	0.6986301	0.4590102	0	1
	year_highest education	1997.472	0.4993818	1997	1998
	health1	0.0027397	0.0522886	0	1
	health2	0.0130137	0.1133717	0	1
	health3	0.1082192	0.3107635	0	1
	health4	0.4582192	0.498422	0	1
	health5	0.4178082	0.4933672	0	1
	edulevel1	0.3226027	0.4676323	0	1
	edulevel2	0.4554795	0.4981846	0	1
	edulevel3	0.2219178	0.4156785	0	1
	sat_job1	0.0612745	0.2399312	0	1
	sat_job2	0.0620915	0.2414203	0	1
	sat_job3	0.120915	0.3261618	0	1
	sat_job4	0.2818627	0.4500907	0	1
	sat_job5	0.3137255	0.4641959	0	1
	sat_job6	0.1601307	0.3668771	0	1
	sat_money1	0.1252019	0.3310815	0	1
	sat_money2	0.1558966	0.3629039	0	1
	sat_money3	0.2342488	0.4236995	0	1
	sat_money4	0.2883683	0.4531864	0	1
	sat_money5	0.1478191	0.355064	0	1
	sat_money6	0.0484653	0.214834	0	1
Interaction effects	female*experience	1.876712	3.659591	0	21
	female*companion	0.2513699	0.4339493	0	1
	female*children (no child care support)	0.3773973	0.4849017	0	1
	education*VET	0.4986301	0.9289338	0	3
Country variables	DK	0.0931507	0.2907431	0	1
	BE	0.0335616	0.1801596	0	1

	IE	0.1458904	0.3531173	0	1
	IT	0.1047945	0.3063934	0	1
	GR	0.0520548	0.2222137	0	1
	ES	0.1390411	0.346108	0	1
	PT	0.1493151	0.3565209	0	1
	AT	0.0643836	0.2455191	0	1
	FI	0.0821918	0.2747508	0	1
	DE	0.1184932	0.3233019	0	1
	UK	0.0171233	0.1297753	0	1
	share_temporary contract (M)	13.33274	8.309439	4.1	32.1
	share_temporary contract (F)	16.27363	8.699951	6.2	35
	share_temporary contract (T)	14.62774	8.400705	5.1	33
	empl_youth(M)	45.75541	10.74233	30.3	68.5
	empl_youth(F)	38.07171	12.46331	20.7	65.8
	empl_youth(T)	41.94486	11.5307	25.7	66
Weights	base_weight	12083.27	10111.09	3515.28	35205.63
	pweight	1.008361	1.471957	0	23.07183

Note: The covariates on the satisfaction to job and satisfaction to money were not collected in Germany.

Table 3.Survival model estimates: Cox proportionate hazard model (Weighted)

	Panel 1994-1997				Panel 1998-2001			
	No interaction		Interactions[(a)]		No interaction		Interactions[(a)]	
	Without DE	With DE	Without DE	With DE	Without DE	With DE	Without DE	With DE
Main covariates								
Female	-0.399**	-0.629***	0.361	0.224	-0.0866	-0.455***	-0.232	-0.360
	(-2.90)	(-5.09)	(1.2)	(0.96)	(-0.77)	(-4.08)	(-1.05)	(-1.67)
Level of education	-0.0522	0.133	-0.0409	0.112	-0.165	0.138	-0.154	0.112
	(-0.50)	(1.75)	(-0.38)	(1.46)	(-1.75)	(1.72)	(-1.59)	(1.37)
Vocational education	0.000263	0.117	0.00485	0.119	0.460***	0.211	0.456***	0.212
	(0.00)	(0.69)	(0.03)	(0.69)	(3.45)	(1.54)	(3.39)	(1.53)
Time varying covariates								
Years of experience	0.0297*	0.0326*	0.0256	0.0289*	0.0756***	0.0730***	0.0717***	0.0614***
	(2.02)	(2.64)	(1.5)	(2.03)	(5.25)	(4.78)	(4.72)	(3.92)
Years of experience squared	-0.00124	-0.00157*	-0.000953	-0.00131	-0.0037***	-0.0036***	-0.0038***	-0.0035***
	(-1.35)	(-2.10)	(-0.95)	(-1.63)	(-4.45)	(-3.95)	(-4.53)	(-3.94)
Companion	0.0625	0.076	0.161*	0.164*	-0.00773	0.0162	0.0391	0.151*
	(1.12)	(1.48)	(2.18)	(2.5)	(-0.17)	(0.33)	(0.56)	(2.34)
Satisfaction with health	-0.0117	0.0387	-0.014	0.0413	-0.0106	0.0552*	-0.0141	0.0560*
	(-0.38)	(1.42)	(-0.43)	(1.46)	(-0.42)	(2.55)	(-0.55)	(2.56)
Satisfaction with work	0.0398*	m	0.0401*	m	0.0228	m	0.0218	m
	(2.35)	m	(2.35)	m	(1.28)	m	(1.24)	m
Satisfaction with financial situation	0.0479	m	0.0494*	m	0.0324	m	0.0335	m
	(2.37)	m	(2.36)	m	(1.84)	m	(1.89)	m
Children looked after on regular basis	-0.106*	-0.114**	0.0375	0.00686	-0.00417	-0.0401	-0.0525	-0.0407
	(-2.23)	(-3.23)	(0.56)	(0.16)	(-0.10)	(-1.15)	(-0.94)	(-0.95)
Share of temporary contracts	-0.0098***	-0.0095***	-0.00986***	-0.00980***	-0.0095***	-0.00838**	-0.0099***	-0.00811**
	(-4.07)	(-3.76)	(-3.84)	(-3.75)	(-3.33)	(-3.03)	(-3.43)	(-2.86)
Total youth employment	0.0026	0.00254	0.00237	0.00183	-0.00393*	-0.00412*	-0.00380*	-0.00402*
	(1.69)	(1.77)	(1.56)	(1.25)	(-2.50)	(-2.49)	(-2.39)	(-2.43)
N	887	1113	887	1113	1223	1460	1223	1460

Notes: * p<0.05, ** p<0.01, *** p<0.001; t statistics in parenthesis. (m) The covariates on the satisfaction to job and satisfaction to financial situation were not collected in Germany. (a) Interaction effects included: female*experience; female*companion; female*chilresp (mother with no child care support).

Table 4 Average number of jumps (measured as number of moves between Markov states), by country (Unweighted)

Sample 1994-1997

Country	Obs	Mean	Std.Dev.	Min	Max
FULL SAMPLE*	887	1.471251	0.859824	0	3
DK	3072	1.330729	0.725401	0	3
BE	5176	1.305255	0.69584	0	3
FR	2616	1.136086	0.779163	0	3
IE	6188	1.186167	0.749283	0	3
IT	4440	1.114414	0.819051	0	3
GR	13512	1.176732	0.874899	0	3
ES	6944	1.097926	0.916302	0	3
PT	9772	1.259517	0.897458	0	3
ES	7468	1.175683	0.801891	0	3
DE	9304	1.280739	0.747543	0	3
UK	7016	1.206956	0.745191	0	3

Note: (*) Full sample weighted

Sample 1998-2001

Country	Obs	Mean	Std.Dev.	Min	Max
FULL SAMPLE*	1223	1.162715	0.961033	0	3
DK	2380	0.981513	0.917621	0	3
NL	3868	0.875905	0.900024	0	3
BE	2148	0.811918	0.830266	0	3
FR	4584	0.820244	0.911042	0	3
IE	3220	0.961491	0.963971	0	3
IT	10720	0.925373	0.926655	0	3
GR	5780	0.885813	0.937633	0	3
ES	8820	1.195465	0.956416	0	3
PT	8368	0.904876	0.898871	0	3
AT	3896	0.75462	0.857709	0	3
FI	2956	1.11502	0.940334	0	3
DE	7820	0.977494	0.926237	0	3
UK	6476	0.744904	0.937143	0	3

Note: (*) Full sample weighted

Table 5. Transition rates matrix Q and jump matrix W in an ILM regime: Example from the United Kingdom

	Panel 1994-1997	
	Q	W
ISCED 0-2	$\begin{pmatrix} -0.454333 & 0.0861667 & 0.0783333 & 0.180167 & 0.1175 \\ 0.0313333 & -0.203667 & 0.0235 & 0.047 & 0.094 \\ 0.0235 & 0.148833 & -0.423 & 0.101833 & 0.156667 \\ 0.0156667 & 0.047 & 0.0391667 & -0.618833 & 0.517 \\ 0.00626667 & 0.0313333 & 0.0235 & 0.0235 & -0.0861667 \end{pmatrix}$	$\begin{pmatrix} 0. & 0.19 & 0.17 & 0.39 & 0.25 \\ 0.16 & 0. & 0.12 & 0.24 & 0.48 \\ 0.05 & 0.35 & 0. & 0.24 & 0.36 \\ 0.03 & 0.08 & 0.06 & 0. & 0.84 \\ 0.07 & 0.37 & 0.28 & 0.28 & 0. \end{pmatrix}$
ISCED 3	$\begin{pmatrix} -0.4465 & 0.0783333 & 0.101833 & 0.109667 & 0.156667 \\ 0.0548333 & -0.282 & 0.0235 & 0.0861667 & 0.1175 \\ 0.0626667 & 0.0861667 & -0.556167 & 0.141 & 0.274167 \\ 0.047 & 0.047 & 0.0235 & -0.611 & 0.4935 \\ 0.0156667 & 0.0313333 & 0.0313333 & 0.0391667 & -0.0861667 \end{pmatrix}$	$\begin{pmatrix} 0. & 0.18 & 0.23 & 0.25 & 0.35 \\ 0.19 & 0. & 0.08 & 0.31 & 0.42 \\ 0.11 & 0.15 & 0. & 0.25 & 0.49 \\ 0.08 & 0.08 & 0.04 & 0. & 0.81 \\ 0.13 & 0.27 & 0.27 & 0.33 & 0. \end{pmatrix}$
ISCED 5-6	$\begin{pmatrix} -0.5405 & 0.0861667 & 0.101833 & 0.148833 & 0.2115 \\ 0.00783333 & -0.266333 & 0.0235 & 0.0626667 & 0.172333 \\ 0.0313333 & 0.0705 & -0.548333 & 0.172333 & 0.274167 \\ 0.00783333 & 0.0313333 & 0.0156667 & -0.5875 & 0.524833 \\ 0.00783333 & 0.0313333 & 0.00783333 & 0.0235 & -0.0705 \end{pmatrix}$	$\begin{pmatrix} 0. & 0.16 & 0.19 & 0.27 & 0.39 \\ 0.03 & 0. & 0.09 & 0.24 & 0.65 \\ 0.06 & 0.13 & 0. & 0.31 & 0.5 \\ 0.01 & 0.05 & 0.03 & 0. & 0.91 \\ 0.11 & 0.44 & 0.11 & 0.33 & 0. \end{pmatrix}$
	Panel 1998-2001	
	Q	W
ISCED 0-2	$\begin{pmatrix} -0.4935 & 0.109667 & 0.0235 & 0.227167 & 0.133167 \\ 0.0156667 & -0.180167 & 0.0391667 & 0.0156667 & 0.109667 \\ 0.0235 & 0.219333 & -0.517 & 0.0235 & 0.242833 \\ 0. & 0.0626667 & 0.0626667 & -0.524833 & 0.407333 \\ 0.0047 & 0.0391667 & 0.0235 & 0.0235 & -0.0861667 \end{pmatrix}$	$\begin{pmatrix} 0. & 0.22 & 0.05 & 0.46 & 0.27 \\ 0.09 & 0. & 0.22 & 0.09 & 0.61 \\ 0.05 & 0.43 & 0. & 0.05 & 0.48 \\ 0. & 0.12 & 0.12 & 0. & 0.76 \\ 0.05 & 0.43 & 0.26 & 0.26 & 0. \end{pmatrix}$
ISCED 3	$\begin{pmatrix} -0.438667 & 0.133167 & 0. & 0.148833 & 0.148833 \\ 0.0548333 & -0.282 & 0.0235 & 0.0626667 & 0.148833 \\ 0.047 & 0.297667 & -0.485667 & 0.101833 & 0.047 \\ 0.1175 & 0.0548333 & 0.0548333 & -0.407333 & 0.188 \\ 0.00783333 & 0.047 & 0.0156667 & 0.047 & -0.1175 \end{pmatrix}$	$\begin{pmatrix} 0. & 0.31 & 0. & 0.35 & 0.35 \\ 0.19 & 0. & 0.08 & 0.22 & 0.51 \\ 0.1 & 0.6 & 0. & 0.21 & 0.1 \\ 0.28 & 0.13 & 0.13 & 0. & 0.45 \\ 0.07 & 0.4 & 0.13 & 0.4 & 0. \end{pmatrix}$
ISCED 5-6	$\begin{pmatrix} -0.532667 & 0.141 & 0.0548333 & 0.109667 & 0.235 \\ 0.0391667 & -0.360333 & 0.0235 & 0.0783333 & 0.219333 \\ 0.047 & 0.133167 & -0.595333 & 0.0705 & 0.344667 \\ 0.0313333 & 0.0626667 & 0.0156667 & -0.415167 & 0.3055 \\ 0.00783333 & 0.0235 & 0.00783333 & 0.0313333 & -0.0705 \end{pmatrix}$	$\begin{pmatrix} 0. & 0.26 & 0.1 & 0.2 & 0.43 \\ 0.11 & 0. & 0.07 & 0.22 & 0.61 \\ 0.08 & 0.22 & 0. & 0.12 & 0.58 \\ 0.08 & 0.15 & 0.04 & 0. & 0.74 \\ 0.11 & 0.33 & 0.11 & 0.44 & 0. \end{pmatrix}$

Table 6. Transition rates matrix Q and jump matrix W in an OLM regime: Example from Germany

	Panel 1994-1997	
	Q	W
ISCED 0-2	$\begin{pmatrix} -0.462167 & 0.141 & 0.0548333 & 0.188 & 0.0783333 \\ 0.0235 & -0.235 & 0.0626667 & 0.0783333 & 0.0705 \\ 0.0391667 & 0.133167 & -0.509167 & 0.148833 & 0.180167 \\ 0.0235 & 0.0626667 & 0.0705 & -0.438667 & 0.282 \\ 0.00626667 & 0.0235 & 0.0548333 & 0.0548333 & -0.141 \end{pmatrix}$	$\begin{pmatrix} 0. & 0.31 & 0.12 & 0.41 & 0.17 \\ 0.1 & 0. & 0.27 & 0.33 & 0.3 \\ 0.08 & 0.27 & 0. & 0.3 & 0.36 \\ 0.05 & 0.14 & 0.16 & 0. & 0.64 \\ 0.04 & 0.17 & 0.39 & 0.39 & 0. \end{pmatrix}$
ISCED 3	$\begin{pmatrix} -0.3995 & 0.0313333 & 0.047 & 0.1645 & 0.1645 \\ 0.0391667 & -0.313333 & 0.0548333 & 0.0783333 & 0.133167 \\ 0.0626667 & 0.0861667 & -0.509167 & 0.156667 & 0.203667 \\ 0.0235 & 0.0548333 & 0.0313333 & -0.564 & 0.454333 \\ 0.00783333 & 0.0156667 & 0.0235 & 0.0548333 & -0.101833 \end{pmatrix}$	$\begin{pmatrix} 0. & 0.08 & 0.12 & 0.4 & 0.4 \\ 0.13 & 0. & 0.18 & 0.26 & 0.44 \\ 0.12 & 0.17 & 0. & 0.31 & 0.4 \\ 0.04 & 0.1 & 0.06 & 0. & 0.81 \\ 0.08 & 0.15 & 0.23 & 0.54 & 0. \end{pmatrix}$
ISCED 5-6	$\begin{pmatrix} -0.6815 & 0.0548333 & 0.156667 & 0.313333 & 0.156667 \\ 0.0235 & -0.297667 & 0.0235 & 0.109667 & 0.148833 \\ 0.0626667 & 0.094 & -0.6345 & 0.2115 & 0.274167 \\ 0.282 & 0.0235 & 0.0235 & -0.485667 & 0.430833 \\ 0. & 0.00783333 & 0.00783333 & 0.0548333 & -0.0705 \end{pmatrix}$	$\begin{pmatrix} 0. & 0.08 & 0.23 & 0.46 & 0.23 \\ 0.08 & 0. & 0.08 & 0.36 & 0.49 \\ 0.1 & 0.15 & 0. & 0.33 & 0.43 \\ 0.37 & 0.03 & 0.03 & 0. & 0.57 \\ 0. & 0.11 & 0.11 & 0.78 & 0. \end{pmatrix}$
VET	$\begin{pmatrix} -0.564 & 0.0156667 & 0.172333 & 0.133167 & 0.250667 \\ 0.391667 & -0.783333 & 0. & 0.391667 & 0. \\ 0.156667 & 0.0548333 & -0.524833 & 0.156667 & 0.156667 \\ 0.0235 & 0.047 & 0.0861667 & -0.3525 & 0.195833 \\ 0.047 & 0.00783333 & 0.0156667 & 0.0391667 & -0.109667 \end{pmatrix}$	$\begin{pmatrix} 0. & 0.03 & 0.3 & 0.26 & 0.44 \\ 0.5 & 0. & 0. & 0.5 & 0. \\ 0.3 & 0.1 & 0. & 0.3 & 0.3 \\ 0.07 & 0.13 & 0.24 & 0. & 0.56 \\ 0.43 & 0.07 & 0.14 & 0.36 & 0. \end{pmatrix}$
	Panel 1998-2001	
	Q	W
ISCED 0-2	$\begin{pmatrix} -0.329 & 0.047 & 0.0235 & 0.219333 & 0.0313333 \\ 0.0235 & -0.2115 & 0.0548333 & 0.0705 & 0.0548333 \\ 0.047 & 0.0861667 & -0.485667 & 0.203667 & 0.141 \\ 0.0235 & 0.0235 & 0.0391667 & -0.148833 & 0.0626667 \\ 0.00313333 & 0.0235 & 0.0548333 & 0.0861667 & -0.1645 \end{pmatrix}$	$\begin{pmatrix} 0. & 0.15 & 0.07 & 0.68 & 0.1 \\ 0.12 & 0. & 0.27 & 0.35 & 0.27 \\ 0.1 & 0.18 & 0. & 0.43 & 0.3 \\ 0.16 & 0.16 & 0.26 & 0. & 0.42 \\ 0.02 & 0.14 & 0.33 & 0.51 & 0. \end{pmatrix}$
ISCED 3	$\begin{pmatrix} -0.344667 & 0.0626667 & 0.0391667 & 0.148833 & 0.094 \\ 0.094 & -0.383833 & 0.0861667 & 0.1175 & 0.0861667 \\ 0.0548333 & 0.0783333 & -0.532667 & 0.195833 & 0.2115 \\ 0.0391667 & 0.0705 & 0.047 & -0.360333 & 0.203667 \\ 0.0705 & 0.0705 & 0.0235 & 0.0861667 & -0.125333 \end{pmatrix}$	$\begin{pmatrix} 0. & 0.18 & 0.11 & 0.43 & 0.27 \\ 0.24 & 0. & 0.22 & 0.31 & 0.22 \\ 0.1 & 0.14 & 0. & 0.36 & 0.39 \\ 0.11 & 0.2 & 0.13 & 0. & 0.57 \\ 0.28 & 0.28 & 0.09 & 0.34 & 0. \end{pmatrix}$
ISCED 5-6	$\begin{pmatrix} -0.5405 & 0.0313333 & 0.094 & 0.329 & 0.094 \\ 0.0235 & -0.603167 & 0.047 & 0.227167 & 0.3055 \\ 0.0705 & 0.141 & -0.430833 & 0.0705 & 0.141 \\ 0.0235 & 0.0626667 & 0.0156667 & -0.3055 & 0.195833 \\ 0.00783333 & 0.00783333 & 0.00783333 & 0.0783333 & -0.094 \end{pmatrix}$	$\begin{pmatrix} 0. & 0.06 & 0.17 & 0.6 & 0.17 \\ 0.04 & 0. & 0.08 & 0.38 & 0.51 \\ 0.17 & 0.33 & 0. & 0.17 & 0.33 \\ 0.08 & 0.21 & 0.05 & 0. & 0.66 \\ 0.08 & 0.08 & 0.08 & 0.77 & 0. \end{pmatrix}$
VET	$\begin{pmatrix} -0.665833 & 0.00783333 & 0.141 & 0.3525 & 0.1645 \\ 0. & -0.391667 & 0. & 0.391667 & 0. \\ 0.227167 & 0.109667 & -0.618833 & 0.227167 & 0.0548333 \\ 0.0313333 & 0.0313333 & 0.0548333 & -0.235 & 0.125333 \\ 0. & 0.00783333 & 0.0156667 & 0.047 & -0.0783333 \end{pmatrix}$	$\begin{pmatrix} 0. & 0.01 & 0.21 & 0.53 & 0.25 \\ 0. & 0. & 0. & 1. & 0. \\ 0.37 & 0.18 & 0. & 0.37 & 0.09 \\ 0.13 & 0.13 & 0.23 & 0. & 0.52 \\ 0. & 0.11 & 0.22 & 0.27 & 0. \end{pmatrix}$

Table 7. Transition rates matrix Q and jump matrix W in a Mediterranean regime: Example from Italy

	Panel 1994-1997	
	Q	W
ISCED 0-2	$\begin{pmatrix} -0.407333 & 0.0626667 & 0.274167 & 0.0548333 & 0.0235 \\ 0.0156667 & -0.203667 & 0.109667 & 0.0548333 & 0.0313333 \\ 0.0313333 & 0.094 & -0.282 & 0.109667 & 0.0548333 \\ 0.00783333 & 0.0313333 & 0.0861667 & -0.391667 & 0.266333 \\ 0.00156667 & 0.0156667 & 0.0313333 & 0.0783333 & -0.133167 \end{pmatrix}$	$\begin{pmatrix} 0. & 0.15 & 0.66 & 0.13 & 0.06 \\ 0.07 & 0. & 0.52 & 0.26 & 0.15 \\ 0.11 & 0.32 & 0. & 0.38 & 0.19 \\ 0.02 & 0.08 & 0.22 & 0. & 0.68 \\ 0.01 & 0.12 & 0.25 & 0.62 & 0. \end{pmatrix}$
ISCED 3	$\begin{pmatrix} -0.423 & 0.0626667 & 0.227167 & 0.0861667 & 0.0391667 \\ 0.0548333 & -0.3525 & 0.125333 & 0.101833 & 0.0783333 \\ 0.0548333 & 0.0705 & -0.297667 & 0.109667 & 0.0626667 \\ 0.0235 & 0.0235 & 0.047 & -0.430833 & 0.336833 \\ 0.0391667 & 0.0156667 & 0.0156667 & 0.0861667 & -0.1175 \end{pmatrix}$	$\begin{pmatrix} 0. & 0.15 & 0.55 & 0.21 & 0.09 \\ 0.15 & 0. & 0.35 & 0.28 & 0.22 \\ 0.18 & 0.24 & 0. & 0.37 & 0.21 \\ 0.05 & 0.05 & 0.11 & 0. & 0.78 \\ 0.25 & 0.1 & 0.1 & 0.55 & 0. \end{pmatrix}$
ISCED 5-6	$\begin{pmatrix} -0.462167 & 0.0626667 & 0.203667 & 0.141 & 0.0626667 \\ 0.0783333 & -0.4935 & 0.180167 & 0.180167 & 0.0548333 \\ 0.0548333 & 0.0705 & -0.376 & 0.172333 & 0.0626667 \\ 0.0391667 & 0.0156667 & 0.0235 & -0.423 & 0.336833 \\ 0. & 0.0156667 & 0.00783333 & 0.094 & -0.1175 \end{pmatrix}$	$\begin{pmatrix} 0. & 0.13 & 0.43 & 0.3 & 0.13 \\ 0.16 & 0. & 0.37 & 0.37 & 0.11 \\ 0.15 & 0.2 & 0. & 0.48 & 0.17 \\ 0.09 & 0.04 & 0.06 & 0. & 0.81 \\ 0. & 0.13 & 0.07 & 0.8 & 0. \end{pmatrix}$
	Panel 1998-2001	
	Q	W
ISCED 0-2	$\begin{pmatrix} -0.242833 & 0.047 & 0.133167 & 0.0313333 & 0.0313333 \\ 0.00783333 & -0.148833 & 0.0783333 & 0.0391667 & 0.0156667 \\ 0.0156667 & 0.101833 & -0.289833 & 0.1175 & 0.0626667 \\ 0.00156667 & 0.0313333 & 0.0783333 & -0.2585 & 0.148833 \\ 0. & 0.0156667 & 0.0235 & 0.0861667 & -0.125333 \end{pmatrix}$	$\begin{pmatrix} 0. & 0.19 & 0.55 & 0.13 & 0.13 \\ 0.06 & 0. & 0.56 & 0.28 & 0.11 \\ 0.05 & 0.34 & 0. & 0.39 & 0.21 \\ 0.01 & 0.12 & 0.3 & 0. & 0.57 \\ 0. & 0.13 & 0.19 & 0.69 & 0. \end{pmatrix}$
ISCED 3	$\begin{pmatrix} -0.336833 & 0.0548333 & 0.133167 & 0.109667 & 0.047 \\ 0.0391667 & -0.289833 & 0.1175 & 0.0783333 & 0.047 \\ 0.047 & 0.0705 & -0.297667 & 0.109667 & 0.0783333 \\ 0.0235 & 0.0235 & 0.0626667 & -0.282 & 0.180167 \\ 0.00783333 & 0.00783333 & 0.0156667 & 0.0705 & -0.101833 \end{pmatrix}$	$\begin{pmatrix} 0. & 0.16 & 0.39 & 0.32 & 0.14 \\ 0.14 & 0. & 0.42 & 0.28 & 0.17 \\ 0.15 & 0.23 & 0. & 0.36 & 0.26 \\ 0.08 & 0.08 & 0.22 & 0. & 0.62 \\ 0.08 & 0.08 & 0.15 & 0.69 & 0. \end{pmatrix}$
ISCED 5-6	$\begin{pmatrix} -0.618833 & 0.0705 & 0.321167 & 0.141 & 0.094 \\ 0.0391667 & -0.4465 & 0.125333 & 0.172333 & 0.109667 \\ 0.0548333 & 0.047 & -0.329 & 0.148833 & 0.0783333 \\ 0.00783333 & 0.0235 & 0.0235 & -0.219333 & 0.172333 \\ 0.00783333 & 0.0235 & 0.0235 & 0.0861667 & -0.141 \end{pmatrix}$	$\begin{pmatrix} 0. & 0.11 & 0.51 & 0.22 & 0.15 \\ 0.09 & 0. & 0.28 & 0.39 & 0.25 \\ 0.17 & 0.14 & 0. & 0.45 & 0.24 \\ 0.03 & 0.1 & 0.1 & 0. & 0.76 \\ 0.06 & 0.17 & 0.17 & 0.61 & 0. \end{pmatrix}$

Table 8. Average time spent at each state in an ILM regime country: Example from the UK

Panel 1994-1997

LOW SKILLED	Education	Inactivity	Unempl.	Temp. Contract	Perm. Contract
Education	2.20				
Inactivity		4.91			
Unemployment			2.36		
Temp.Contract				1.62	
Perm.Contract					11.61

MEDIUM SKILLED	Education	Inactivity	Unempl.	Temp. Contract	Perm. Contract
Education	2.24				
Inactivity		3.55			
Unemployment			1.80		
Temp.Contract				1.64	
Perm.Contract					11.61

HIGH SKILLED	Education	Inactivity	Unempl.	Temp. Contract	Perm. Contract
Education	1.85				
Inactivity		3.75			
Unemployment			1.82		
Temp.Contract				1.70	
Perm.Contract					14.18

Panel 1998-2001

LOW SKILLED	Education	Inactivity	Unempl.	Temp. Contract	Perm. Contract
Education	2.03				
Inactivity		5.55			
Unemployment			1.93		
Temp.Contract				1.91	
Perm.Contract					11.61

MEDIUM SKILLED	Education	Inactivity	Unempl.	Temp. Contract	Perm. Contract
Education	2.28				
Inactivity		3.55			
Unemployment			2.06		
Temp.Contract				2.45	
Perm.Contract					8.51

HIGH SKILLED	Education	Inactivity	Unempl.	Temp. Contract	Perm. Contract
Education	1.88				
Inactivity		2.78			
Unemployment			1.68		
Temp.Contract				2.41	
Perm.Contract					14.18

Table 9. Average time spent at each state in an ILM regime country: Example from DE

Panel 1994-1997

LOW SKILLED	Education	Inactivity	Unempl.	Temp. Contract	Perm. Contract
Education	2.16				
Inactivity		4.26			
Unemployment			1.96		
Temp.Contract				2.28	
Perm.Contract					7.09

MEDIUM SKILLED	Education	Inactivity	Unempl.	Temp. Contract	Perm. Contract
Education	2.50				
Inactivity		3.19			
Unemployment			1.96		
Temp.Contract				1.77	
Perm.Contract					9.82

HIGH SKILLED	Education	Inactivity	Unempl.	Temp. Contract	Perm. Contract
Education	1.47				
Inactivity		3.36			
Unemployment			1.58		
Temp.Contract				2.06	
Perm.Contract					14.18

VET	Education	Inactivity	Unempl.	Temp. Contract	Perm. Contract
Education	1.77				
Inactivity		1.28			
Unemployment			1.91		
Temp.Contract				2.84	
Perm.Contract					9.12

Panel 1998-2001

LOW SKILLED	Education	Inactivity	Unempl.	Temp. Contract	Perm. Contract
Education	3.04				
Inactivity		4.73			
Unemployment			2.06		
Temp.Contract				6.72	
Perm.Contract					6.08

MEDIUM SKILLED	Education	Inactivity	Unempl.	Temp. Contract	Perm. Contract
Education	2.90				
Inactivity		2.61			
Unemployment			1.88		
Temp.Contract				2.78	
Perm.Contract					7.98

HIGH SKILLED	Education	Inactivity	Unempl.	Temp. Contract	Perm. Contract
Education	1.85				
Inactivity		1.66			
Unemployment			2.32		
Temp.Contract				3.27	
Perm.Contract					10.64

VET	Education	Inactivity	Unempl.	Temp. Contract	Perm. Contract
Education	1.50				
Inactivity		2.55			
Unemployment			1.62		
Temp.Contract				4.26	
Perm.Contract					12.77

Table 10. Average time spent at each state in a Mediterranean regime country: Example from IT

Panel 1994-1997

LOW SKILLED	Education	Inactivity	Unempl.	Temp. Contract	Perm. Contract
Education	2.45				
Inactivity		4.91			
Unemployment			3.55		
Temp.Contract				2.55	
Perm.Contract					7.51

MEDIUM SKILLED	Education	Inactivity	Unempl.	Temp. Contract	Perm. Contract
Education	2.36				
Inactivity		2.84			
Unemployment			3.36		
Temp.Contract				2.32	
Perm.Contract					8.51

HIGH SKILLED	Education	Inactivity	Unempl.	Temp. Contract	Perm. Contract
Education	2.16				
Inactivity		2.03			
Unemployment			2.66		
Temp.Contract				2.36	
Perm.Contract					8.51

Panel 1998-2001

LOW SKILLED	Education	Inactivity	Unempl.	Temp. Contract	Perm. Contract
Education	4.12				
Inactivity		6.72			
Unemployment			3.45		
Temp.Contract				3.87	
Perm.Contract					7.98

MEDIUM SKILLED	Education	Inactivity	Unempl.	Temp. Contract	Perm. Contract
Education	2.97				
Inactivity		3.45			
Unemployment			3.36		
Temp.Contract				3.55	
Perm.Contract					9.82

HIGH SKILLED	Education	Inactivity	Unempl.	Temp. Contract	Perm. Contract
Education	1.62				
Inactivity		2.24			
Unemployment			3.04		
Temp.Contract				4.56	
Perm.Contract					7.09