Tackling multiple choices: a joint determination of transitions out of education and into the labour market across the European Union

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ABSTRACT

The general aim of this research is to study transitions from education into the labour market among youths under a simultaneous framework. Using a sub-sample of youths from the European Community Household Panel, the empirical strategy has consisted of a *trivariate probit* estimation; initial conditions are controlled for. Results show that expectations about future labour market outcomes do not always contribute to explain youths decisions regarding education, other factors (i.e., current unemployment, family background and institutional factors) being more important. Moreover, there is a strong state dependency in educational choices and the relevant transitions from school into employment and job search are shown to be clearly interdependent

Keywords: school-to-work transitions, simultaneous decisions.
JEL classification codes: I21, J22, J24

NON-TECHNICAL SUMMARY

In this piece of work we intend to contribute to the empirical evidence on the determinants of youth's strategies for human capital accumulation. The novelty of our proposal is two-fold: the joint determination of education and first labour market related decisions and the availability of international and longitudinal information. We work on a sub-sample of young (under 30 in 1994) inactive students in 13 different countries (the EU-15 except Luxembourg and Sweden) drawn from the European Community Household Panel. Its longitudinal nature makes it possible to look at education and labour market transitions when they take place, and the way information is displayed enables simultaneous estimations of the whole set of relevant transitions. We estimate jointly the decisions of leaving education, starting to work and starting job search. Particular concern has been made on controlling for family, regional, business cycle and institutional factors affecting these decisions.

Results point to the fact that expected labour market outcomes do not always contribute to the explanation of the interruption in the demand for education, other factors – household income, state dependency, institutional frameworks- being more important. Country differences are striking and the very different patterns across countries shed some light on how relevant institutional differences are in determining something that is supposed to follow a "universal rule" (i.e., the human capital model). A very significant inter-relation has been found between decisions related to human capital and labour markets, youth being much more prone to leave education if they are to accept a job offer or to initiate job search.

1. INTRODUCTION

Since the industrial crisis in the seventies, labour market opportunities for the young have hardly registered any significant amelioration in the European Union with the remarkable exception of Ireland, which has gone through a particularly successful process. As a response, given the decrease in the opportunity cost of undertaking further education expansion of education systems at all levels, youth have massively extended their time in school. The economic upswing at the end of the nineties hardly changed trends in the demand for education, and the effects of the recent stagnation are yet to be evaluated. Therefore, the expansion of education may have responded initially to poor prospects in the labour markets but decisions regarding education are "long-term commitments" with strong inertia. Generalised increases in the demand for education yield in job queuing processes if the number of vacancies does not increase at the same pace. This will end in education related decisions rigid towards changes in labour market conditions, and dependent on the decision those in the labour force already made in the past.

In this piece of work we intend to contribute to the empirical evidence on the determinants of youth's strategies for human capital accumulation. The novelty of our proposal is two-fold: the joint determination of education and first labour market related decisions and the availability of international and longitudinal information.

Most of the empirical evidence on the school-to-work transition process follows a sequential perspective: researchers usually take the starting point (the decision to leave education) as given or exogenous. This needs accepting the assumption of independency between education and labour supply decisions, which is far from being realistic. For instance, any human capital model would point at educational choices depending on labour market prospects, which should as well influence current labour supply. Moreover, dependency across these decisions would apply regardless the economic model used to explain them, as a result of a simple time constraint: youth will allocate their time among the labour market, education and leisure so that decisions regarding each option necessarily influence the rest.

Despite this well-known feature of the school-to-work transition process (i.e., interdependence across states), the way information about economic activity is displayed, the sequential perspective is the prevalent one since most data sets does not make simultaneous analysis possible. The European

Community Household Panel (hereinafter, ECHP) is not affected by this limitation, though: its longitudinal nature makes it possible to look at education and labour market transitions at "real time" and they are registered in a way that enables simultaneous estimations of the whole set of relevant transitions. Moreover, being an European endeavour, designed for comparative research, it is ideal for observing differences across countries in the European Union.

The theoretical framework combines a basic, two-period human capital model and a simple job search model. Both pay particular attention to how market forces determine individual decisions, and control for family background and individual features, together with a detailed classification of the type of education youths are enrolled in during the observation period. The econometric specification also includes measures of possible crowding-out effects, with highly qualified labour forces pushing new cohorts inside the education system in order not to loose competitiveness or "market share".

As for the empirical strategy, we apply a *trivariate* model for the simultaneous decisions of leaving education, starting to work and starting job search among inactive students in the European Union using a sub-sample of young (under 30 in 1994) students in 13 different countries (the EU-15 except Luxembourg and Sweden) drawn from the ECHP. Particular concern has been made on controlling for family, regional, business cycle and institutional factors affecting these decisions.

Results point to the fact that expected labour market outcomes do not always contribute to the explanation of the interruption in the demand for education, other factors – household income, state dependency, institutional frameworks- being more important. Country differences are striking and the very different patterns across countries shed some light on how relevant institutional differences are in determining something that is supposed to follow a "universal rule" (i.e., the human capital model). A very significant inter-relation has been found between decisions related to human capital and labour markets, youth being much more prone to leave education if they are to accept a job offer or to initiate job search.

The paper goes as follows: next section surveys former empirical evidence on youths education and employment transitions. Afterwards, in Section 3, both the theoretical model is presented, followed by the empirical strategy in Section 4. Section 5 introduces both the data-set and some initial descriptive analysis prior to the results of the econometric estimations displayed in Section 6. Finally, some concluding remarks are gathered in an ending section.

2. FORMER EMPIRICAL EVIDENCE

The demand for education processes and the school-to-work transitions have received much attention from both the Economics of Education and Labour Economics empirical literature. The following survey does not intend to be exhaustive, then, but only leading the reader towards our research questions. For example, as far as demand for education is concerned, Albert *et al.* (2002) study demand for education patterns of Irish, German and Spanish youth, and find a relevant influence of family background characteristics on the kind and amount of human capital the young invest in. As for the effect of wage expectations on educational decisions, we could mention Oosterbeck and Van Ophem (2000) who take into account the two-tier nature of education as consumption good and asset. Several empirical pieces of work have added more relevant variables such as (un)employment expectations (Kodde, 1986), family background (Wulff (1999), Ermisch and Francesconi (2001) and Casquel (2003)), gender (Ianelli (2002) and Smyth (2002)) among many others.

As for the first decisions in the labour market, young people may choose from a whole range of possibilities: for instance, Albert *et al.* (1998), Soro (2001), Denny and Harmon (2000) and Nguyen and Taylor (2003), consider the probabilities of going to employment, unemployment or just remaining inactive and in education. All of them adopt a mutually exclusive alternatives framework, which may be solved through a multinomial *logit* model. The present piece of work enlarges this literature by relaxing the assumption of independence of the different decisions through a *trivariate probit,* which consists of the resolution of a three equations system.

Nevertheless, the adoption of simultaneous approaches for the study of labour supply and educational decisions is far from being new (Blinder-Weiss, 1976; Heckman, 1976). With the availability of longitudinal data-sets, technically sophisticated proposals have been developed, such as Keane and Wolpin (1997), who provide for a simulation of the initial career of a sample of young men across four different states: education, job search, work and leisure. But very often researchers find themselves constrained by cross-sectional databases where they are not able to observe decisions in “real time”. That is the case of Martínez-Granado and Ruiz-Castillo (2002) and Gianelli and Monfardini (2003). The former develop a simultaneous model for the joint decisions of working, studying and leaving the parental household by young people in Spain. Endogeneity of the three decisions (which is entered in the empirical model through an adaptation of the Generalised Method of Moments methodology usually applied to panel data) proves to be important in order to understand the dynamics of household

formation. The latter study the decisions of Italian young adults both related to education versus work and the option to remain in the parental home. They focus on the effect of labour market conditions and family background characteristics together with housing costs. Their empirical strategy is a multinomial *probit* model, which allows us to relax the assumption of independence of irrelevant alternatives that applies in multinomial *logits*. The decision to take study and employment as compatible options has been addressed by Cebrián *et al*. (2000) using a sub-sample of Spanish workers and students from the European Community Household Panel and a very similar technique to the one applied here (they add the control for a possible selection bias in any of the two decisions involved in a *biprobit* model). They find that those who study and work in Spain tend to be full-time workers who take study as a marginal option, whereas the opposite (students who work part-time) is really rare. Our results are consistent with theirs.

3. THEORETICAL FRAMEWORK

Initial steps in the labour market require a combination of education and labour supply decisions and may only be approached through a combination of human capital, labour supply and job search theories (Bradley, 1990 and Bradley *et al*, 1992): the decision of leaving school once compulsory education has been fulfilled is linked to decisions regarding labour supply; the latter depend on non wage income, time and leisure preferences and budget constraints, which are given by both expected wages and employment opportunities in the market. This set of variables, according to human capital theory (Becker, 1964), make up expected returns to education, and individuals will invest in the amount and kind of human capital that maximise the gap between expected (monetary) returns and costs of education. Finally, labour supply may materialise (if success) in employment or in job search before a matching is found. In that case job search theory provides a framework for studying job search decisions and, implicitly, job search durations.

In order to identify the main links between the relevant variables in the model, in the following paragraphs we will try to combine a single utility maximising exercise under a human capital framework in line with Keane and Wolpin (1997) and, especially, Gianelli and Morfardini (2003), with a two thresholds job-search model for the combination of education and other labour market statuses from Parsons (1991):

Young people assume their lifetime expected utility, U_t, derived from the consumption of goods and leisure, C_t and L_t, subject to a number of constraints. Say their individual utility function follows the traditional expression:

$$max\, E \sum_{t=1}^{tend} (1+\delta)^{t-1} [U(C_t, L_t)] \qquad (1)$$

where δ is the rate of time preferences and t_{end} denotes working life expected duration. The maximization problem needs to be solved under four kinds of constraints: first of all, a budget constrain, given by the whole amount of income the youth expects along her working life net of direct and indirect costs linked to the decisions she may take at time *t=1*:

$$\sum_{t=1}^{tend} (1+\delta)^{t-1} [W_t + Y_{ft} + Y_{et} + Y_{ut} - DC_{Et} - DC_{St} - OC_{Et} - OC_{St}] \qquad (2)$$

where W_t means wages expected in the labour market, Y_{ft} refers to family income; Y_{et} refers to non wage income derived from the education system (i.e. grants and subsidised fees), Y_{ut} gathers all types of unemployment benefits, DC_{Et} and DC_{St} are the direct costs of education and job search respectively, fixed and independent from the time devoted to study or to job search in every time unit (*t*). Finally, OC_{Et} + OC_{St} refer to opportunity costs linked to the abovementioned alternatives, which may be expressed as follows:

$$OC_{Et} + OC_{St} = E_t W_t + S_t W_t \qquad (3)$$

where E_t is the portion of every time unit devoted to study and S_t is the portion of every time unit devoted to job search. Both are decision variables in our model. As for the second constraint, earnings are defined by:

$$W_t = w_t K_t H_t + w_t q(AS_t) = w_t (K_t H_t + q(AS_t)) \qquad (4)$$

where w_t is the wage rate prevailing at time *t,* depending on the future aggregate supply and demand. K_t refers to the type (vocational, general programmes, on-the-job training) and amount (say, level) of human capital investment the individual has achieved at *t* (see the accumulation rule at (6)). Note that H_t, the portion of every time unit devoted to work, is our third decision variable. As regards the second part of the addition, *q* is a function measuring the improvement in the quality in job match when an additional unit of time is devoted to job search. In intends to reflect the idea from job matching models (Jovanovic, 1979), that productivity (and hence, wages) depends on both human capital and worker-job match quality. AS_t refers to the accumulated job search at time *t*, (see accumulation rule (6')).

We need to add a time constraint as well, since time may be devoted to study (E_t), job search (S_t), leisure (L_t) [1] or work (H_t):

$$T = H_t + E_t + S_t + L_t \qquad (5)$$

Finally, we may introduce human capital and job search accumulation rules, given that human capital and enquiries in the labour market may be acquired either from education or from working experience. The following array of possibilities are available along time:

$$\begin{aligned} K_t &= K_{t-1} + \lambda F_v(E_t) + (1-\lambda) F_g(E_t) && \text{if } t = 1,\ldots, t^* \\ K_t &= K_{t-1} + \lambda F_v(E_t) + (1-\lambda) F_g(E_t) + G(H_t) && \text{if } t = t^*, \ldots, t^{**} \\ K_t &= K_{t-1} + G(H_t) && \text{if } t = t^{**}, \ldots, t_{end} \end{aligned} \qquad (6)$$

Where t=1 refers to the end of compulsory education and the minimum legal age for work. $\lambda \in (0,1)$ represents the proximity of education programs to occupation-specific training requirements. If $\lambda = 0$, education programmes cover only general knowledge no directly applicable to the labour market, whereas if $\lambda = 1$ training is completely liked to the tasks needed in an occupation, i.e. on-the-job vocational training. As for F_v, F_g and G, they are functions, meaning the amount of human capital derived from the allocation of time between E_t and H_t. $F_{v(g)}$ would express productivity of each unit of time devoted to study (E_t) on vocational (general) programmes, whereas G refers to ability to transform time in work (H_t) into specific human capital.

The distribution of time set in (6) means that, during a certain period (1-t^*), youths will only be interested in accumulating human capital through formal education[2], whereas they might allocate resources on both types of human capital during some time (t^*-t^{**}) or go directly to the labour market until the end of working life (t^{**}, t_{end}). Therefore, for youths who make both transitions at the same time (leaving education and starting to work), $t^* = t^{**}$.

A similar schedule applies to the amount of time spent on job search (AS, *accumulated job search*) at time t:

[1] L_t is directly introduced in the utility function as a "good" as well a C_t, consumption at t. Since T is given, and S_t and H_t are decision variables, L_t might be seen as a "residual", just time devoted to non-productive activities; Nevertheless, since it is meaningful from an economic viewpoint, it may also be seen as a decision variable, being an input for the utility function. For the sake of simplicity we take it just as a residual way of time use.

[2] We will assume that youths may always go on further in the education system: young graduates may always enrol in a Master course or a Ph.D. programme, those in secondary education may have access to higher education, and so on. This

$$AS_t = AS_{t-1} + M(S_t) \qquad if\ t = 1,\ldots, t'$$

$$AS_t = AS_{t-1} + N(S_t) \qquad if\ t = t', \ldots, t'' \qquad (6')$$

$$AS_t = AS_{t-1} + \tilde{N}(S_t) \qquad if\ t = t'', \ldots, t_{end}$$

As for the distribution of time set in (6'), it means that time devoted to job search has different returns or consequences (returns) depending on whether it is combined with employment and/or education. Therefore, "job search expertise"/knowledge of the market is defined by three different functions: *M* when individuals are still in education and not in employment (if any, it is a first-time browsing), *N* when individuals allocate most resources to job search, other activities being marginal, and Ñ, when a job has already been achieved but individuals pursue further or better matches.

For the sake of clarity, we could use the following metaphor: each individual has got "two clocks" running simultaneously, and the combination in the speeds of the three of them will define the periods we are interested in the career or lifecycle. One of the clocks defines the proper time to change the strategy of human capital accumulation (it will mark *t** and *t***), the other one will defines the changes in the accumulation of knowledge about the labour market (and marks *t'* and *t''*). The rules defining the thresholds from *t=1* to *t=t** and *t=t*** or from *t=1* to *t=t'* and *t=t''* are given by a set of the so-called "reservation wages" that keep the individual in the initial state (or interval in the time axis) unless better outcomes are expected compared to the looses in cases of abandoning the current state. For an example of how this set of reservation wages would work, see how Parsons (1991) applies Burdett (1978) to allow for the combination of job search and employment. Our case would be parallel to Parsons' but with an additional state to employment and job search: studies.

The individual will decide when *t=t** or *t=t*** confronting the expected labour market outcomes of the strategy of human accumulation is changed with the welfare or income looses due to the change. The same would apply to the decisions about when the time *t'* or *t''* have arrived. Labour market outcomes are simply the combination of employment probabilities and wage expectations in every moment (in every point in $t=\{1, t^{end}\}$). We assume that the individuals are able to estimate, from the information they gain about the labour market through job search, the probability to reach a job offer at time *t*, which is denoted by p_t, ($0 < p_t < 1$). This offer is a random draw from the cumulative distribution of wages $\Phi(w_t)$, which relevant density function being $\phi(w_t)$. The main parameters of the function $\phi(w_t)$ are known and given (exogenous) to the worker in every point in time. As for p_t, the arrival rate of job

is somewhat simplistic, particularly for youths living in small towns or in rural areas for which direct costs of going on in education may be extremely high due to distance to education institutions.

offers, it depends on aggregate labour market conditions and the institutional features that may enhance the creation of jobs for youth, together with some personal characteristics that may condition job search effort and employability, such as former experience and gender.

The relevant thresholds of welfare/income and costs (therefore, of net welfare/income) are given by Y_f, $Y_{et} - DC_{Et}$ and $Y_{St} - DC_{St}$ as already seen in (2). Direct costs of either education or search are assumed to be functions of personal and institutional characteristics as well. They include variables such as age, level of education already attained and the education attainment of the head of the household, enrolment rates and some indicator of public subsidising of education, among others (see empirical strategy).

As for the last types of costs defining the stopping rules in each initial state (being education or inactivity or job search) are given by the opportunity costs defined at (3) and (4), which are simply the forgone income when some time is devoted to education ($E_t>0$) AND/OR to job search ($S_t>0$).

Summarising, how would we expect youths to behave in the European countries considered? In terms of human capital decisions, youths are expected to lengthen their education if either costs (direct or indirect) decrease, i.e., for higher levels of non-wage income or higher unemployment rates. Youths are expected to drop out of education if the immediate benefits from it increase, for example if employment rates rise. They are assumed to remain in education if mid-term outcomes improve, as a result, for instance, of higher wage or employment prima. On the other hand, should these forces not drive youths in/out of education, the national trends in demand for education should also define minimum levels (such as the median level of education achieved by older cohorts) under which labour market prospects get really poor and youths will tend to remain longer in education in more educated countries. As regards other decisions, we expect youths to start work if living in poorer families, or if there is an economic upswing which increases the immediate benefit to enter the labour market, with apprenticeship systems and active labour market playing a role there. And finally, as regards job search processes, we expect youths living in more difficult and diverse contexts to need more time to browse the market and, therefore, to be more prone to be job seekers during the observation period.

4. ECONOMETRIC STRATEGY

Now we proceed to present the implementation of the model. Youth decide simultaneously whether to stop studying (*t=t**** in the "human capital accumulation" clock), start looking for a job (*t=t'* in the "knowledge of the labour market" clock) or start working (*t=t** or even *t=t''*) and there are factors that influence all of these decisions. We assume that youths undertake the decision that maximise their utility function but we are not able to observe directly the partial utilities derived from each decision (namely, $v^*_{SE,}$ v^*_{SW} and v^*_{JS}, meaning the utility from stopping education, starting work and job search, respectively). Instead, we observe the transitions themselves, so that although $v^*_{SE,}$ v^*_{SW} and v^*_{JS} are not observable, the decisions deriving their value being over 0 are observed. The explanatory factors of all underlying partial utility functions have been discussed in the above paragraphs. We will use information about those (observable) factors to explain the (observed) decisions.

The econometric strategy applied here is a *trivariate probit*[3]. Following Greene (2000), the *multivariate* model applies when several decisions (in our case, three) may be interdependent or may depend on a common set of explanatory variables:

$$
\begin{array}{lll}
v^*_{SE} = X_{SE}\beta_{SE} + u_{SE}, & v^*_{SW} = X_{SW}\beta_{SW} + u_{SW} & v^*_{JS} = X_{JS}\beta_{JS} + u_{JS} \\
v_{SE} = 1 \;\; if \;\; v^*_{SE} > 0 & v_{SW} = 1 \;\; if \;\; v^*_{SW} > 0 & v_{JS} = 1 \;\; if \;\; v^*_{JS} > 0 \\
v_{SE} = 0 \;\; otherwise & v_{SW} = 0 \;\; otherwise & v_{JS} = 0 \;\; otherwise
\end{array}
\qquad (7)
$$

This three-equation model is characterised by correlated disturbances, which (due to identification reasons) follow a normal distribution. That is:

$$E\,[u_{SE}] = E\,[u_{SW}] = E\,[u_{JS}] = 0$$

$$Cov\,[u_{SE}, u_{SW,}\, u_{JS}] = \rho = \{\rho_{SE\text{-}SW}, \rho_{SE\text{-}JS,}\, \rho_{SW\text{-}JS}\}$$

$$Var\,[u_{SE}] = Var\,[u_{SW}] = Var\,[u_{JS}] = 1$$

where ρ is vector of "correlation parameters" denoting the extent to which the error terms covary. Should this be the case, we would need to estimate the three equations jointly, following a

[3] Given that we study transitions from education out of the education system and into the labour market (either in employment or in unemployment), it is straightforward to ask "*why not use a duration model for tackling this?*" Two main econometric problems arise: the first one is that we are estimating three different events taking place. This could be tackled through competing risks models if the independence and exclusivity of applied. The interdependence of durations and hazard functions would complicate extraordinarily the search for a likelihood function to maximise. The second problem is that the ECHP does not provide with the exact date when the current studies started if this happened two years or more before the interview, which is, needless to say, the most common case. We have therefore not only a left truncation problem (which may be easily dealt with) due to the fact that we are working with a stock sample of students, but also a left-censoring problem.

trivariate normal distribution: $\{u_{SE}, u_{SW}, u_{JS}\} \sim \phi_3(0,0,0,1,1,1,\rho)$. The simultaneous estimation of all the relevant decisions means working with joint probabilities. For example, the probability of observing the three decisions taking place at the same time ($\upsilon_{SE} = 1, \upsilon_{SW} = 1, \upsilon_{JS} = 1$) would be:

$$Pr(\upsilon_{SE}=1,\upsilon_{SW}=1,\upsilon_{JS}=1) = \int_{-\infty}^{u_{SE}}\int_{-\infty}^{u_{SW}}\int_{-\infty}^{u_{JS}} \varphi_3(X_{SEi}\beta_{SE}, X_{SWi}\beta_{SW}, X_{JSi}\beta_{JS}, \rho)du_{SE}du_{SW}du_{JS} =$$
$$= \Phi_3(X_{SEi}\beta_{SE}, X_{SWi}\beta_{SW}, X_{JSi}\beta_{JS}, \rho)du_{SE}, du_{SW}, du_{JS} \qquad (8)$$

As in the standard *probit* model, observations contribute some combination of $Pr(\upsilon_k=1)$ for $k \in \{SE,SW,JS\}$, depending on their specific values on those variables. The (log)-likelihood is then just a sum across the eight possible transition probabilities (that is, the eight possible combinations of successes ($\upsilon_k=1$) and failures ($\upsilon_k=0$)) times their associated probabilities (Greene, 2003). These probabilities may be drawn from *(8)* as well. The most relevant coefficients estimated in the model are β_{SE} , β_{SW} , β_{JS} and ρ (ρ_{SESW}, ρ_{SEJS}, ρ_{SWJS}). The latter, if significantly different from 0, will evaluate to which extent each pair of decisions are inter-related.

Most widely used statistical packages cannot, however, resolve the Log-likelihood function directly from expression *(8)*, and, therefore, we have used the GHK (Geweke-Hajivassiliou-Keane) smooth recursive conditioning simulator to approximate these integrals. This simulator was first implemented for STATA by Terracol (2002) and then improved by Cappellari and Jenkins (2003), whose programme allows for an *n*-equations system. The Geweke-Hajivassiliou-Keane (GHK) simulator evaluates the *n* (3, in our case) -dimensional Normal integrals in the likelihood function. For a brief description of the GHK smooth recursive simulator, see Greene (2003: 931-933).

Last but not least, our sample is a pool of subsequent pairs of observations starting in "full-time education", there are many individuals who are interviewed several times during the observation period. Therefore, robust variance estimates have been produced across individual observations (using a *cluster adjustment* as developed by Huber, 1967).

Explanatory variables for the equation of education disruption include those conditioning direct and indirect costs and expected returns to education. The vector X_s is, therefore, conformed by gender, age, level and type of education (vocational specificity of the programme the student is attending); family related variables are education attainment of the head of the household and household equivalent income relative to the average GDP per capita expressed in a common unit and controlling for purchase parity power differences in regions of residence (aggregated at NUTS2 level). We expect these variables to have a negative effect on experiencing any transition since we know from the some

of the empirical evidence quoted in Section 2 that those living with educated and wealthy people (i.e. parents) will tend to lengthen their time in education.

As for the earnings expectations influencing human capital decisions, we have computed the wage youths could achieve if they completed the immediately higher education level[4] and the probability of failure in the labour market (unemployment rate by gender, age and country) if the interviewee decided to leave education in the moment of the survey. Non-wage income is approached through grants and fellowships received during the year prior to the interview. The nation-wide institutional factors affecting demand for education have been summarised by the enrolment rates by age and gender, which may denote either large public and private effort on youths education or some indicator or "peer effect" or pressure to younger cohorts to study more through the proportion of young adults (25-34 year olds) with higher education attainment. Both variables may contribute to explain youth education decisions in two ways: on the one hand, youths will study more if their relatives and friends do, being education a "cheap" option in terms of psychological costs for being "different" to the average. On the other hand, the more the previous cohorts study, the higher the necessary investment to be done if restrictions in the availability of jobs are accepted. Under a strict human capital frame, though, the higher the level of education in one's cohort or the immediately ones, the lower the expected wage as a result of future competition in the labour market (a larger supply of skilled workers will push down wages if the demand for skilled workers does not increase at the same pace). Should returns to education diminish, going on education would be less interesting and more transitions out of education would be observed. On the contrary, should we accept that wages are not so flexible and certain constraints to the demand for labour prevail, we would assume a job-competition approach and (Thurow, 1975) and would expect higher education in elder cohorts to keep youths in education until they reach, at least, the same level as the average already in the labour force. The long-term trend would be a continuously increasing level of education attainment in the population, with more qualified cohorts in the labour force "pushing" younger cohorts not yet in the labour force to reach an upper ladder in the educational system.

Among explanatory variables for the second equation (X_w) we have gathered variables indicating personal features, institutional characteristics and national-wide indicators of the labour markets. Personal features are, again, gender and age, together with the level and kind of education

[4] For those who are enrolled in higher education we have computed the wage gap between those young university graduates who are working in occupations that only require short cycle university degrees (technicians and associate professionals) and those who require long cycle university degrees, such as professionals, legislators, managers, and the like.

attended, non-wage income and former worker experience. As for national labour market or institutional variables, we have included expenditure on active labour market programmes targeted at unemployed youth as a percentage of GDP, strictness in employment protection legislation (OECD definition for regular employment) and temporality rates among youth as a proxy for both the relative ease to hire youths under temporary basis and the elasticity of youth employment to changes in the economic cycle. Finally, we control for the relative openness of the labour market to new entrants through the proportion of youths who work in "professional occupations": if youths had access to high scale jobs, internal labour markets structures should not refrain them on the doorstep of the labour market.

Labour market institutions are not the only ones to affect youth insertion in the labour market; the education system also plays an important role. There are two main types of educational systems in Europe: sequential systems and dual systems. The former (and also the most common, as it prevails in northern countries such as Finland and Sweden, and also in southern countries such as France, Italy and Spain) separate initial training completely from work experience: youth enter the labour market once they have finished formal education. Dual systems are pursued by Germany and other German-speaking countries, such as Austria, together with Northern countries (in our sample only represented by Denmark). It provides specific training in firms as part of the general education of youths, who are trained in particular occupations. Dual systems are well-known for enhancing better labour market attainments amongst school-leavers than sequential ones do (OECD, 1998). We expect very different profiles of school-leaving and labour market participation processes between countries with dual systems and other types of regimes. In order to control for education system features we have added the proportion of youths who undertake any kind of vocational training and apprenticeship in the region of residence. Finally, the GDP at NUTS 2 level (ESA95) expressed in purchase power parities per inhabitant (in logs), is also used as a proxy for average income in the region of residence.

The set of explanatory variables in the decision for initiating job search (X_{JS}) includes variables that try to approach reservation wages, direct and opportunity costs of job search and possible returns to job search. For such purpose, we have computed the yearly expected income from the welfare state (housing allowances and unemployment benefits) if youth went into non-experienced unemployment[5]. Besides, we have computed not only the average wage the individual would get if she entered the

[5] It has been computed from the information available in OECD "Benefits and wages, 2003". Computations include housing allowances and unemployment special subsidies for non-experienced unemployed youths. They are not included here for the sake of brevity but are available from the author upon request.

labour market at the moment of the interview but also the dispersion of available wages[6]. Both variables summarise the distribution of available job offers.

The last relevant coefficients in the models ($\rho_{SE\text{-}SW}$, $\rho_{SE\text{-}JS}$, $\rho_{SW\text{-}JS}$) refer to the correlation between the error terms in the set of equations which, if significant, would reflect that the set of decisions are strongly interrelated and, therefore, must be studied under a simultaneous framework, given that they are determined by a common set of unobserved factors, i.e. ability and preferences. All of them are expected to be significant and positive, with $\rho_{SE\text{-}SW}$ and $\rho_{SE\text{-}JS}$ meaning that youths who leave education tend also to start work or to start job search, whereas a positive $\rho_{SW\text{-}JS}$ could mean that both job seekers and young employed workers share a common features

Finally, when longitudinal matters are tackled one very plausible problem relates with the need for establishing "initial conditions". In order to do so, we have computed the probability for the individual being an inactive student during her first interview through a cross-sectional *logit* model on the basis of retrospective information about former labour market experience, the labour force status at the year before the initial interview, and other features such as gender, age, family income and enrolment rates by country, age and gender, together with country dummies. In a second stage, we have computed Mill's inverse ratio and, using Heckman´s approach (Heckman, 1979), we have added this ratio as an additional variable in the model[7]. Should the corresponding coefficient be significant it would mean that controlling for initial conditions is important when explaining transitions out of education. This new variable will only be used in one of the equations, namely, the decision to stop education equation, which is the "core" of our model.

[6] Should the average value of the reachable wages distribution increase (as a result, for instance, of a higher investment in human capital), while relative dispersion keeps constant, then, *ceteris paribus*, net benefit from searching will be higher and, therefore, individuals will devote more time to job search. If only a higher dispersion of expected wages were observed, this would mean the existence of both higher and lower wage offers but, given that the lowest ones will not be accepted, the net benefit from search will increase and, again, both reservation wages and search duration will reach higher values. But the latter will only happen if youths are not risk averse: risk aversion against wage variability will make youths more prone to start work as soon as they can and stop risky or unlikely rewarding search periods. In our case, given than youths are able to go on in education since they are initially enrolled in formal education system, their reaction is, again, not searching, but remaining instead in education for more time.

[7] This is not the only way to control for initial conditions. It is also possible to add a fourth equation to the system so that we could observe the probability of being inactive and in education in the first wave and then the probability of being out of education, in employment and/or looking for a job in any of the following ones. This would mean dealing with the whole potential sample of inactive students (basically, any youth under 30 in 1994, which is about five times larger than the one we are using) and would cause a really heavy computational burden, since the time necessary to estimate this type of models increases extraordinarily every time either the sample size or the number of equations change (Capellari and Jenkins (2003) give some examples).

5. THE ECHP AND SOME INITIAL DESCRIPTIVE ANALYSIS

The European Community Household Panel has been used here because of its many advantages, the most relevant of which are its longitudinal and comparative nature. Besides, being a household survey, it makes it possible to take into account family characteristics and it covers all kinds of school attendance, from all levels and kinds of programmes, which diversity may be, at least partially, controlled for. Some minor problems have arisen, such as the small sample size for the particular target group (inactive students) in some countries, together with the usual attrition in household panels which may cause an underestimation of all kinds of transitions, particularly the ones into employment in case they coincide with geographical mobility or the formation of a new household. We use the weights provided by *Eurostat* in order to deal with attrition.

The observation window comprises from 1995 to 2001 due to the lack of detailed information in 1994 in the ECHP about the types of programmes young students attended. The sample from Luxembourg has been finally excluded from the analysis due to sample size problems and difficulties to follow individuals along time. The Swedish sample is excluded as well because it was not drawn from a panel but from a cross-sectional survey. Particular attention has been devoted to complete the information in the data-set with labour market and institutional indicators at regional (drawn from REGIO data-set, which is also a product of *Eurostat*) and national level.

As for the most relevant initial descriptive information, Figure 1 shows the distribution of the whole initial sample (youths under 30 in 1994) in all the countries in the ECHP at the first year when the interviewee enters the survey, which is 1994 in most cases (except 1995 for Austria and 1996 for Finland). It may be noticed that the sub-sample of interest, non-working young students were a small part of the overall sample of youth in several countries, particularly in the UK and Germany. On the contrary, it was a very important part of the youth population in Spain, France, Belgium, Finland and, at a lower extent, in Ireland, Greece and Italy. The combination of education and work was quite common in Denmark, the UK, Finland and Sweden, whereas youths in Italy, Greece and Spain were more prone to be in unemployment or even in inactivity than in the rest of the countries. This may be relevant as regards the inference that can be drawn out of samples that of “atypical” individuals in their countries of residence. The distribution of youths is quite similar to the one from the ELFS, with inactivity while in education being an exceptional situation among British, Danish and German youths.

We have also looked at the main transitions (Figure 2) from inactive students and we have noticed that in some countries there is a certain amount of youths who start working before finishing education (namely, Denmark and the Netherlands, followed by Finland and Austria). In most cases, though, youths undertake both transitions at the same time or very close to each other (UK, Germany, Ireland). Transitions out of school but not to employment are particularly relevant in Spain, Italy and Greece.

6. THE RESULTS OF THE MULTIVARIATE ESTIMATIONS

This section aims at summarising the main results of the *trivariate* probits estimated on the transitions out of education and into employment and job search. Two specifications have been tested, the first has been estimated for each country and the second takes a common specification for all countries but it has been estimated for six different levels of education[8]. Before performing both of them, the initial conditions problem has been tackled through a *logit* model on the first observation for each individual on the pool of countries, that is, on the overall sample. Results are shown in Table 1 and they show that women, youngsters, youths who live with their parents and youths in wealthier families are more prone to be in the sample (that is, being inactive and in education during the first time they are interviewed) than the rest. As for country differences, if we rank the coefficients, Dutch youths register the lowest probability to be found as inactive students, followed by the British, Danish, Austrian and Germans. The countries for which the probability to be included in our target group is higher are Finland, France, Belgium, Italy and Spain.

The main results of the estimations for the simultaneous equation systems have been displayed in tables 2 and 3. Table 2 gather results for the estimations for each country, and attention is driven here towards personal and family characteristics, with information on education attainment being quite detailed. Institutional factors which hardly vary along time have been omitted and only those related to the business cycle (which vary across genders and age groups) and regional income are kept in the specification. As for Table 3, the sample has been split among different levels of education, so that six groups have been studied across countries. Given that we want to control for cross-country

[8] The level of education attained during the first interview is a combination of the level and type of the programme, that enables us to specify it in a much more detailed way than usual. Should we use the already achieved level of education, only three levels (ISCED 0-2, ISCED 3 and ISCED 5-7) would have been available.

differences among people who are undertaking a similar or equivalent type of education, we use here the complete set of variables related to institutional factors.

For the sake of clarity in the exposition of results, both Tables 2 and 3 have been split into three parts, one for each relevant decision. Table 2.A shows the profile of people who stop education in t+1 given they were inactive students in t. We find that women tend to prolong more their studies than men do in Germany, France, Greece Denmark, Austria and Finland (and we would expect, from former empirical evidence, a similar result in Spain as well). The variables indicating age (namely, distance from compulsory education age) show positive and significant coefficients in almost every country. Remarkable exceptions are some northern countries (Germany, the Netherlands and Denmark). In these countries it is not age itself what make youths more prone to leave education but the proximity to what we could call "critical ages" (the median leaving age at each level of education and country).

As expected, youths in higher levels of education are more prone to remain there (as shown by the negative sign of the coefficient), showing an "inertia" (state dependency) effect due to length of programmes and sunk costs. This effect is particularly noticeable among those in university and non-university higher education, but not among those in higher vocational training, which programmes are shorter. Again, compared to youngsters attending lower vocational training, state dependence is more marked in upper secondary general programmes (particularly strong in France and Spain). In line with the effect of age, in the northern countries characterised by a dual education system we do not find stronger state dependency among the students in the higher levels.

The already well-known trend of Italian and Irish youths to follow in education when belonging to families with parents more educated than the average may be seen clearly, with children of educated parents being more prone to go on in education than independent youths, whereas the pattern is not that clear in the rest of the countries. In both Spain and Greece the coefficient registers the expected sign but it is not statistically significant.

Family income usually decreases the probability of leaving education, with few exceptions which may respond to the fact that this variable is also included in the initial conditions equation. And the perception of grants (which are compared with the average personal income in the region as a proxy of their purchase power) during the year contributes to maintain youths in education in all the countries except Denmark, Belgium, Spain and Portugal. For the Spanish and Portuguese case this is not surprising, given that grants are not only scarce but also poorly endowed.

As for the probability of starting work (table 2.B), only in Portugal do women seem to be less prone to make this transition than their male counterparts. Again the North-South profile comes out as regards age of students: in the case of Germany, Denmark, Austria and the UK, age does not show

any significant coefficient for explaining the access to jobs, meaning that, amongst students, although the ones more close to the critical ages are more prone to stop education, all register a similar probability to access a job. For the rest of the countries both current age and being in a critical age are good predictors of the probability of starting to work. In Denmark, Finland and The Netherlands there seems to be no state dependency in inactivity among higher education students, whereas it is the opposite in France, Ireland, Italy, Greece and Spain.

The business cycle, which is measured through the employment rate, shows hardly any pushing effect: when significant, coefficients hardly differ from zero. Changes in nation-wide employment rates along time do not seem strong enough to determine behaviour of youths when there is a relevant state dependence (the expected effect would be stronger if our sample were restricted to school-leavers). Previous employment experience hardly ever contributes to increase the probability of entering a job from full-time education. Youths who leave in wealthier regions (this is only noticeable for countries with enough number of NUTS2 divisions) have a higher level of access to jobs.

When we turn to the probability of being found in the following interview as a job seeker (remember, regardless of the employment status) (table 2.C) the following cross-country differences arise: women are more prone to be found looking for a job than men in Spain and Greece. Age and being in a "critical age" increase the transition into job search in most countries. Family income contributes to reduce the probability of looking for a job in most of the countries, whereas living with parents and depending economically on them does not. The lack of significance of this variable may respond to two opposite trends: those who depend on their parents find it less costly both looking for a job and staying full-time in education. The negative and significant coefficient for family income may be both linked with the lengthening of full-time education for those living in wealthier families and the fact that these families may provide with social networks that contribute to direct school-to-work transitions without needing a long time to browse the market. As for the economic incentives to look for a job, neither the evolution of employment rate nor expected wages explain the decision to start search. Nevertheless, these variables, though varying along time and across broad age groups and gender, are national-wide, which means they hardly vary during the observation period.

Last but not least, the coefficients reported for the correlation between the errors, that is, the vector of coefficients ρ, as expected, in most countries all of them are significant and positive, with $\rho_{SE\text{-}SW}$ and $\rho_{SE\text{-}JS}$ meaning that the transitions of interest are usually taken at the same time and condition each other, whereas a positive $\rho_{SW\text{-}JS}$ could mean that both new job seekers and new young employed workers have shared a common pattern of behaviour. In some countries (namely, Denmark, the

Netherlands and Finland), $\rho_{SW\text{-}JS}$ is not significant, though. This should respond to an independent pattern of exits towards both employment and unemployment, with the profiles of youths going through both transitions being quite different. The size of $\rho_{SE\text{-}SW}$ (the correlation between the errors in the stopping education and starting employment equations) ranks from less than 0.75 in Germany and Spain to more than 0.9 in Belgium and Ireland. As for $\rho_{SE\text{-}JS}$ (the correlation related to leaving education and starting job search) is negative for Ireland and quite low (under 0.25) in Denmark, Austria and Finland, and reaches maximum values in the countries more hit by unemployment: Spain and Greece, followed by Italy and France.

The following paragraphs are devoted to differences in behaviour of young inactive students who attain the same education level, but in different countries. We have split the sample into the following levels of education: university, higher education not provided at universities, upper secondary general programmes, upper secondary vocational training, lower secondary general programmes and lower secondary vocational training. Here our focus is not only in personal and family related features, but also on cross-country differences which we may label as "institutional features" and business cycle effects. Results for the six groups of students are displayed in table 3, which is again split into three parts, one for each relevant decision.

The first difference across students refers to the role age plays to explain the decision to leave education (table 3.A). For instance, in upper secondary general programmes, since they are not a "terminal point" in the education ladder but often a stepping stone into higher education, it is not being in a "critical age" but age (measured as distance between current age and the one when compulsory education finishes in each country) which contributes to explaining this decision. Family income retains youth in the initial status, though not in all levels, whereas the amount from grants does contribute always to keep youths in education for a longer time. We have tried to test a possible "peer effect" and an eventual "job competition" dynamics in our sample through the inclusion of enrolment rates for age and gender and the proportion of 25 to 34 year-olds who have higher education attainment. The former, when significant, hardly differs from zero, and the latter only shows the expected "pushing" effect from the elder cohorts amongst youngsters in lower secondary education, but not in upper secondary (where we would expect it to be clear).

The wage premium expected if continuing in education is hardly ever relevant when explaining persistence in education, but the incentive to remain in education coming from unemployment does seem to work in all levels of education (with the natural exception of compulsory levels), with youths remaining more time in all the levels whenever and wherever unemployment rates are higher.

Therefore, the economic variables affecting expected returns to education and opportunity costs are explaining only partially educational decisions. This may be showing how unemployment plays a more important role than expected income when understanding investments on education, and a shelter as well from adverse labour market conditions. During periods of demand constraints accumulating signals for prospective employers becomes more necessary and less costly.

The coefficient related to the initial conditions in all the levels of education (except university and lower vocational training) is negative and significant, which shows a common feature of state dependence across levels and countries.

If we look at the transition into employment (table 3.B), we will notice a higher propensity to starting work among women from university and from upper secondary general programmes than for their male counterparts, with the effect of age not being uniform across levels. Employment rates, as expected, are positively related to transitions into employment and former employment experience is only relevant for students of general or academic programmes, but not for those in vocational training at any level.

The link with the expenditure on active labour market policies for young unemployed does not show a consistent positive sign, which is probably due to the fact that the size of the policy measure may also reflect the size of the problem (i.e., youth unemployment) and, therefore, it is negatively correlated with the target variable (transition into employment).

The strictness in employment protection legislation affects negatively employment for those in higher education and upper secondary general programmes, but does not seem to affect employment prospects for those in vocational training. The same applies to relative wealth in the region, which only affects the former. In the same vein, the ability to hire people under temporary basis, which is measured through temporality rates, seems to contribute only to transitions for highly qualified youths. The relative openness of university graduates to the labour market, measured by the proportion of youths who work in professional occupations, seems to improve only the employment prospects fort this group, and hardly ever affects the rest.

And as regards the probability of being found as a job seeker (table 3.C), women are more prone to be in this situation than men when they were either higher education or upper general secondary students. Job search shows the expected link with age and with family income. In the same vein, it shows a negative reaction to expected income if becoming non-experienced unemployed for those in higher education and upper secondary. As for employment prospects, employment rates are, as expected, enhancing job search, whereas expected wages if education were interrupted do not register a consistent behaviour. Finally, we would expect wage dispersion for a given level of education

to increase the need for browsing the market more intensively, but the observed negative sign among secondary education students may mean that, when facing uncertainty, students in this level tend to remain inactive and pursue higher level courses. Again, the incentives for participating in the labour force come most often from employment prospects, but not from income expectations.

And as for as the correlation between the relevant decisions, the coefficients reported for the correlation between the errors, $\rho = \{\rho_{SE\text{-}SW}, \rho_{SE\text{-}JS}, \rho_{SW\text{-}JS}\}$, as expected, in most types of education all of them are significant and positive. For students of upper and lower secondary vocational programmes $\rho_{SW\text{-}JS}$ is negative but not significant, though. This could show an independent pattern of exits towards both employment and unemployment in this group.

Finally, the results displayed in table 2 have been used to compute the probabilities of each of the transitions of interest during the period of observation. We display the main average effects for each country by gender and distinguishing between those youngsters who are in a "critical age" and those who, according to their age, should be in the middle or beginning of the programme they are attending.

We will first focus on relevant average marginal probabilities for the three transitions of interest in the model: Figure 3 registers the predicted values for all the countries for men and women. Youths remain for longer time in education in Belgium, France, Spain and Italy, and young women register a longer time in education than men in all the countries except in The Netherlands, the UK and Ireland. The probability of starting work is above the one of finishing education in the Netherlands and Denmark, followed by Germany. This means that, in these countries, the probability of combining education and work is higher than in the rest. The combination of education and work has proved to be one of the best strategies to succeed in the labour market across European countries but, unfortunately, it is an option not equally available in all regions or countries. The opposite holds true (the average probability of leaving education is above the one of starting work) in Southern Europe: Italy, Greece and, at a lower extent, Spain, France and Portugal. The differences in the proneness to starting job search are linked to the relevance of transitions towards inactivity (in Greece and Portugal) and unemployment (Spain, France, Italy) after school. Transitions towards employment are more frequently forecasted among men, with the most relevant advantage for men being in Austria, Portugal and Spain. And only in the UK men register a higher predicted probability of being job seekers than women do.

Figure 4 shows the evolution of the above mentioned trend across the distribution of family income in every country. We find a large variety of profiles: transitions into employment do not show a

sharp decline along the distribution[9] except in the Netherlands, Belgium, France and Finland, where they are slightly higher in the second decile of the distribution, from which they go down. The link between transitions and income is much clearer as regards transitions out of education (see the Netherlands, Greece, Finland, France and Belgium) with youths in richer families remaining longer in education. There is also a noticeable link between the probability of being found as a job seeker and household income in Ireland, Italy, Portugal, Austria and Finland. It is very interesting to see how the probabilities to stop education and start work tend to meet for richer families in Italy, Spain, Portugal, Ireland and France whereas it is not the case in Belgium, Denmark and Germany (the distance keeps more or less stable) and the opposite holds true in the Netherlands.

Finally, Figure 5 shows a snapshot of what could be the evolution of predicted transition probabilities along the time. The X axis displays the distance between age at the date of the interview and the age when compulsory education finishes. Again there is a very interesting variety of patterns (reflecting, though only partially, the "relevant ages" in each country). To mention just a few of the most peculiar, it is interesting the trend in the Netherlands, with younger people registering a higher probability of getting a job than of finishing education and in Denmark, with the same pattern, though less accentuated, or the persistence in full-time education in Portugal during the first five years after compulsory education is achieved, with a similar pattern followed in Spain and Italy, though with a lower rate of success in the labour market.

The very varied results, which are more evident when looking at figures across countries, show that idiosyncratic national factors play an important role and market forces do not always have the expected effect. This applies to both the human capital model and labour supply hypotheses, as well as the job search theoretical approach. Crowding-out hypotheses are not always confirmed either, at least if the relevant variables are measured as used here.

7. CONCLUSIONS

In this piece of work we have confirmed that education and labour market transitions are interdependent and must be estimated in a simultaneous framework in order to achieving a more accurate measure of the real impact of labour market indicators, institutions and family conditionings on

[9] We are computing, for the sake of clarity, just marginal probabilities. Should we explore conditional probabilities, we would observe a more pronounced link between transitions to employment and family income when conditioning to having

educational decisions. State dependence has shown to be a major issue when observing school-to-work transitions.

As for the main transition patterns across Europe, evidence has been found of differences between dual and sequential education systems, the former being more characterised by earlier transitions to employment often even before leaving education.

Labour market conditions do not always determine the transition out of education. Employment and wage prospects do not pull students out of education, but unemployment make them remain longer under the shelter of the educational system. Wage prospects hardly ever influence transitions out of education, whereas expected non-monetary income does inhibit them: those youths who either have high expectations or are "cushioned" by their families or the welfare state will be less prone to search.

Our results challenge some of the hypotheses drawn from our initial human capital frame. The demand for education across the European Union has proven to be to a certain extent defined by the availability of the financial resources to "acquire" as much education as possible, and by other factors such as social background and the design of education systems. Therefore, in a context of shortage in demand for qualified youth labour, human capital theory and, particularly, the decision rule defining optimal investment in education is questioned. Competition for available posts will make overinvestment on education pay and youths and their families will disregard direct monetary returns to education, with non-monetary returns to education, such as employment stability and satisfaction issues, acquiring more relevance. In our simple human capital model education is only an investment. Nevertheless, the observed link in most of the countries between family income and the persistence in education is also pointing at education as consumer good as well. Youths may shelter themselves from unemployment if their families can afford their longer stay in inactivity. At the same time, they "buy" a signal for capturing attention from future potential employers, and this purchase needs time.

These assertions should be checked with information about local or detailed regional labour markets. Unfortunately this is not possible with the ECHP, with the level of regional aggregation being extraordinarily high for confidentiality reasons (NUTS 2), so that the explanations of the paragraph above should be tested in other data-sets, when available. Moreover, some authors have found a certain lag between the economic cycle and the reaction of youths (Albert, 2000). The problem to do so here is that we cannot identify the precise moment when students began the programme they are

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abandoned education.

attending during the first interview, which makes it impossible to know to which year lagged information should refer.

The analysis developed here for educational decisions lack some variables related to institutional features: the expected direct cost of education (i.e., fees), the relative difficulties to access the next levels of the education system (entry-exams or some other screening procedure) and indicators on who (and how) takes the decision to proceed to the next levels in the education system. The only way to deal with it as we have done is to estimate the model country by country, but still it could be interesting to find a reliable way of measuring them.

The blurred effect of labour market incentives, particularly those coming from income expectations, point at a profile of demand for education more based on present purchase power than on future expected returns. If this pattern is to be driven towards a more efficient allocation of both students and educational resources, more effort should be expended on policies targeting equal opportunities and access to education.

Finally, the different results across countries and the relative importance of institutions compared to market forces in determining human capital and labour supply imply different strategies in every country. These should promote either employment amongst student and non student youths or increases in demand for education amongst those cohorts with a skill deficit/shortages. Market forces that may explain differences across countries are not valid as predictors of behaviour in each country.

References:

Albert, C., Juárez, J.P., Sánchez, R., Toharia, L. (1998) Las transiciones de los jóvenes de la escuela al mercado de trabajo: un análisis de flujos. IVIE (*Instituto Valenciano de Investigaciones Económicas*) WP-EC 98-24.

Albert, C. (2000) Higher Education Demand in Spain; the Influence of Labour Market Signals and Family Background. Higher Education 40: 147-162.

Albert, C., Davia, M.A., Hernanz, V., Toharia, L. (2002) Choosing between Education, Training and Labour Market Entry. In: Schömann, K., O'Connell, J.P. (eds) Education, Training and Employment Dynamics. Transitional Labour Markets in the European Union. Edward Elgar, Cheltenham, United Kingdom . 41-70.

Becker, G. (1964) Human Capital. National Bureau of Economic Research, New York.

Blinder, A.S., Weiss, Y. (1976) Human Capital and Labor Supply: a Synthesis. The Journal of Political Economy 84 (3): 449-472.

Bradley, S (1990) School Leaver Unemployment: a Proactive Approach. Applied Economics 22 (4). 439-461.

Bradley, S, Taylor, J. (1992) An Empirical Analysis of the Unemployment Duration of School-leavers, *Applied Economics*, 24 (1): 89-101.

Burdett, K. (1978) Employee Search and Quits. American Economic Review, 68 (March): 212-220.

Cappellari, L., Jenkins, S.P. (2003) Multivariate *probit* regression using simulated maximum likelihood. The Stata Journal 3(3): 278-294.

Casquel, E. (2003) The effect of labor market conditions and family background on educational attainment of Spanish youngsters. ISER working paper 2003-1.

Cebrián, I., Moreno, G., Lázaro, N. (2000) ¿Trabajar o Estudiar?: el Caso de los Trabajadores Españoles. IVIE (*Instituto Valenciano de Investigaciones Económicas*) WP-EC 2000-14.

Denny, K., Harmon, C. (2000) The Impact of Education and Training on the Labour Market Experiences of Young Adults, Institute for Fiscal Studies WP 00/08, London, United Kingdom.

Ermisch, J.F., Francesconi, M. (2001) Family matters: impact of family background on educational attainments. Economica 68 (270): 137-156.

Gianelli, G.C., Monfardini, C. (2003) Joint Decisions on Household Membership and Human Capital Accumulation of Youths. The Role of Expected Earnings and Local Markets. Journal of Population Economics, 16 (2):265-286.

Greene, W.H. (2000) Econometric Analysis, Fourth edition, Prentice-Hall International Editions, Upper Saddle River, New Jersey.

Heckman, J.J. (1976) A Life-cycle Model of Earnings, Learning and Consumption. The Journal of Political Economy 84(4) part 2: Essays in Labor Economics in honor of H. Gregg Lewis, S11-S44.

Heckman, J.J. (1979) Selection bias as a specification error. Econometrica 47(1):153-161.

Huber, P.J. (1967) The Behaviour of Maximum Likelihood Estimators under Non-standard Conditions. In: Proceedings of the fifth Berkeley Symposium in Mathematical Statistics and Probability. Berkeley CA: University of California Press.

Ianelli, C. (2002) Parental Education and Young People's Educational and Labour Market Outcomes: a Comparison across Europe, Arbeitspapiere –Mannheimer Zentrum für Europäische Sozialforschung, 45.

Jovanovic, B. (1979) Job Matching and the Theory of Turnover. Journal of Political Economy. 87(5): 972-990.

Keane, M.P., Wolpin, K.I. (1997) The Career Decisions of Young Men. The Journal of Political Economy 105(3): 473-522.

Kodde, D.A. (1986) Uncertainty and the Demand for Education. The Review of Economics and Statistics 68(3):460-467.

Martínez-Granado, M., Ruiz-Castillo, J. (2002) The Decisions of Spanish Youth: a Cross-section Study. Journal of Population Economics 15: 305-330.

Nguyen, A.N., Taylor, J. (2003) Post-high School Choices: New Evidence from a Multinomial *Logit* Model. Journal of Population Economics 16: 287-306.

OECD (1998) Getting started, settling in: the transition from education to the labour market. In: OECD, Employment Outlook 1998.

OECD (2003) Benefits and wages, OECD indicators, 2002 edition.

Oosterbek, H., Van Ophem, H. (2000) Schooling Choices: Preferences, Discount Rates and Rates of Return. Empirical Economics 25 (1):15-34.

Parsons, D. O. (1991) Job Search Behaviour of Employed Youth. The Review of Economics and Statistics 73(4): 597-604.

Smyth, E. (2002) *Gender Differentiation and Early Labour Market Integration across Europe.* MZES working papers, 46. (in http://www.mzes.uni-mannheim.de)

Soro, A. (2001) From School to Work: a Comparison of Labour Market Transitions and Leaving Home Decisions of Young People in Germany, Italy and Spain. Doctoral dissertation. European University Institute. Firenze. Italy.

Terracol, A. (2002) TRIPROBIT: Stata Module to estimate *Trivariate Probit* model using the GHK Simulator. Statistical Software Components no. S424302. Boston College Department of Economics.

Wulff, S. (1999) The Role of Family in Determining Youth Employment. University of Washington, mimeo. Presented at NLSY97 Early Results Conference, Bureau of Labor Statistics en Washington, D.C.

Figure 1: Initial state in first interview (from 1994 to 2000)

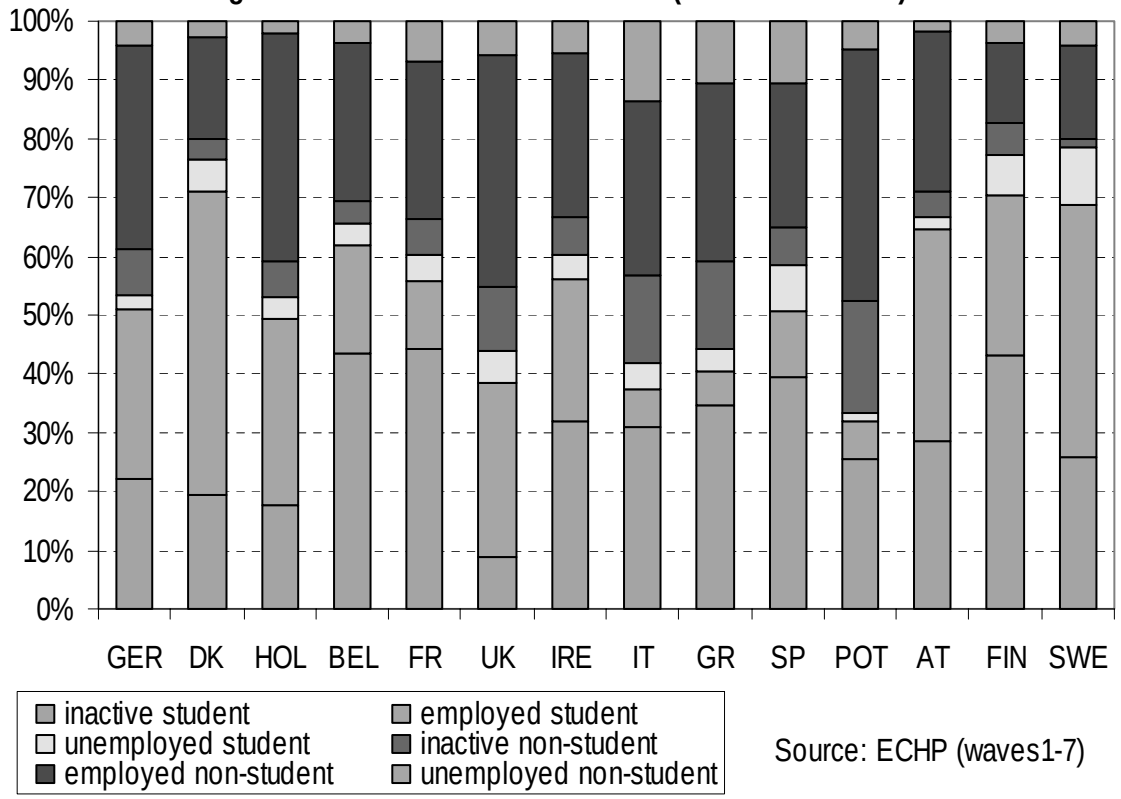


Figure 2: observed year-in-year destinations of inactive students

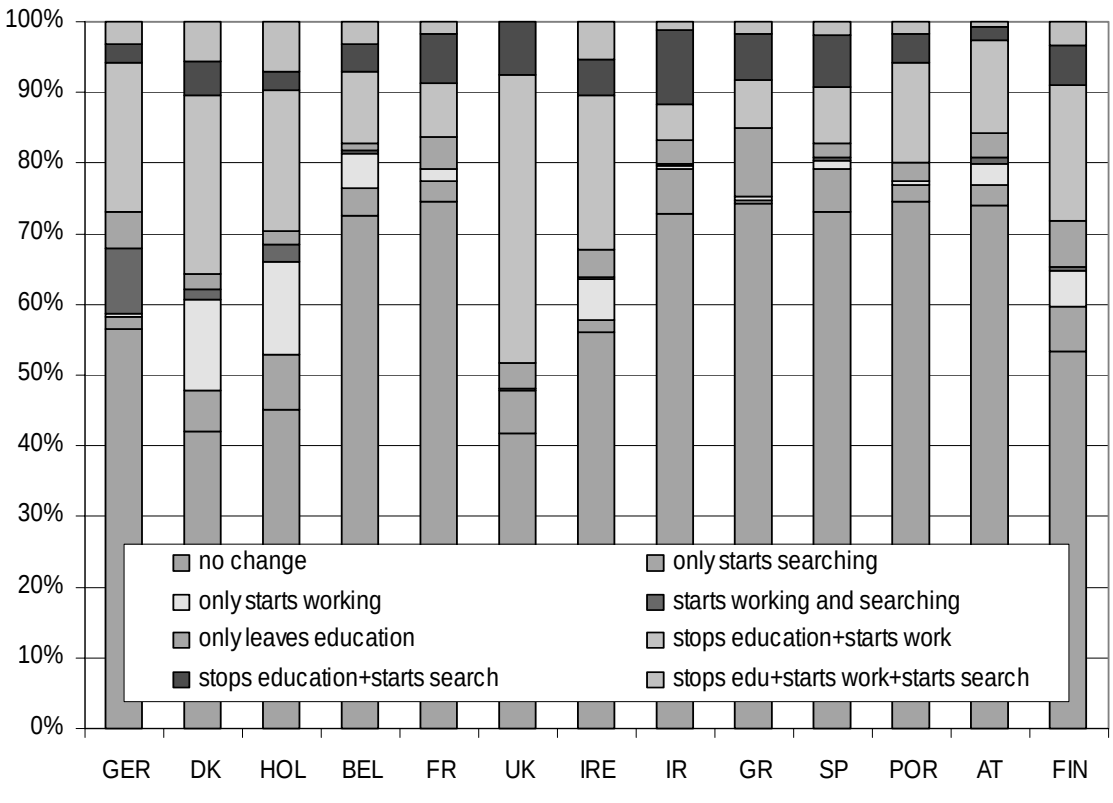


Table 1: Control for initial conditions: being inactive student in the first interview

	Results of pooled estimation			*Descriptive values*	
	B	***student t***	***Sig.***	***mean***	***sd***
Women	0.311	14.253	0.000	0.500	
relation with the head of the HH (ref: child)					
HOH	-0.073	-1.618	0.106	0.210	
spouse of HOH	-1.489	-25.597	0.000	0.192	
other relation	-0.020	-0.421	0.674	0.053	
No former work experience	0.791	27.289	0.000	0.596	
Age	-0.296	-48.846	0.000	20.25	3.2
Family income	0.000	3.483	0.000	22742	17861
Enrolment rates for country, age and gender	0.006	7.987	0.000	37.26	30.97
Country (ref: Spain)					
GER	-0.611	-10.517	0.000	0.090	
DK	-0.994	-13.532	0.000	0.038	
NTL	-1.250	-21.861	0.000	0.068	
BEL	0.372	5.698	0.000	0.039	
FR	0.426	8.968	0.000	0.096	
UK	-1.000	-18.285	0.000	0.076	
IRE	-0.443	-9.037	0.000	0.077	
IT	0.196	3.810	0.000	0.123	
GR	-0.092	-1.873	0.061	0.080	
POR	-0.332	-6.995	0.000	0.128	
AT	-0.707	-11.564	0.000	0.084	
FIN	0.574	9.301	0.000	0.052	
Constant	4.699	30.069	0.000	0.048	
Number of observations:	59410				
-2 Log likelihood	53188				
Cox & Snell R Square	0.343				
Nagelkerke R Square	0.486				

Source: ECHP, waves 2-8 (1995-2001), *Eurostat*.

Table 2: Transitions out of education and into the labour market. Country specific models. A. Transition out of education

	GER	*DK*	*NTL*	*BEL*	*FR*	*UK*	*IRE*	*IT*	*GR*	*ES*	*PT*	*AT*	*FIN*
Women	-0.240***	-0.230**	0.076	-0.146*	-0.220***	0.048	-0.062	-0.123	-0.334**	0.007	-0.075	-0.399***	-0.206***
Current age -compulsory	0.007	0.026	0.037	0.118***	0.206***	0.050**	0.056**	0.107***	0.080***	0.129***	0.105***	0.135***	0.099***
Over the median age of leaving current level	0.395***	0.390***	0.345***	0.626***	-0.031	-0.531***	0.440***	0.350***	0.099	0.147**	0.420***	0.426***	0.353***
University long progr	-1.111***	-1.237***	-0.363*	-0.507*	-1.494***		-1.754***	-0.893***	-1.224***	-1.739***	-0.723**	-1.461***	-0.221
University short progr	-1.123***	-0.973***	-0.324	-1.236***	-1.850***		-1.684***	-1.185***	-1.134***	-1.447***	-0.522*	-0.708*	-0.396**
University programmes						-0.632**							
Higher non University	-0.587**	-0.199		-0.994***	-1.721***		-1.400***	-0.653**	-0.446**	-1.509***	-0.331		
Third level technical	0.233	-0.248		0.712	-1.113***		4.610***	0.522	0.276	-0.620*	0.307		
Non-university higher						-0.862***							0.532
2nd stage Secondary	-0.681***	-0.364	-0.499**	-0.803***	-1.747***	-0.697***	-1.333***	-0.498*	-0.396*	-1.294***	-0.085	-0.280	-0.234**
Upper vocational training (center)	-0.717**	-0.829**		0.166	-0.658	-0.458*	-0.732	-0.095	-0.141	-0.945***	0.449	-1.215**	0.158
Upper vocational training (dual)	-0.122	-0.185			-0.380	-0.387*	-0.139	-0.030	0.006	-0.586			
Lower secondary	-0.156	-0.461	-0.214	-1.135***	-1.213***	-0.385**	-1.099**	0.244	-0.285	-0.580	0.238	0.962*	-0.264
Lower vocational training (center)	-0.211	-0.236	0.043	0.113	-0.574**		-0.803*	0.127	-0.009	-0.728**	0.274	0.508	
Household pc income relative to region	0.064*	0.068	-0.100*	-0.095***	-0.037**	-0.040	-0.011	-0.088***	-0.023	-0.059**	-0.055***	0.007	-0.011
Grants received relative to regional pc income	-1.874***	-0.064	-3.580***	-2.647	-1.298***	-1.262***	-0.698***	-1.696**	-1.988**	-0.253	-0.024	-1.013*	-2.668***
Wage premium expected if studying	0.096	-0.201	0.073	0.075	-0.123	-0.254	0.202	0.271	-0.043	0.141	-0.205**	0.018	-0.066
Unemployment rate	0.006	0.018	-0.049***	-0.001	0.010**	-0.039***	-0.008**	-0.006	0.004	-0.007*	-0.014*	0.005	0.013*
Child of HH: isced 5-7	-0.282**	-0.579***	0.018	0.061	-0.134*	0.075	-0.249**	-0.347***	0.063	-0.115	-0.183*	-0.240	-0.125*
Child of HH: isced 3	-0.182	-0.427**	-0.030	-0.014	0.096	0.112	-0.278**	-0.198**	0.156	-0.111	-0.080	-0.101	-0.150*
Child of HH: isced 0-2	-0.199	-0.284	-0.012	0.096	0.183***	0.131*	0.042	-0.086	0.316***	-0.007	-0.070	0.055	-0.077
Initial conditions	-0.659*	-0.063	-0.784*	-0.183	0.007	-0.403	-0.151	0.631***	-1.497***	-0.312	-0.200	0.184	-0.007
Constant	0.266	0.381	0.301	-0.432	0.021	1.970***	0.998**	-0.957**	0.510	0.168	-0.457	-0.750*	-0.777

Note: * significant at 10%; ** significant at 5%; *** significant at 1%. Reference: men in lower vocational training in some sort of dual system who are not children of the HOH.

Table 2: Transitions out of education and into the labour market, country specific models. B. Transitions into employment

	GER	*DK*	*NTL*	*BEL*	*FR*	*UK*	*IRE*	*IT*	*GR*	*ES*	*PT*	*AT*	*FIN*
Women	-0.096	-0.096	0.089	-0.055	-0.069	0.107	-0.058	-0.012	0.017	-0.057	-0.223***	-0.110	-0.069
Current age - compulsory	0.034	-0.018	-0.001	0.033	0.135***	-0.023	0.002	0.057***	0.065**	0.065***	0.105***	0.075***	0.025
Over the median age of leaving current level	0.033	0.147	0.184	0.386***	-0.034	-0.277**	0.149	0.287***	0.066	0.197**	0.430***	0.494***	0.013
University long progrr	-0.504**	-0.473	-0.171	0.333	-0.865***		-1.285***	-0.771**	-0.815***	-0.571*	-0.762**		0.021
University short progr	-0.454*	-0.285	-0.187	-0.663*	-0.916***		-1.495***	-1.083***	-0.831***	-0.602*	-0.566*	-0.625*	-0.156
University programmes						0.039							
Higher non University	-0.289	-0.046		-0.477	-0.990***		-1.339***	-0.719**	-0.610**	-0.556*	-0.341	-0.069	
Third level technical	0.117	0.014		0.291	-0.904***		-0.564	-0.589	-0.133	0.263	0.076		
Non-university higher						-0.318							-0.002
2nd stage Secondary	-0.295	-0.305	-0.276	-0.483	-1.081***	-0.006	-1.427***	-0.767***	-0.466*	-0.422	-0.371	0.057	-0.100
Upper vocational training (centre)	-0.445	-0.874**	-0.152	-0.511	0.182	-0.000	-0.843*	-0.141	-0.081	-0.060	-0.089	-0.256	0.131
Upper vocational training (dual)	0.222	0.220	-0.040		0.254	0.039	-0.982**	-0.543	-0.653*	0.022			
Lower secondary	0.076	-0.446		-0.712**	-0.696***	0.052	-2.217***	-0.858**	-0.114	-0.175	-0.179	0.711	-0.006
Lower vocational training (centre)	0.015	-0.141		-0.237	-0.259		-1.969***	-0.121	-0.152	-0.104	0.054	0.563	
Employment rate for her age and country	-0.004	0.013	0.008	0.002	0.001	0.007	-0.002	0.005	0.006**	0.006**	-0.001	0.005	0.005
Former working experience	0.221**	0.023	-0.163	-0.252	0.053	0.055	0.068	0.114	0.436***	0.070	0.162	-0.146*	0.171**
PPP pc in region (logs)	-0.060	0.355	0.605**	0.398***	0.246***	0.068	0.076	0.827***	0.191	0.612***	-0.001	0.243	0.206
Constant	0.567	-4.111	-6.671***	-4.663***	-3.236***	-1.054	0.270	-9.259***	-3.096*	-7.261***	-1.163	-3.716**	-2.912**

Note: * significant at 10%; ** significant at 5%; *** significant at 1%. Reference: men in lower vocational training in some sort of dual system who have no former experience in the labour market.

Table 2: Transitions out of education and into the labour market, country specific models. C. Transitions into job search

	GER	*DK*	*NTL*	*BEL*	*FR*	*UK*	*IRE*	*IT*	*GR*	*ES*	*PT*	*AT*	*FIN*
Women	0.052	-0.140	0.076	-0.049	0.077	-0.091	-0.058	0.082	0.328***	0.148**	0.152	0.200	-0.041
Current age - compulsory	0.023	0.058**	0.041	0.090***	0.091***	-0.006	-0.010	0.056***	0.090***	0.062***	0.054	-0.006	0.078***
Over the median age of leaving	-0.000	0.088	0.137	0.436***	-0.012	-0.015	0.192	0.289***	0.001	0.167**	0.482***	0.445***	0.055
University long	-0.077	-0.479	-0.352	0.232	-0.77***		0.305	-0.99***	-0.135	-0.749**	-0.496		-0.354*
University short	-0.278	-0.742	-0.313	-0.061	-1.05***		0.255	-1.08***	0.209	-0.489	-0.170	0.421	-0.283
University s						-0.122							
Higher non University	-0.130	-0.442		0.157	-0.92***		0.265	-0.761**	0.395	-0.690**	0.087	0.177	
Third level technical	0.071	-0.186		0.682	-0.80***		-3.98***	-0.150	0.613*	0.037	-0.080		
Non-university higher						-0.008							-0.296
2nd stage Secondary	0.388*	-0.472	-0.020	0.313	-1.05***	-0.232	0.439	-0.74***	0.425	-0.634**	-0.182	0.615	-0.230*
Upper vocational training (center)	-0.364	0.016		1.495**	-0.621	-0.109	0.716	-0.591*	0.642**	-0.433	0.469	0.557	-0.019
Upper vocational training (dual)	-0.247	-0.760			-0.87***	-0.024	1.633***	-0.007	0.754**	-0.455			
Lower secondary	0.176	-0.779	0.050	0.021	-0.60***	-0.267	0.212	-0.371	0.958***	-0.428	-0.051	1.203	-0.305
Lower vocational training (center)	0.220	-0.243	-0.300	0.248	-0.480*		0.263	-0.266	0.895***	-0.357	0.129	0.489	
non-wage personal income (logs)	-0.008	0.003	-0.007	0.004	0.006	-0.006	0.011	-0.001	-0.012	0.002	-0.023*	0.004	0.012
son/daughter	0.291**	0.245	-0.025	0.272	0.050	0.120	-0.137	0.016	0.084	0.014	-0.077	-0.261	-0.146
HH pc income relative to region	-0.064	-0.084	-0.030	0.013	-0.08***	0.001	-0.11***	-0.11***	-0.09***	-0.08***	-0.17***	-0.079	-0.128**
Employment rate	0.008**	-0.013	0.010*	-0.002	0.003	0.004	0.001	0.001	0.006**	0.005	0.006	0.008	-0.010**
Expected wage if entered employment	0.041	-0.097*	-0.081	-0.004	-0.014	0.009	-0.031	-0.057**	-0.14***	-0.020	-0.14***	-0.138**	-0.145**
Constant	-2.04***	0.822	-0.925	-2.07***	-0.61***	-1.127**	-1.068**	-0.055	-1.76***	-0.792**	-1.24***	-1.493**	0.158

Note: * significant at 10%; ** significant at 5%; *** significant at 1%. Reference: men in lower vocational training in some sort of dual system who do not live with their parents.

Table 2: Transitions out of education and into the labour market, country specific models. (*cont*)

D. relevant information, fit of the model and correlation between errors

	GER	***DK***	***NTL***	***BEL***	***FR***	***UK***	***IRE***	***IT***	***GR***	***ES***	***PT***	***AT***	***FIN***
Observations	2780	894	1243	2439	5768	1507	2657	7317	3655	7650	3973	2044	2557
Log pseudo-likelihood	-2.35E+7	-1.52E+6	-3.73E+6	-2.84E+6	-3.89E+6	-2.34E+7	-2.03E+7	-1.37E+6	-1.90E+7	-2.85E+6	-1.87E+7	-1.63E+6	-1.69E+6
rho21	0.724	0.758	0.828	0.946	0.829	0.763	0.924	0.858	0.775	0.749	0.813	0.899	0.834
pvalue rho21	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
rho31	0.210	0.318	0.178	0.424	0.557	0.664	-0.183	0.599	0.691	0.775	0.576	0.252	0.217
pvalue rho31	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
rho32	0.482	-0.037	0.088	0.203	0.275	0.187	-0.445	0.307	0.272	0.398	0.209	0.173	-0.061
pvalue rho32	0.000	0.6	0.163	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.182
Wald Chi2	253.67	143.31	221.84	437.65	396.41	742.8	205.2	2468	779.66	541.76	979.00	266.83	339.81
DF (wald)	52	52	40	49	49	52	43	52	52	52	52	43	43
prob > chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Source: ECHP, 1995-2001, (*Eurostat*)

Table 3: Transitions out of education and into the labour market, level of education-specific models.

A. Transitions out of education	***TYPE 1***	***TYPE 2***	***TYPE 3***	***TYPE 4***	***TYPE 5***	***TYPE 6***
Women	-0.049	-0.060	0.009	-0.032	0.133	-0.012
Distance between age and compulsory education age	0.056***	0.049***	0.071***	0.049**	0.044*	0.087***
The student has achieved the median age of leaving the level of education attain	0.262***	0.340***	0.021	0.220***	0.080	0.399***
University short programmes	-0.040					
Third level technical				0.793***		
Vocational training second stage (centre)					-0.341***	
Vocational training first stage (centre)						-0.488***
Household pc income relative to average PPP in region	-0.054***	-0.029	-0.092***	-0.047**	-0.116***	-0.059*
Grants received relative to regional pc income	-0.425**	-2.741***	-4.474***	-1.065*	-2.044***	-5.075***
Enrolment rate for her age and country	-0.002*	-0.008***	-0.007***	-0.004***	0.001	-0.002
Proportion of 25 to 34 year-olds with higher education attainment	0.019***	0.000	-0.019***	-0.003	-0.001	-0.001
Wage premium expected if goes on studying	-0.095	0.081	-0.111	-0.176	0.242	-0.614***
Unemployment rate for her age and country	-0.012***	-0.004**	-0.005	-0.005	-0.010**	-0.016***
Control for initial conditions	0.059	-1.235***	-1.443***	-0.379*	-0.666**	-0.154
Constant	-1.198***	0.258	1.741***	-0.209	0.472	1.343***
B. Transitions into employment						
Women	0.195***	0.140***	-0.063	-0.028	0.076	-0.182*
Distance between age and compulsory education age	0.009	-0.112***	-0.074***	0.019	-0.005	-0.050**
The student has achieved the median age of leaving the level of education attain	0.217***	0.300***	-0.122	0.053	0.180	0.290*
University long programmes	0.121**					
Third level technical				0.483***		
Vocational training second stage (centre)					-0.219*	
Vocational training first stage (centre)						-0.208
Employment rate for her age and country	0.016***	0.020***	0.022***	0.015***	0.010***	0.009***
Former working experience	0.115**	0.491***	0.405***	-0.071	-0.015	0.116
ALMP on youth as a % of GDP	0.424**	-0.384	-0.797**	-0.633**	-0.200	0.643
Strictness employment protection legislation	-0.101***	-0.058**	0.087	-0.083**	-0.072	0.071
Temporary rate for her age and country	0.004***	-0.000	-0.003	-0.001	0.002	-0.003
PPP pc in region (logs)	0.508***	0.311***	-0.054	0.142	0.338	0.230
% Of professionals in youth employment	0.029***	0.002	-0.021**	-0.014*	-0.021	0.011
Incidence of apprenticeships in the country	0.018*	-0.021**	0.010	0.004	0.050**	0.013
% Of youths in secondary education attending vocational programmes in the region	0.005***	0.002	0.006**	0.004**	-0.000	0.009***
Constant	-7.600***	-4.656***	-0.804	-2.808**	-3.879*	-3.591**

C. Transitions into job search	***TYPE 1***	***TYPE 2***	***TYPE 3***	***TYPE 4***	***TYPE 5***	***TYPE 6***
Women	0.118***	0.157***	0.014	0.159**	0.112	0.037
Distance between age and compulsory education age	0.034***	0.016	0.018	0.041**	0.026	0.071***
The student has achieved the median age of leaving the level of education attain	0.124**	0.189***	-0.169	0.230***	0.082	0.264
University short programmes	-0.097**					
Third level technical				0.355***		
Vocational training second stage (centre)					-0.034	
Vocational training first stage (centre)						-0.145
Non-wage personal income (logs)	-0.008	-0.018***	0.002	0.001	-0.014	-0.004
Son/daughter of the HOH	0.042	0.254***	0.183	0.141	0.029	0.227
Household pc income relative to average PPP in region	-0.058***	-0.104***	-0.073*	-0.103***	-0.033	-0.068
Employment rate for her age and country	0.004***	0.008***	0.010***	0.004*	-0.003	-0.001
Expected wage if entered employment	0.003	0.058***	-0.059**	0.029	0.051	0.067
Wage dispersion in available jobs	0.030	-0.252***	0.107	-0.099**	-0.361***	0.087
Yearly expected income if non-experienced unemployed /region pc income	-0.338*	-0.451***	-0.669**	-0.909***	-0.705	-0.543
Constant	-1.495***	-1.585***	-1.077***	-1.515***	-0.590*	-1.507***
Observations	16536	14159	3376	5536	1893	2235
Log pseudo-likelihood	-4.65E+7	-3.39E+7	-1.28E+7	-1.27E+7	-6.67E+6	-6.84E+6
Rho21	0.766	0.749	0.889	0.816	0.807	0.788
Pvalue rho21	0.000	0.000	0.000	0.000	0.000	0.000
Rho31	0.519	0.517	0.336	0.488	0.312	0.303
Pvalue rho31	0.000	0.000	0.000	0.000	0.000	0.000
Rho32	0.250	0.381	0.999	0.180	-0.104	-0.019
Pvalue rho32	0.000	0.000	0.000	0.000	0.049	0.724
Wald chi2	1077.41	1412.2	414.79	764.3	203.63	328..58
Df	53	50	50	53	53	53

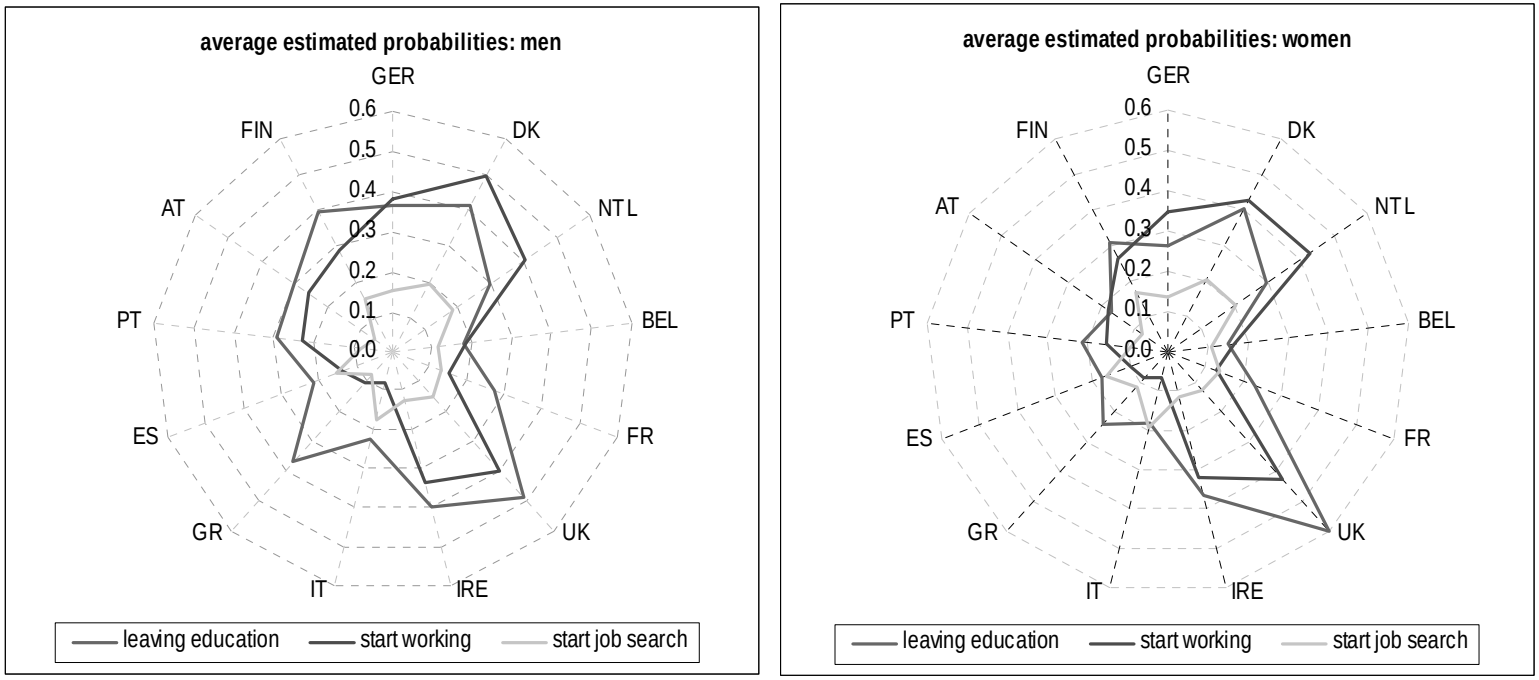
Note: Type 1: University programmes, Type 2: upper secondary general programmes, Type 3: lower secondary general programmes, Type 4: non-university higher education. Type 5: Upper secondary vocational training, Type 6: lower secondary vocational training.

Note: * significant at 10%; ** significant at 5%; *** significant at 1%.

Reference group: Men without working experience, does not live with his parents, undertaking, when in types 4, 5 and 6, the types of programmes more linked to the labour market (i.e. dual programmes).

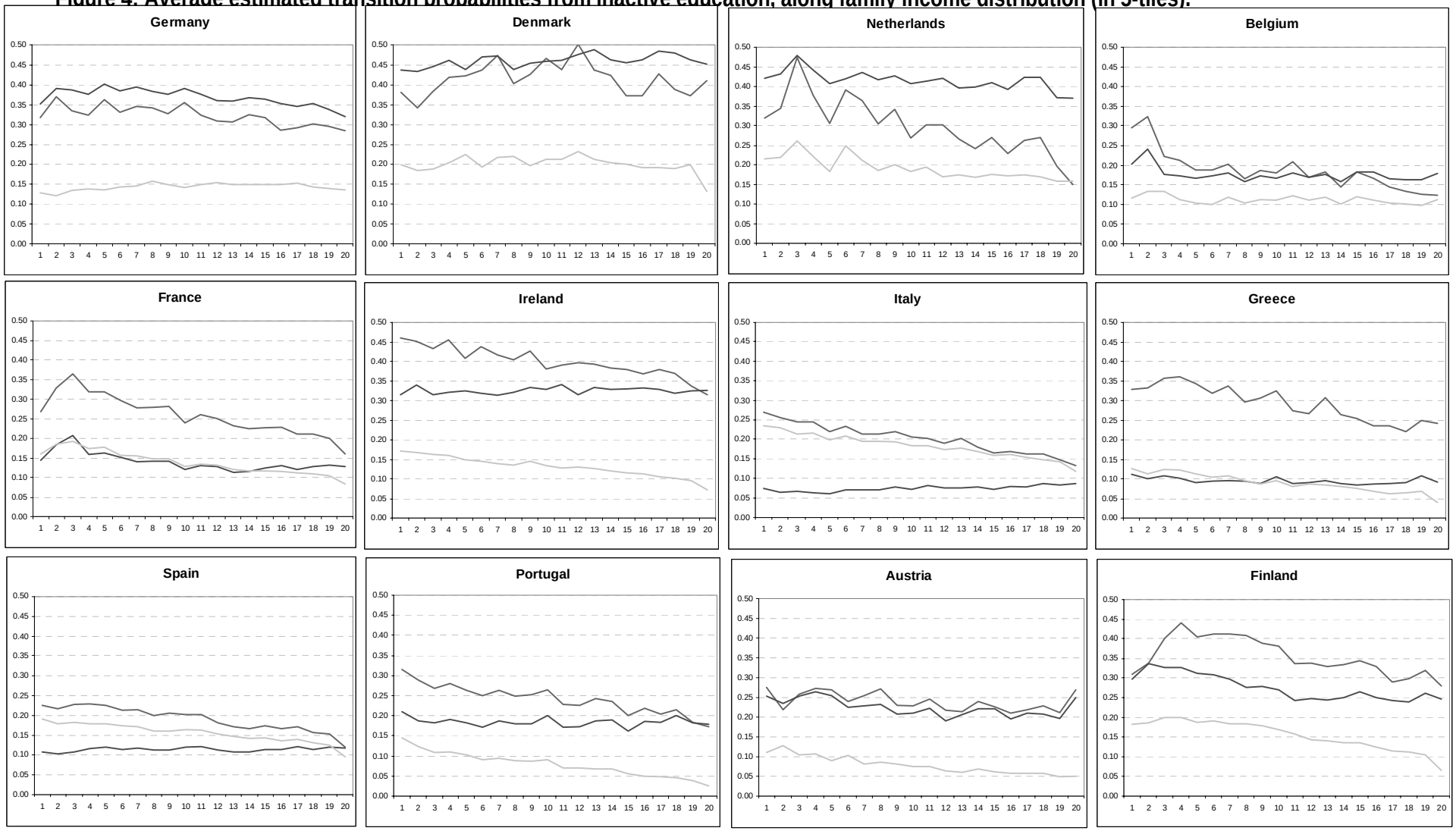
Source: ECHP (1995-2001), waves 2 to 8, *Eurostat*.

Figure 3: average estimated transition probabilities from inactive education, by gender, and ratio of male/female expected transition rates.



Source: ECHP, waves 2-8 (1995-2001), Eurostat.

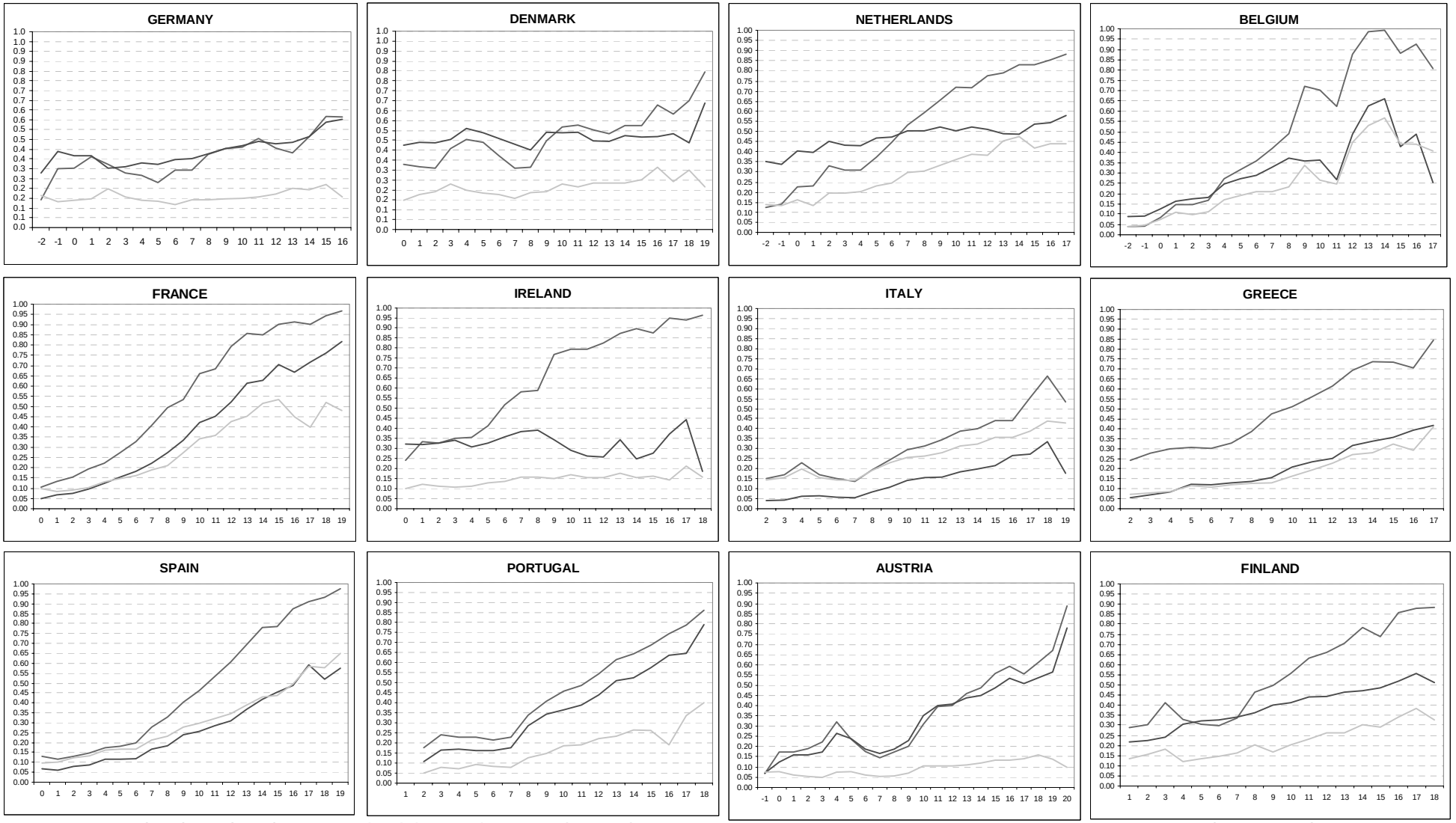
Figure 4: Average estimated transition probabilities from inactive education, along family income distribution (in 5-tiles).



---- leaving education --- starting job search **--- starting work**

Source: ECHP, waves 2-8 (1995-2001), *Eurostat*.

Figure 5: Average estimated transition probabilities from inactive education, along time (from compulsory education age onwards).



---- leaving education --- starting job search --- starting work

Source: ECHP, waves 2-8 (1995-2001), *Eurostat*.

Table A.1. Average values of the main variables used in the country specific models

	GER	*DK*	*NTL*	*BEL*	*FR*	*UK*	*IRE*	*IT*	*GRE*	*ES*	*POR*	*AT*	*FIN*
Leaving education	0.328	0.403	0.308	0.165	0.262	0.557	0.384	0.206	0.319	0.206	0.233	0.237	0.354
Starting work	0.379	0.442	0.419	0.165	0.135	0.405	0.327	0.073	0.097	0.118	0.164	0.203	0.261
Starting job search	0.145	0.199	0.203	0.110	0.136	0.135	0.117	0.182	0.101	0.158	0.073	0.068	0.159
Women	0.493	0.603	0.483	0.499	0.516	0.536	0.495	0.517	0.491	0.521	0.543	0.521	0.523
Age - compulsory education age	2.344	6.457	2.295	1.807	3.919	4.397	3.233	5.815	4.458	3.939	4.897	4.870	3.873
Age ≥ median age of leaving the level of education	0.450	0.560	0.555	0.488	0.502	0.906	0.257	0.400	0.416	0.487	0.565	0.301	0.445
University long programmes	0.194	0.220	0.286	0.013	0.196	0.099	0.053	0.020	0.236	0.296	0.021	0.000	0.194
University short programmes	0.067	0.200	0.090	0.128	0.260	0.027	0.307	0.495	0.046	0.126	0.328	0.366	0.144
Higher non University	0.060	0.089	0.000	0.251	0.208	0.017	0.140	0.040	0.396	0.043	0.077	0.046	0.000
Third level technical	0.011	0.045	0.000	0.007	0.011	0.018	0.002	0.002	0.027	0.036	0.004	0.000	0.017
Second stage Secondary	0.410	0.334	0.202	0.416	0.114	0.411	0.388	0.416	0.161	0.257	0.446	0.556	0.381
Vocational training second stage (centre)	0.012	0.035	0.050	0.002	0.002	0.033	0.020	0.010	0.071	0.105	0.014	0.008	0.066
Vocational training second stage (dual)	0.008	0.012	0.000	0.000	0.007	0.058	0.004	0.007	0.010	0.005	0.000	0.000	0.000
Less than second stage secondary	0.171	0.026	0.076	0.167	0.178	0.295	0.018	0.003	0.016	0.054	0.079	0.005	0.038
Vocational training first stage (dual)	0.039	0.023	0.296	0.007	0.008	0.035	0.061	0.005	0.026	0.073	0.024	0.010	0.160
Vocational training first stage (centre)	0.028	0.015	0.000	0.010	0.014	0.009	0.007	0.003	0.012	0.003	0.007	0.010	0.001
HH pc income relative to regional pc income	1.716	1.093	1.213	1.926	1.653	1.423	2.022	1.616	1.787	1.835	1.804	1.806	1.358
Grants received relative to regional pc income	0.017	0.098	0.036	0.004	0.017	0.049	0.029	0.004	0.002	0.000	0.010	0.016	0.032
Wage premium expected if goes on studying	1.355	1.210	1.088	1.034	1.118	1.197	1.137	1.170	1.163	1.202	1.490	1.373	1.123
Unemployment rate for her age and country	8.14	8.95	10.71	25.31	26.83	13.82	20.53	32.66	33.70	39.32	13.85	6.23	26.99
Is not a child of the HOH	0.149	0.596	0.323	0.109	0.178	0.486	0.034	0.050	0.106	0.097	0.069	0.135	0.491
Child of HOH: higher education	0.304	0.174	0.107	0.370	0.211	0.263	0.176	0.117	0.200	0.225	0.087	0.135	0.202
Child of HOH: upper secondary	0.370	0.166	0.257	0.271	0.271	0.060	0.278	0.351	0.257	0.137	0.078	0.588	0.180
Child of HOH: lower secondary	0.177	0.064	0.313	0.250	0.339	0.190	0.512	0.482	0.436	0.540	0.766	0.143	0.127
Control for initial conditions	0.437	0.272	0.365	0.726	0.704	0.340	0.529	0.582	0.637	0.632	0.575	0.410	0.635
Employment rate for her age and country	46.75	68.45	60.73	26.29	22.58	59.51	34.37	30.32	24.59	29.33	39.11	53.21	33.99
Former working experience	0.227	0.471	0.084	0.016	0.145	0.193	0.264	0.060	0.038	0.086	0.022	0.576	0.539
PPP pc in region (logs)	9.792	9.929	9.890	9.862	9.785	9.748	9.749	9.667	9.389	9.534	9.354	9.905	9.802
Non-wage personal income (logs)	1.480	6.225	3.072	0.428	3.271	4.811	1.232	-0.968	0.717	0.478	-0.651	3.016	4.552
Son/daughter of the HOH	0.858	0.404	0.693	0.965	0.836	0.565	0.981	0.961	0.894	0.912	0.951	0.865	0.514
Expected wage if entered employment	5.821	6.623	6.546	5.924	6.220	6.970	5.685	6.142	4.127	5.492	4.663	6.188	5.236
Number of observations	2780	894	1243	2439	5768	1507	2657	7317	3655	7650	3973	2044	2557

Source: ECHP, waves 2-8 (1995-2001), *Eurostat*.

Table A.B. Average values of the main variables used in the type of education-specific models

	T1	*T2*	*T3*	*T4*	*T5*	*T6*
Dependent variables						
Leaving education	0.210	0.232	0.334	0.305	0.526	0.491
Starting work	0.160	0.164	0.226	0.172	0.305	0.297
Starting job search	0.131	0.126	0.126	0.136	0.240	0.204
Explanatory variables						
Women	0.527	0.521	0.480	0.506	0.517	0.470
Distance between age and compulsory education age	6.148	2.327	1.418	4.615	5.662	3.056
The student has achieved the median age of leaving the level of education attain	0.376	0.430	0.828	0.287	0.873	0.880
Household pc income relative to average PPP in region	1.799	1.690	1.550	1.733	1.544	1.424
Grants received relative to regional pc income	0.024	0.006	0.004	0.015	0.009	0.009
Enrolment rate for her age and country	38.25	69.13	77.89	50.87	44.91	63.07
Proportion of 25 to 34 year-olds with higher education attainment	22.19	21.00	25.50	25.02	26.55	26.04
Wage premium expected if goes on in education	1.220	1.218	1.188	1.155	1.229	1.154
Unemployment rate for her age and country	24.23	26.54	23.36	27.08	28.13	25.70
Control for initial conditions	0.509	0.655	0.667	0.589	0.511	0.564
Employment rate for her age and country	43.93	25.11	23.10	33.67	40.73	35.11
Former working experience	0.181	0.111	0.124	0.132	0.215	0.192
ALMP on youth as a % of GDP	0.170	0.148	0.166	0.148	0.113	0.130
Strictness employment protection legislation	2.978	2.817	2.565	2.969	2.922	2.622
Temporary rate for her age and country	35.58	34.79	40.10	33.42	43.92	42.57
PPP pc in region (logs)	9.667	9.671	9.715	9.620	9.603	9.682
% Of professionals in youth employment	8.610	8.704	9.737	10.23	10.25	10.81
Incidence of apprenticeships in the country	1.771	1.751	1.290	1.500	1.325	1.552
% Of youths in secondary education in vocational programmes in the region	48.76	50.90	53.49	45.11	42.94	49.73
Non-wage personal income (logs)	1.816	0.237	1.327	1.635	1.737	2.050
Son/daughter	0.827	0.939	0.942	0.869	0.791	0.860
Expected wage if entered employment	6.234	5.295	5.483	5.292	6.101	5.064
Wage dispersion in available jobs	1.259	1.098	1.508	1.322	1.258	1.149
Yearly expected income if non-experienced unemployed/region pc income	0.060	0.085	0.101	0.048	0.081	0.126
1995	0.152	0.171	0.188	0.203	0.146	0.152
1996	0.143	0.198	0.179	0.154	0.147	0.211
1997	0.120	0.165	0.192	0.137	0.102	0.162
1998	0.152	0.134	0.117	0.121	0.172	0.138
1999	0.150	0.125	0.113	0.107	0.151	0.113
2000	0.151	0.114	0.114	0.098	0.145	0.091
Observations	16536	14159	3376	5536	1893	2235

Source: ECHP, waves 2-8 (1995-2001), *Eurostat*.

Note: Type 1: University programmes, Type 2: upper secondary general programmes, Type 3: lower secondary general programmes, Type 4: non-university higher education. Type 5: Upper secondary vocational training, Type 6: lower secondary vocational training.