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THE TRANSITION OUT OF EDUCATION AND THE INITIAL STEPS INTO THE LABOUR MARKET IN THE EUROPEAN UNION

by

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The transition out of education
and the initial steps into the labour market
in the European Union

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Abstract:

The general aim of this research is the study of transitions from education and into the labour market among youths under a simultaneous framework in order to control for the interdependency of such relevant events. An extended version of the human capital model has been applied using the European Community Household Panel. The empirical strategy has aimed at reflecting the independent and simultaneous determination of both labour market and education transitions. Results show that the expected labour market outcomes do not significantly contribute to explain demand for education, other factors being more important. Finally, in the school-to-work transition, demand-side and institutional factors turn to be very important, education attainment effects being blurred by the nature of our sample (students in different points of their programmes).

Keywords: Youth labour market, human capital, labour supply, simultaneous decisions.

JEL codes: I21, J13, J22, J24

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1. INTRODUCTION

European youths, particularly in Southern countries, have incessantly extended their demand for education since the industrial crisis in the seventies. Labour market opportunities for youths have not registered any significant amelioration, though. Their outcomes are still quite vulnerable and dependent on the business cycle; Moreover, during the economic downturn in the mid nineties youth unemployment rates went to some of their maximums ever reached. As a response, given the decrease in the opportunity cost of education and the public provision for all levels of education, youth have massively gone through longer and longer education processes. With the economic upswing at the end of the nineties hardly any change in the patterns of demand for education was observed, and the effects of the recent downturn are yet to be evaluated.

Most of the empirical evidence on the school-to-work transition process follows a sequential perspective: very often researchers look at young school-leavers labour transitions taking previous demand for education as given or exogenous. Such methodological approach needs the initial presumption that education and labour supply decisions are independent, although educational choices might depend on labour market prospects, which should as well influence labour supply. These arguments apply regardless the economic model we use to explain both educational decisions, as a result of a simple time constraint: youth will allocate their time on employment, study and leisure and decisions regarding each of them necessarily determine the rest.

Needless to say, this hypothesis of independence is far from being realistic: youths may leave education because they bump into an interesting job offer or because the economic situation of the family requires the youth's financial support. Despite this well-known feature of the school-to-work transition process, since most data sets do not make simultaneous analysis possible, the sequential perspective is the prevalent one. The European Community Household Panel (hereinafter, ECHP) gives us the opportunity to revisit the above-explained question and to contribute to the already very wide empirical evidence on determinants of youth demand for education and school-to-work transition. Its longitudinal nature makes it possible to look exactly at the moment when the education and labour market decisions of interest are being taken and, given the way information on education activities is provided, it

enables the observation and estimation of both transitions under a simultaneous framework. Moreover, its international and comparative design will also enrich prior results on the topic, since it will allow us to observe differences across countries in the European Union.

As for the empirical strategy, we apply a *bivariate* model for the simultaneous decisions of start working and stop studying among non employed students in the European Union using a sample of nonworking young (under 30 in 1994) students in 13 different countries in the EU (EU15 except Luxembourg and Sweden) drawn from the ECHP. Particular concern has been made on controlling for regional, family, business cycle (or demand side) and institutional factors affecting these decisions.

Results point that expected labour market outcomes measured through wage premiums and unemployment rates do not contribute to explain the interruption in the demand for education, other factors – household income, financial help, regional wealth - being more important. Nevertheless, a very significant relation has been found between both types of decisions, youth being much more prone to leave education if they are to accept a job offer.

The paper goes as follows: next section goes briefly through some former empirical evidence on youths education and employment transitions. After that, both the theoretical model (Section 3) and the empirical strategy (Section 4) are presented, and we briefly introduce our data-set and present some relevant descriptive analysis (Section 5) before going into the results of the econometric estimations (Sections 6). Finally, some concluding remarks and the research agenda are gathered in an ending section.

2. FORMER EMPIRICAL EVIDENCE

Demand for education and school-to-work transitions have received much attention from both Economics of Education and Labour Economics empirical literature. To name but a few of the recent ones, 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 youths invest on. 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), Casquel (2003)), gender (Ianelli, 2002 and Smyth, 2002) among many others. Ianelli (2002) and Smyth (2002) use an international data-set, the *ad-hoc* module of the EULFS, and refer to the nineties as well, but the information gathered there is strictly retrospective and they are not able to look at the moment when education was interrupted and access to initial working life started. This marks an outstanding difference with the present paper.

As for the first decisions in the labour market, youths may choose from a whole arrange of possibilities. Although, for the sake of simplicity, we will only divide youths between those who start working and those who do not, job search options are also very often included in theoretical models. Albert *et al.* (1998), Soro (2001), Denny and Harmon (2000) and Nguyen and Taylor (2003), to name a few, consider the possibility of going to employment, unemployment or just keep inactive and in education. All of them adopt a mutually exclusive alternatives framework, which may be solved with a multinomial *logit* model, whereas the assumption of independence of the different decisions has been released here through the use of a *bivariate* estimation and the resolution of a two equations system.

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 career of a sample of young men provided they maximise utility coming from four different states along life course: studying, looking for a job, working or leisure. But very often researchers find themselves constrained by cross-section 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 at parental home. They study the effect of labour market conditions (affecting income and employment expectations) and family background characteristics together with housing costs. Their empirical strategy is a multinomial *probit* model, which allows to release of the hypothesis of independence of irrelevant alternatives that applies in multinomial *logits*. The alternatives are exclusive (i.e. studies and work may not be simultaneous). The decision to

make study and employment compatible options has been addressed by Cebrián et al. (2000) for the Spanish case using the European Community Household Panel and a very similar technique to the one used here (although they add the control for a possible selection bias in any of the two decisions involved in the to the *biprobit* model). They find that, in Spain, those who study and work tend to be full-time workers who take study as a marginal option.

3. THEORETICAL FRAMEWORK

Human capital theory is the most widespread theoretical tool for the study of individual education decisions and takes into account personal and labour market conditions. Nevertheless, 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 and labour supply theories[2] (Bradley, 1990 and Bradley *et al*, 1991): On the one hand, the decision of leaving education over the compulsory levels is very much linked to the labour supply decisions; the latter depend on non wage income, time preferences, leisure preferences and budget constraints, which are given by both expected wages and employment opportunities in the market. On the other hand, according to human capital theory (Becker, 1964), in order to maximise the future flow of labour income individuals will choose the amount and kind of human capital that maximise the gap between expected returns[3] and costs, that is, net benefits. For computing net benefits the youth needs to estimate (monetary) rewards net of expected direct and indirect (opportunity) costs.

In the following paragraphs we will try to combine both transitions of interest in a single utility maximising exercise, in line with Keane and Wolpin (1997) and, especially, Gianelli and Morfardini (2003):

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:

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[2] Being both framed in the neoclassical tradition and using a utility maximization approach, it is quite straightforward to combine them in order to achieve a description of education and labour supply decisions where endogeneity of both dependent variables is considered.

[3] Wages are just part of the returns to education, given that there are many non-monetary returns to education (in terms of health, satisfaction, job quality, status, happiness and the like) but, for simplicity, we will constrain ourselves to monetary rewards on the computation of expected rewards from education.

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

where **d** is the rate of time preferences and t_{end} denotes working life expected duration. Note that (1) is true if utilities are inter-temporally separable. 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 taken:

$$\sum_{t=1}^{tend} (1+\ddot{a})^{-1} [W_t + Y_f + Y_{nw} - DC_t - OC_t] \qquad (2)$$

where W_t means wages expected in the labour market, Y_f refers to family income[4]; Y_{nw} refers to non wage income derived from government social schemes, which cover from grants and subsidies for students to unemployment assistance, DC_t are the direct costs of education, fixed and independent from the time devoted to study in every time unit (t). Finally, OC_t refers to opportunity costs lined to the abovementioned alternatives, which may be expressed as follows:

$$OC_t = S_t W_t \qquad (3)$$

where S_t is the portion of every time unit devoted to study, which is a decision variable: youths decide how much time to allocate to study in every time unit (regardless the unit: months, weeks, even days).

As for the second constraint, earnings are defined by:

$$W_t = w_t K_t H_t \qquad (4)$$

where w_t is the wage rate prevailing at time t, depending on the future aggregate supply and demand for labour with an accumulation of human capital. 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 also a decision variable: it will depend both on demand and supply factors. From the supply viewpoint, the amount of hours offered in the labour market depends on non-labour income and also on hourly wage rate, together with preferences for leisure. From the demand side, it depends on the economic cycle and,

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[4] This will be entered in the empirical model through two different variables, since parents may support youths both through cohabitation and direct monetary transfers

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particularly, on those features in the labour market that may have a stronger impact on new job creation, such as labour market regulation and active labour market policies (hereinafter, ALMPs).

We need to add a time constrain as well, since time may be devoted to study, leisure[5] or work:

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

Finally, we may introduce a human capital accumulation rule, given that human capital may be acquired both from education or from working experience. In our model, youths may even devote their time to both activities at the same time, which means that, if we observed one young student in moment "t" we may observe the following array of human capital accumulation possibilities:

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

where $\mathbf{1} \in (0,1)$ represents the degree of proximity of education programs to occupation-specific training requirements. If $\mathbf{1} = 0$, education programmes cover only general knowledge non directly applicable to the labour market, whereas if $\mathbf{1} = 1$ training is completely liked to the tasks needed in an occupation, i.e. on-the-job vocational training. Youths are not supposed to be able to switch every year from vocational to general programmes. As for F_v, F_g and G, they are functions, meaning the amount of human capital that may be obtained by the youth from the allocation of time between S_t and H_t. $F_{v(g)}$ would express productivity of each unit of time devoted to study (S_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 (t-t^*), youth will only be interested on accumulating human capital as formal education, whereas they might share both ways of investment during some time (t^*-t^{**}) or, directly, go to the labour market until the end of working life (t^{**}, t_{end}). Therefore, for youth who make both transitions at the same time (stop studying and starts working) $t^* = t^{**}$. In our data-set all the individuals in the sample are initially in t, and we will here assume that youths may always study "something

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[5] 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 economic meaningful, it may also be seen as a decision variable, being an input for the utility function.

else" in the education system: young graduates may always enrol in a Master course or a Ph programme, those in secondary education have access to higher education, and the like. This is somewhat simplistic, particularly for youths living in small towns or in rural areas.

The youth is assumed to choose the amount and kind of human capital and the working experience that maximizes her utility. As long as she must think simultaneously about whether to start working (from the future earnings and employment expectations) or go on studying (from the combination of expected wages and costs derived from education), youth find themselves in the need to maximize a combination of several partial or indirect utilities, which are given by $u_{s,\ now}$; $u_{s,w}$; $u_{nos,\ w}$; $u_{nos,\ now}$. Given that our target group will be initially nonworking students (*s,now*), the rest of the alternatives represent the utilities of start working while going on studying (*s,w*), interrupt studies and start working (*nos,w*) or interrupt studies but non start working (*nos,now*) against continuing as non working students (*s,now*).

Therefore, the final utility function the individual needs to maximize should be given by the following problem:

$$Max\ \mathbf{L} = max\ (u_{s,w};\ u_{s,\ now};\ u_{nos,\ w};\ u_{nos,\ now}) \qquad (7)$$

Each indirect utility function depends to a different set of variables which were commented in the paragraphs above and will be listed:

Λ = f(income expectations, non-wage income, labour market conditions, personal characteristics, institutional framework[6])

And, given the abovementioned time constraint (5) and the expression (2) for overall utility, all these partial decisions are interdependent, that is, the decisions of working and studying are taken simultaneously and the combination of them derive in the four possibilities given in (7). The way the utility maximizing problem is tackled calls for a specific empirical strategy, which will presented in the next section.

The hypotheses we would like to test in the case of the decision to stop education, will be the following ones:

- If (un)employment or wage rates (w_t) are not the same for all youths, those variables different from human capital accumulation that derive in different wage rates or

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[6] The theoretical model does not explicitly consider institutional differences, which are taken as given. In our case, though, they acquire a crucial role in explaining international differences given that they may condition most of the variables in the model: from direct cost of education to average wage rate and unemployment expectations, among others.

employment opportunities will condition both returns and opportunity costs of education. One example of such variables is gender: women tend to demand more education despite their lower returns (European Commission, 2002) because of their also smaller opportunity costs compared to their male counterparts.

- Labour market conditions may also change employment (H_t) and wage (w_t) prospects for youth and, therefore, expected returns and opportunity costs of investment on education. For instance, a higher unemployment rate is expected to keep youth in the education system because it decreases the opportunity cost of studying, whereas the wage premium for education will have the same effect, meaning a higher net return to education. The same applies to the composition of the demand for skills and the extent till which youth access to jobs requiring high qualifications.

- Those with an initially higher level of education (K_{t-1}) and those in longer programmes will be the ones less prone to leave education: once youths have achieved a certain level it is less costly in time and direct resources to go on in education.

- Those living with educated people (i.e. parents) will tend to lengthen their time in education. The same applies for those in a country with high enrolment rates, where we could find a sort of "peer effect"[7], or in a country where public expenditure on education is large or has been recently increased, which could act as indicators of growing availability of training places.

- Any kind of non-wage income (such as family income, private transfers, unemployment subsidies or grants) should contribute to keep students at school, since both variables reduce the cost of education and increase, therefore, net rewards for education. The same applies to the wealth in the area where youth lives, since it is

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[7] This may have a two-tier interpretation: 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 those immediately prior, 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, the interest for going on education would diminish as well. The question lies on a very basic assumption: if we accept wages being flexible and reacting to relative supply and demand for skills we could expect higher education attainment in people around to push youths out of the education system, given that it is no longer profitable at shirt or mid-term. On the contrary, should we accept that wages are not so flexible and certain restraints to the demand for labour prevail, we would assume a job-competition approach and (Thurow, 1975) and would expect higher education in people around to keeps youths in education until they reach, at least, the same level as the average. The long-term trend is a continuously increasing level of education attainment in the population.

correlated with employment rates and financial resources from families or the public sector to provide youths with education.

As for the probability to start working, we would like to test the following:

- Human capital investment either provides a good signal for employers or increases productivity of workers. Whatever the argument, the result should be that a higher level of education will enhance access to a job. But given a level of education, those fields of study more linked to the labour market needs (those with l nearer to 1) should provide for a quicker exit to employment.

- Those who live with their parents and those who get any kind of non-wage income will need less time at work (H_t) to maximise their utility functions. For them, study and leisure are cheaper options and, given the time constraint, they will register a higher S_t (or L_t) and lower H_t, which will result in a later entry into the labour market.

- Those who live in a country with institutional mechanisms that enhance the school-to-work transitions (i.e. employment protection, ALMPs, availability to employ under temporary basis, access to high status occupations) will have, everything else the same, a higher probability of being employed in the near future.

4. ECONOMETRIC STRATEGY: *BIVARIATE* PROBITS

The econometric strategy applied here is a *bivariate probit*[8] on the two decisions considered in the theoretical model: stop education or start working. Following Greene (2000), the *bivariate* model applies when two decisions may be interdependent or may depend on a common set of explanatory variables. In our case, youth decide simultaneously whether to stop studying or to start working and there are factors that influence both decisions. We

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[8] Given that we study transitions from education out of the education system and into the labour market, the direct question is "*why not using a duration model for tackling this?*" Two main econometric problems arise: The first one is that we are estimating two durations until two different events do take place. This could be tackled through competing risks models where the independence and exclusivity of ends would apply. The interdependence of durations and hazard functions would complicate extraordinarily the search for a likelihood function to maximise. The second problem is also quite difficult to assess: the ECHP does not provide with the exact date when the current studies started when this happened two years or more before the interview, which is, moreover, the most common case. We have therefore not only a left censoring problem, but also a possible self selection problem: since the survey is performed randomly to individuals in a certain moment of their lives, those who study more time are more prone to be found in education, and those who study more are, as well, more prone to remain in the education system, which would contribute to biased estimators for transitions patterns.

assume that youths undertake the decision that maximise their utility function but we are not able to observe directly the partial utilities expressed in (7). Instead, we observe the transitions themselves, so that although υ_{SE} (the probability of stopping education) and υ_{SW} (the probability of starting work) are not observable, the decisions deriving their value being over 0 are observed:

$$
\begin{aligned}
&\boldsymbol{u}^*_{SE} = X_{SE}\boldsymbol{b}_{SE} + u_{SE}, \qquad && \boldsymbol{u}^*_{SW} = X_{SW}\boldsymbol{b}_{SW} + u_{SW} \\
&\boldsymbol{u}_{SE} = 1 \;\; if \;\; \boldsymbol{u}^*_{SE} > 0 \qquad && \boldsymbol{u}_{SW} = 1 \;\; if \;\; \boldsymbol{u}^*_{SW} > 0 \qquad (8) \\
&\boldsymbol{u}_{SE} = 0 \;\; otherwise \qquad && \boldsymbol{u}_{SW} = 0 \;\; otherwise \\
&\quad (\boldsymbol{u}^*_{SE} > 0 \; if \; \boldsymbol{u}_{s,w} < \boldsymbol{u}_{nos,w} \; and \qquad && \quad (\boldsymbol{u}^*_{SW} > 0 \; if \; \boldsymbol{u}_{s,now} < \boldsymbol{u}_{s,w} \; and \\
&\quad \boldsymbol{u}^*_{SE} > 0 \; if \; \boldsymbol{u}_{s,\,now} < \boldsymbol{u}_{nos,\,now}) \qquad && \quad \boldsymbol{u}^*_{SW} > 0 \; if \; \boldsymbol{u}_{nos,\,now} < \boldsymbol{u}_{nos,\,w})
\end{aligned}
$$

This two-equation model is featured by correlated disturbances each of which follow a normal distribution. That is:

$$
\begin{aligned}
&E\,[u_{SE}] = E\,[u_{SW}] = 0 \\
&Var\,[u_{SE}] = Var\,[u_{SW}] = 1 \\
&Cov\,[u_{SE}, u_{SW}] = \boldsymbol{r}
\end{aligned}
$$

where $\boldsymbol{r}$ is a "correlation parameter" denoting the extent to which the two error terms covary. Should this be the case, we would need to estimate the two equations jointly, following a bivariate normal distribution: $\{u_{SE},\ u_{SW}\} \sim \boldsymbol{f}_2(0,0,1,1,\ \boldsymbol{r})$. As long as we are interested in both decisions simultaneously, we need to define the joint probability, which is as follows:

$$
Pr\,(\tilde{o}_{SE} = 1, \tilde{o}_{SW} = 1) = \int\limits_{-\infty}^{u_{SE}} \int\limits_{-\infty}^{u_{SW}} \ddot{o}_2(X_{SEi}\hat{a}_{SE},\, X_{SWi}\hat{a}_{SW},\, \tilde{n})\, du_{SE}\, du_{SW} = \ddot{O}_2(X_{SEi}\hat{a}_{SE},\, X_{SWi}\hat{a}_{SW},\, \tilde{n}) \qquad (9)
$$

As in the standard *probit* model, observations contribute some combination of $Pr(\boldsymbol{u}_k=1)$ for $k\ \widehat{\boldsymbol{I}}\ \{SE, SW\}$, depending on their specific values on those variables. The (log)-likelihood is then just a sum across the four possible transition probabilities (that is, the four possible combinations of υ_{SE} and υ_{SW}) times their associated probabilities (Greene, 2000). These probabilities may be drawn from (9) as well. The most relevant coefficients estimated in the model are $\hat{a}_{SE}$, $\hat{a}_{SW}$ and $\boldsymbol{r}$. The latter, if significantly different from 0, will evaluate to which extent both decisions are inter-related.

Another interesting information is the one generated in marginal effects (Greene, 2000): we may infer the effect of a covariate on each dependent variable regardless this covariate is initially in the same equation or not, given that both dependent variables are connected through error terms. To complete the amount of information derived from the

results of the models, we may finally obtain conditional probabilities, that is, $E[u_{SE}/u_{SW} = 1, x]$ and $E[u_{SE}/u_{SW} = 1, x]$, also explained in detail in Greene (2000).

Last but not least, given that there are many individuals who are observed several times during the observation period 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 costs of education, those which influence returns to education and some personal characteristics that may have bearing on both at the same time. The vector X_s of personal explanatory variables in the first equation is, therefore, conformed by gender, age, level and type of education; family related variables are education attainment of the head of the household and household equivalent income relative to the average GDP per capita expressed PPP in regions (aggregated at NUTS2 level) of residence. 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[9] and the probability of failure in the labour market (unemployment rate by gender, age and country) if she decided to leave education in the moment of the interview. Non-wage income is approached through grants and fellowships received during the year prior to the survey. The nation-wide institutional and economic factors affecting demand for education are the recent increase on public expenditure on education, the yearly expected income from the welfare state (adding household allowances and unemployment benefits) if youth went into non-experienced unemployment[10] and the enrolment rate for her age and gender. 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.

Among explanatory variables for the second equation (X_w) we have gathered personal features, but also a set of 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 (vocational specificity of the programme the student is attending), whether the youth lives independently from their parents, non-wage income, whether the youth received

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[9] For those who are studying 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.

[10] 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.

any private transfer the year prior to the interview[11], and former worker experience. As for national labour market or institutional variables, we have included four indicators: expenditure on active labour market programmes targeted at unemployed youth as a percentage of GDP, strictness in employment protection legislation (according to the 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 will control for the relative openness of the labour market to new entrants. This can be measured through different indicators, among which we have chosen the proportion of youths who work in "professional occupations": wherever youths access to high scale jobs, this means that both the labour market is creating qualified jobs and the ILM structures do not refrain youths on the doorstep of the labour market.

Finally, controls for country of residence (through a set of dummy variables) and for the year of the interview have been introduced in both equations. The aim is to find those differences that, once all the rest of national, cyclical, regional and individual characteristics are controlled for, still remain across individuals or along the time. For example, dummies for countries may indicate (among other things) different educational systems. 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) separates initial training completely from work experience: youth enter the labour market once they have finished formal education. The dual system is pursued by Germany and other German-speaking countries, such as Austria, together with Denmark. It provides with specific training in firms as part of the general education of youths and training in particular occupations instead of general skills and knowledge is the rule. Dual systems are well-known for enhancing success at labour market outcomes for school-leavers much more than sequential ones (OECD, 1998).

The last relevant coefficient in the models refers to the correlation between the error terms in both equations, which could mean either that both decisions are strongly interrelated and, therefore, must be studied under a simultaneous framework, or that there are factors affecting both decisions that are either unobserved for the researcher or omitted in the specification. In our case, both possibilities are plausible: first, because of time constraints, so

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[11] Unfortunately, as the reader may have already noticed, all income variables in the ECHP refer to the year prior to the interview except those concerning current monthly wage, which are used here only for the computation of wage premiums.

that the more time is devoted to education, the less is available for the labour market; second, because of important unobserved variables such as ability[12] and present consumption preferences, for which there is no information available in the ECHP. Ability does not only contribute to enhance investment on education but also improves employment chances. As for time preferences, those who invest more in education show a higher preference for the future and the opposite holds for those early school leavers or early labour market entrants. This coefficient is expected to be significant and positive, meaning that both transitions of interest are usually taken at the same time and condition each other.

As for the expected sign in the coefficients for the different explanatory variables, some hypotheses have already been drawn from the theoretical model: any feature or circumstance that increases (reduces) the opportunity cost of studying will reduce (increase) the probability of stopping education. Good labour market prospects should enhance transitions towards employment and out of the education system. Variables related to non-wage income contribute to refrain youths from taking any of the decisions of interest.

5. THE ECHP AND SOME INITIAL DESCRIPTIVE ANALYSIS

We have tackled this study with The European Community Household Panel[13] because of several reasons, the most relevant of which could be its longitudinal and comparative nature. Besides, being a household survey, it is possible to control for family characteristics and it covers all kinds of school attendants, 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 (nonworking young students), 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.

Data cover from 1995 to 2000 due to the lack of detailed information in 1994 in the ECHP about the types of programmes young students attended. Data from Sweden and

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[12] In Davia (2003) an *ex-post* measure of ability was introduced in a single equation framework on the decision to stop education. It referred to the relative delay in the achievement of the former education level. It turned out to be not significant in any of the specifications or groups. Should we have had a measure of academic outcomes, i.e. marks achieved at the last exams, we could have constructed a somehow reliable measure of ability.

[13] Eurostat, European Community Household Survey Users' Database (ECHP-UDB), version of July 2003.

Luxembourg have been finally excluded in the multivariate analysis due to both sample size problems and difficulties to follow individuals along time.

Particular attention has been devoted to complete the information in the data-set with labour market and institutional indicators at regional (using REGIO data-set, which is also a product of Eurostat) and national level, together with the estimation of wage premiums to denote expected rewards to education.

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 interview where complete information on education is available (1995) or in the first interview when the youth enters the survey. 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 Luxembourg, the UK and Germany. It was a very important part of the youth population in Spain, France, Belgium, Finland, Sweden and, at a lower extent, in Ireland and Denmark. The combination of education and work was quite common in Denmark, the UK, Finland and Sweden, and youths in Italy, Greece and Spain were more prone to be out of the education system and the labour market at the same time than in the rest of the countries.

(Figure 1 about here)

We have also looked at the main transitions (Figure 2) from non-employed students and we have noticed that in some countries transitions to employment are more intensive than transitions out of education, which means that there is a certain amount of youths who start working before finishing education (Denmark and the Netherlands are good examples, followed by Germany and Austria). In most cases, though, youths undertake both transitions at the same time or very close to each other. On the contrary, in Italy and Greece (followed by Spain, France and Finland) there is a higher proportion of non-employed students who leave education compared to the ones who go to employment, which indicates the relevance of transitions out of education but to non-employment (either unemployment or inactivity) in those countries.

(Figure 2 about here)

Finally, Table 1 shows the main descriptors of the explanatory variables for both equations. It has been split into levels of education and types of programmes, according to the subsequent multivariate analysis. Taking the pool of observations from the second to the sixth

interview, we observe that, for every two subsequent years, observations linked to higher levels of education attainment and general training register lower transition rates to both employment and out of education. Nearly one forth of the whole sample are students in short university programmes and almost one third are in upper general secondary programmes, the rest being unevenly distributed across the rest of educational levels and types of programmes. Students in higher levels of education and in general programmes belong, in average, to wealthier families, estimated wage premiums are higher for those attending lower levels of education and those in general programmes. Those in secondary general education register the highest risks of going into unemployment. The heads of the households where youths in higher education live (usually parents but also partners in the case of those who live independently form their parental families) with more educated than the average.

(Table 1 about here)

As for the distribution of the sample across countries, Italian and Spanish sub-samples are the most represented ones, each one gathering 20% of the total amount of observations, being followed by France (13%). The rest of the country sub-samples not only have smaller initial sample sizes but also register lower incidence of non-employed students.

6. THE RESULTS OF THE MULTIVARIATE ESTIMATIONS

This section aims at summarising the main results of the *bivariate* probits estimated on the transitions out of education and into employment. First, we will report here results for the whole sample and, afterwards, the model has been replicated for those who were enrolled in general programmes against those in vocational training. The latter are linked to a higher short-term access to employment, even before education finishes. Besides, preferences towards more or less specific training may also condition behaviour and decisions of both students and job seekers.

We have also split the sample according to the level of education attended in order to check whether the behaviour of youths changes across levels and kinds of education, provided a different composition of sub-samples. This seems to be quite plausible, since the higher the investment, the higher the possible loss in case it gets interrupted and the profile of those who achieve higher education is necessarily different from those in lower levels, not only because

of age, but also because their income and employment expectations are different, they might come from slightly different family backgrounds, and the some other arguments.

The "overall" specification (Table 2) shows the coefficients for the whole sample. Results may be summarised as follows: as regards the probability of leaving education, women tend to persist more in education than men (confirming, therefore, our expectations), elder students are more prone to leave education when the level attained is controlled for; the higher the level the lower the probability to stop education. Besides, general programmes tend to maintain students more time in education than vocational training tracks do. Family income and the education attainment of the head of the household, as well as fellowships and enrolment rate, are related to longer stays in education.

Unlike much of the previous evidence on the topic, the labour market indicators do not seem to confirm the basic human capital theory hypothesis: expected wage premium if achieving a higher level of education is not significant and unemployment rate, when significant, shows the opposite sign to the expected although the estimated coefficients hardly differ from zero. Moreover, the expected income from government subsidies if the youth went into the labour market and did not succeed in finding a job does not make any difference in this decision[14]. Finally, youth living in wealthier regions tend to persist more in education. Regional per capita income is correlated with employment rates, purchase power of families and financial resources from families and public administrations to subsidise youths education.

Concerning the probability of accessing a job, we find no gender differences in the whole sample once the rest of covariates are controlled for. Elder students tend to transit more into employment and the longer and higher level programmes apparently contribute less to achieve a job than very specific, low level vocational training schemes[15]. Again, general programmes provide a lower exit rate towards employment. Labour market and cycle indicators are particularly relevant here: youth in wealthier regions transit more to employment, employment rates, which may act as a cycle indicator, show the positive elasticity of youth employment to the evolution of the demand for labour in the national economy, and the same applies for temporality rates and active labour market policies

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[14] Nevertheless, there may be a strong composition effect given the heterogeneity of the sample that might blur the results. The coefficients for the different sub-samples show clearer profiles.

[15] Nevertheless, the latter are shorter than the former and we are studying youths who are initially undertaking education regardless how much time they need to finish the programme they are enrolled in. Should we restrict our sample to those who really finish their studies during the period of observation that is, to school-leavers strictly speaking, we should find less poor labour market outcomes for highly qualified youths.

addressed to youth, together with the proportion of youth employed as "professionals", which intends to measure access of youths to highly qualified jobs. The opposite holds true for strictness in employment protection legislation.

As for differences across countries, the estimated coefficients do not always provide for a clear idea of the size of country effects. At the end of this section predicted probabilities and marginal and conditional effects will be plotted and national differences will be properly settled or quantified.

In the overall specification and for all the specified groups the correlation between errors coefficient (*rho*) is very significant and positive, meaning that those who decide to stop education will be more prone to start working as well.

As already mentioned, we have split the sample in those who have attended general and vocational programmes (Table 2). There is hardly any difference across those groups in the decision of going on education: only receiving grants contributes more to keep youths in vocational training than in general programmes. We could say that the direction of effects is the same in all the explanatory variables, and the only differences might appear in the size of the effects. As for the second equation in the model, active labour market policies and strictness in employment protection legislation seem to alter significantly employment chances for only those in general programmes. It seems that, although economic cycle and personal features alter employment decisions of both vocational training and general programmes students, the former are less dependent on institutional frameworks and active measures, being, in general, more prone to enter the labour market than the latter.

When we split the sample in three groups according to the aggregated level of education, we find interesting differences across youths who are involved in different education options. Only the most relevant peculiarities for each group will be mentioned here, whereas those variables that follow the general trend seen in the paragraphs above will not be commented. Interestingly, women do not register a higher persistence in tertiary education, fellowships seem to retain youth in education when they initially attend second cycle at secondary (and not tertiary, as would be expected), wage premium if continuing studies is only relevant for tertiary education students, whereas unemployment rate is only significant in the equation for the least qualified[16]. Regional wealth is not related with the persistence in the

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[16] Unemployment rate for youth in the same age and education attainment achieved might measure not only employment expectations, but also the result of people in that level of education exiting to the labour market and not finding jobs, that is, it may be the result, and not the cause, of the exit from education and, therefore, the

lowest levels of education but household income is more relevant for this level compared to the rest.

When looking at the transition into employment, living with parents and non-wage income affect employment choices to students in secondary education, whereas students in higher education show no reaction to these matters. Former working experience is relevant for all except for the least qualified and expenditure on ALMPs for youth, surprisingly, is only related to the probability of accessing employment from higher education. This is not consistent with the expected, since ALMPs are particularly addressed at long-term unemployed and the underprivileged youth, and should, therefore, affect their employment expectations more that the rest's[17]. On the other hand, strictness in employment protection legislation only affects negatively the chances of accessing a job for the least qualified. Interestingly enough, the relative presence of professionals in youth employment is positively correlated with the likelihood of accessing a job[18] in all the groups. As regards international differences, they will also be assessed when looking at marginal and conditional effects at the end of this section.

As seen in Section 4, *bivariate probits* provide with two interesting additional ways of displaying relevant results: marginal effects and conditional probabilities. Marginal effects allow observing the effect on, say, variable X on Y both directly and through its effect on Z, being Y and Z the relevant decisions under study. We have obtained a battery of predicted values to gain a richer and more complete view of differences across groups that the estimated coefficients in the models do not always clearly reflect.

We will first focus on relevant marginal and conditional probabilities for the two transitions of interest in the model[19]: Figure 3 registers the predicted values for all the countries, with dark-coloured lines for marginal effects and light-coloured ones for conditional probabilities. Since both probabilities (as we saw in the coefficient for the

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positive sign could apply in this coefficient. A different argument could be as follows: unemployment rates measure returns of education; if youths found that education is less profitable, the option to maximise income in the mid-term would be start working as soon as possible, even despite low chances of success.

[17] We think that this measure is correlated with national wealth and financial capacity to promote employment and, in those countries, jobs with high qualification requirements are created, the education attainment of youth is higher in average and qualified youth succeed more in the access to the labour market.

[18] This is a very interesting result: it may indicate that, when qualified youth do not have severe problems to access the labour market in the proper jobs and, therefore, find proper matches in the labour market, they do not interfere in the rest of the youth labour market and do not cause a crowding-out effect on their least qualified counterparts.

[19] Results for the Netherlands are quite inconsistent with both the descriptive analysis and the expected what we know about the institutional framework. We think that the re-arrangements in the ECHP as regards classification of educational attainment might blur our results, which become less reliable.

correlation between errors) are positively interrelated, conditional probabilities are always higher than marginal (unconditional) effects. The countries where youths will remain for longer time in education are Belgium, Spain and Italy, and the transition out of education but not into employment (i.e. youth unemployment or economic inactivity) is more frequent in Italy and Greece than in the rest of the countries. We can derive this from the fact that marginal average probability to leave education is higher than marginal probability to start work. Should we estimate predicted probabilities for the four combinations of transitions we could see clearly this effect[20]: they are the countries where youths persist more in non employment-education. On the contrary, the probability of start working is higher than the one for finishing education in Germany, Denmark and the UK, followed by Ireland, Austria and Finland. This means that, in these countries, the probability of combining education and work is higher than in the rest.

(Figure 3 about here)

Finally, the higher distance between marginal and conditional probability of starting work, which refers to the increase in the probability of starting work among those who finish education, is highest for Austria, Denmark, Finland and Germany, followed by Ireland and the UK. This is an indicator of direct and successful school-to-work transitions, being the poorest outcomes again in Italy and Greece, followed by France and Spain.

The estimation and plotting of marginal and conditional probabilities derived from the multivariate models has brought to the light the strong relation between wealth in the region of residence and the probability to start work but non stopping. The combination of studies and work has proved to be one of the best strategies to success in the labour market across European countries (Davia, 2003) but, unfortunately, it is an option only available to rich regions or countries, as we may see in Figure 3. This is not a very good news in terms of strategies to better insert youths in the labour market, since it gives us the idea that "good transitions" leading to successful careers are quite dependant on demand conditions.

In Figure 4 it can be seen that youths living in the poorest families are the ones more prone to stop education but not necessarily to start work, and after a certain level of income (after the 25th percentile in the overall distribution of income) the trend is clearly decreasing: the wealthier the family, the lower the probability to stop education, and these trends are even

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[20] The predicted probabilities for the whole array of combination of transitions (none, exiting education but not starting work, starting work but not exiting education and both movements) are not shown for brevity but they are available from the author upon request.

stronger when we condition the probability to stop education to the one of starting work, so that these results could confirm the ones mentioned in Figure 3.

(Figure 4 about here)

As for the probability to start working, initially, the marginal probability of start working does not register any relation with family income, but when it is conditioned to the human capital decision some interesting nuances appear: those youths leaving in very poor families who stop education have a strong propensity to start work, then this trend decreases until the 40th percentile in the distribution of income and it goes up again, so that from a certain level of income, the wealthier the family, the higher the probability to start working conditioned to having stopped education[21].

7. CONCLUSIONS AND FUTURE AGENDA

In this piece of work we have confirmed that education and labour market transitions must be estimated in a simultaneous framework, given that they are not only determined by a common set of variables but also interdependent. 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. The combination of study and work, which provides with higher wage dynamics, stability in employment and occupational upward mobility, among other good labour market outcomes, has turned to be quite dependent on the level of income in both the region of residence and the family, and very unevenly distributed across countries with different institutional arrangements: the duality between countries with sequential education systems and those with dual schemes arise clearly in terms of school-to-work transitions.

As for the first transition studied here, the end of investments on education, the more qualified youths are the more persistent in the achievement of the next education level and vocational training programmes do provide for a quicker transition to employment in all levels of education and countries. Besides, labour market conditions do not seem to determine the transition out of education. This result challenges some of the hypotheses drawn from our

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[21] Should the graph be plotted using family equivalent (according to the OECD scale) income relative to average regional income *per capita*, the trends would not vary but slopes would be less pronounced. The graph is not shown for the sake of brevity but it is available from the author upon request.

human capital frame: although hypotheses around family income, level and type of education are confirmed, the ones on income and employment expectations are not. How could we interpret these puzzling results?

Even in times of economic growth the demand for youth labour has not been enough to provide jobs for most school-leavers, particularly in those occupations that require higher education degrees. This has pushed young graduates towards less demanding (and less rewarding) jobs and has ended in a crowding-out or expelling of the least qualified youths from the labour market. Should this define the real dynamics in youth labour markets, youths would go on in education for longer and longer and acquire qualifications above the level required to access the available jobs in the market in order to achieve any of them. Their demand for education would no more follow a strict human capital model, and would not adjust itself to signals from the labour market. The demand for education will probably be defined by the availability of the financial resources to "acquire" as much education as possible, and by other factors such as social (or cultural) background, proximity to educational institutions 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 benefits and the consumption nature of education acquiring more relevance. Both aspects are quite difficult to measure.

Nevertheless, before confirming the assertions in the paragraph above, two other possibilities should be explored in the near future: our labour market indicators refer to nation-wide labour markets, whereas youths do not usually look at such large market. Prior pieces of evidence finding a strong connection between labour market prospects and educational decisions gathered information on local labour markets. Unfortunately the ECHP has no information on local labour markets but maybe at least large regional units might provide with some more precise information. Moreover, some authors have found a certain lag between the economic cycle and the reaction of youths (Albert, 2000), so that lagged variables should be also tested.

The analysis developed here for educational decisions lack three very important 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 way of limiting access to any level of education) and some indicator on who (and how) takes the decision to proceed to the next levels in the education system. The latter would refer to the fact that, in some countries, teachers, and not parents, are the ones who take the decision to lead youths to each education track according to their academic performance and, sometimes, family background.
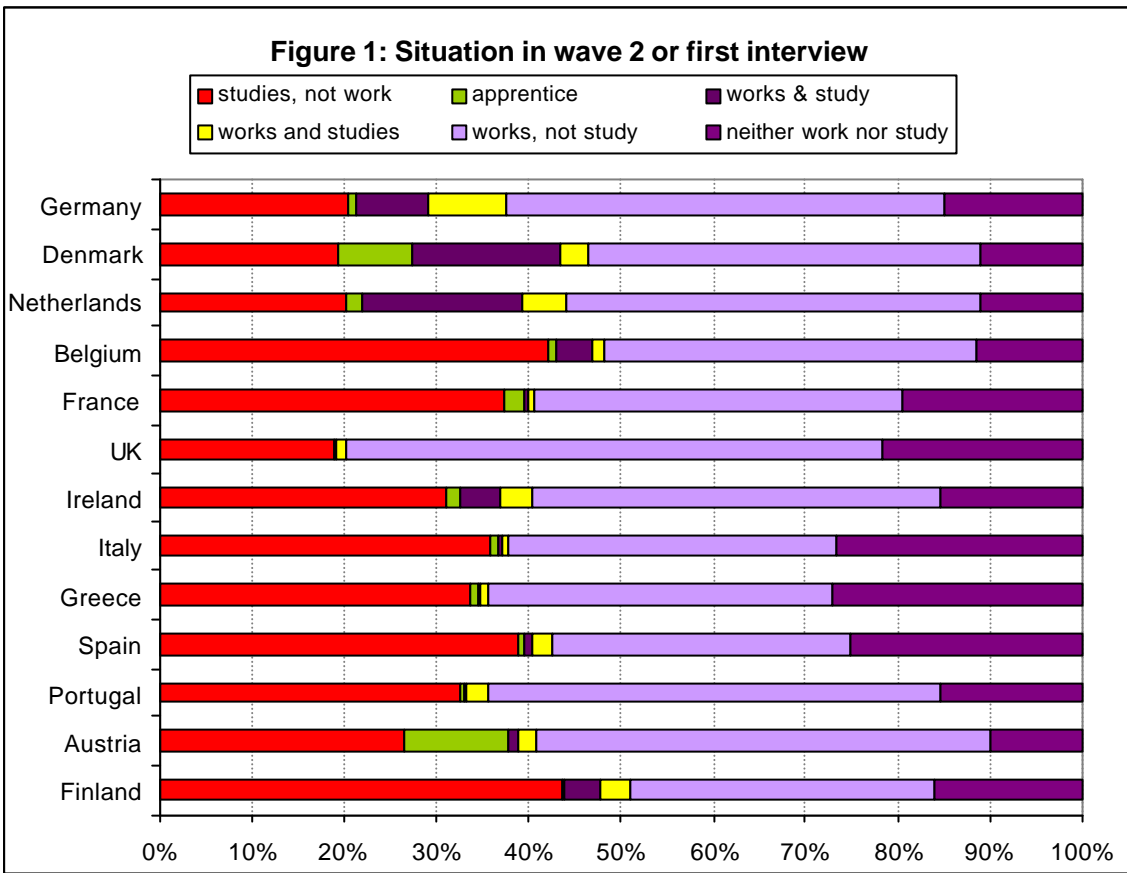
As regards the observed transitions towards employment, given that our target group are students, most of which with a strong *inertia* to remain in education, we have hardly observed the expected link between level of education attained and labour market outcomes, but the rest of the variables enhancing access to jobs (institutions and demand-side features) are confirmed.

As for the future agenda, apart from the points already mentioned, the array of transitions considered in this paper can be completed with a more realistic option: labour supply decisions may not only be observed through transitions into employment, but also into unemployment. Therefore in the near future the analysis will be developed for the combination of three, instead of two, relevant transitions: starting work, starting looking for a job and leaving education. It would be very interesting to explore the possibility of going beyond the stationary analysis developed here without sacrificing the main advantage of the empirical strategy used in this paper (interdependence of decisions). Finally, we are also quite concerned about the need to take "unobserved heterogeneity" into account and to properly study the effect of differences across educational institutions as well as going beyond the stationary analysis. All of the above-mentioned possibilities imply restrictions but, at the same time, will be interesting fields to explore.
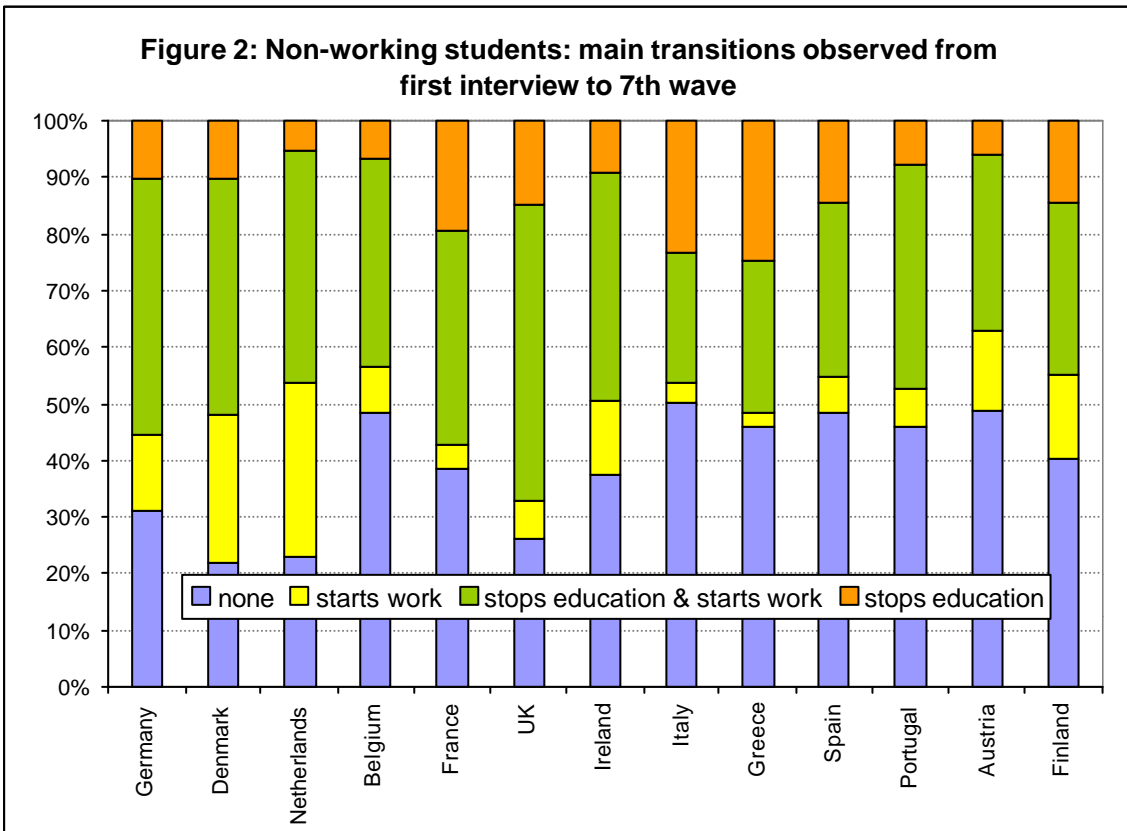
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Figure 1: Situation in wave 2 or first interview

Source: ECHP 1994-2000, Eurostat.

Figure 2: Non-working students: main transitions observed from first interview to 7th wave

Source: ECHP 1994-2000, Eurostat. Source: ECHP 1994-2000, Eurostat.

Table 1. Variables used in the multivariate regressions	Whole sample	Higher	2nd cycle secondary	1st cycle secondary	General	Vocat.
Stop education	*0,12*	*0,09*	*0,13*	*0,18*	*0,09*	*0,20*
Start work	*0,18*	*0,16*	*0,18*	*0,23*	*0,15*	*0,26*
Women	0,53	0,53	0,53	0,48	0,52	0,54
Age	20,47	21,92	19,25	19,04	20,18	21,40
University long cycle	0,13	0,29			0,18	
University short cycle	0,23	0,49			0,30	
Higher non university	0,09	0,20				0,39
High vocational	0,01	0,02				0,05
General 2ndary 2nd cycle	0,32		0,81		0,42	
Vocational training centre	0,05		0,12			0,20
Vocational training dual system	0,01		0,03			0,05
Vocational training other	0,01		0,04			0,06
General less than 2nd cycle 2ndary	0,08			0,57	0,10	
Vocational training less than 2nd cycle 2ndary	0,04			0,32		0,19
Other vocational training	0,02			0,12		0,07
HH pc income relative to average GDP/PPP in region	1,64	1,73	1,61	1,42	1,68	1,51
Received some fellowship last year	0,10	0,15	0,06	0,07	0,11	0,09
Enrolment rate for her age and country	47,69	35,45	55,69	66,08	48,68	44,49
Recent increase in expenditure on education	6,27	6,88	5,97	5,09	5,79	7,83
Wage premium if goes on studying	1,40	1,24	1,51	1,58	1,42	1,31
Unemployment rate for her age and country	25,70	24,76	27,07	24,97	25,51	26,31
GDP/PPP pc in region (logs)	9,67	9,67	9,66	9,69	9,67	9,65
Yearly expected income if non-experienced unemployed /region pc income	0,07	0,05	0,07	0,09	0,06	0,07
Head of the household: Higher education	0,19	0,22	0,17	0,13	0,20	0,15
Head of the household: Upper secondary	0,27	0,26	0,28	0,25	0,27	0,25
Head of the household: Lower secondary	0,45	0,39	0,49	0,53	0,44	0,47
Lives independently from parental family	0,14	0,18	0,11	0,13	0,12	0,21
Non-wage personal income (logs)	1,25	1,75	0,55	1,56	1,06	1,85
Employment rate for her age and country	35,73	42,72	29,43	30,16	34,62	39,34
Youth received private transfers	0,10	0,14	0,06	0,07	0,10	0,09
Former working experience	0,20	0,20	0,20	0,23	0,17	0,30
ALMP on youth as a % of GDP	0,16	0,17	0,15	0,15	0,16	0,13
Strictness employment protection legislation	2,85	2,94	2,83	2,62	2,86	2,85
Temporary rate for her age and country	36,24	33,94	36,71	42,58	35,74	37,84
% of professionals in youth employment	2,96	2,84	2,91	3,47	2,82	3,41
Germany	0,04	0,02	0,04	0,08	0,03	0,05
Denmark	0,02	0,02	0,03	0,01	0,02	0,03
Netherlands	0,04	0,03	0,02	0,09	0,03	0,05
Belgium	0,05	0,04	0,06	0,07	0,05	0,06
France	0,13	0,17	0,05	0,20	0,12	0,14
UK	0,03	0,01	0,04	0,09	0,03	0,02
Ireland	0,06	0,06	0,07	0,04	0,06	0,06
Italy	0,19	0,21	0,22	0,03	0,22	0,08
Greece	0,07	0,10	0,06	0,02	0,05	0,15
Spain	0,20	0,18	0,20	0,25	0,18	0,27
Portugal	0,09	0,07	0,11	0,08	0,10	0,04
Austria	0,05	0,05	0,08	0,01	0,06	0,02
Finland	0,03	0,03	0,03	0,04	0,03	0,03
N	34533	16114	13602	4817	26384	8149

Source: ECHP waves 2 to 7, Eurostat. GDP/PPP pc for regions has been drawn from REGIO data-set.

T.2. Biprobits: stop studying and start working, overall specification and different programmes

	Whole sample		General		Vocational	
	stop studying	*start working*	*stop studying*	*start working*	*stop studying*	*start working*
Women	-0.156***	0.004	-0.135***	0.001	-0.180***	-0.037
Age	0.089***	0.046***	0.114***	0.071***	0.056***	0.017
University long programmes	-1.557***	-0.686***	-0.879***	-0.538***		
University short programmes	-1.713***	-0.856***	-1.086***	-0.691***		
Higher non university	-1.418***	-0.592***			-1.322***	-0.651***
High vocational	-0.746***	-0.149			-0.646***	-0.144
General 2nd 2nd cycle	-1.166***	-0.530***	-0.391***	-0.302***		
Vocational training centre	-0.925***	-0.175**			-0.832***	-0.156*
Vocational training dual system	-0.669***	-0.113			-0.662***	-0.006
Vocational training other	-0.764***	-0.309***			-0.672***	-0.208*
General less than 2nd cycle 2ndary	-0.857***	-0.216**	*ref*	*ref*		
Vocational training first stage (centre)	-0.750***	-0.215***			-0.673***	-0.225**
Vocational training first stage (other)	*ref*	*ref*			*ref*	*ref*
HH pc income relative to average GDP/PPP in region	-0.081***		-0.063***		-0.096***	
received some fellowship last year	-0.102*		0.05		-0.477***	
enrolment rate for her age and country	-0.005***		-0.005***		-0.006***	
recent increase in expenditure on education	0.005		0		0.012***	
wage premium if goes on studying	-0.012		0.015		-0.047	
unemployment rate for her age and country	0.007**		0.008***		0.004	
GDP/PPP pc in region (logs)	-0.416***	0.225**	-0.401***	0.196	-0.468***	0.212*
yearly expected income if unemployed /region pc inc	0.504		-0.702		1.842**	
HOH: higher education	-0.023		-0.069		0.006	
HOH: upper secondary	0.101		0.014		0.193**	
HOH: lower secondary	0.258***		0.227***		0.201**	
Lives independently from parental family		-0.083**				
Non-wage personal income logs		-0.012***		-0.012***		-0.01
Employment rate for her age and country		0.009***		0.007***		0.008***
Youth received private transfers		0.081		0.085		-0.056
Former working experience		0.228***		0.268***		0.195***
ALMP on youth as a % of GDP		2.253***		2.614***		2.274**
Strictness employment protection legislation		-0.149**		-0.165**		-0.132
Temporary rate for her age and country		0.003**		0.003*		0.003
% of professionals in youth employment		0.118***		0.128***		0.109***
Germany	0.107	0.431***	0.02	0.531***	0.053	0.408**
Denmark	0.101	0.207	0.821*	0.213	-0.794*	0.277
Netherlands	0.979***	-0.283**	1.253***	-0.151	0.606***	-0.397**
Belgium	0.142*	0.197**	0.134	0.255**	0.14	0.290**
France	0.568***	-0.139	0.596***	-0.181	0.502***	-0.067
UK	0.292	-0.610**	0.602	-0.546	0.126	-0.909***
Ireland	0.372**	-0.074	0.802***	0.041	-0.078	-0.34
Italy	0.579***	0.024	0.645***	0.006	0.516***	0.192
Greece	0.686***	-0.044	0.775***	-0.07	0.517***	-0.032
Portugal	0.516***	0.18	0.619***	0.193	0.052	0.151
Austria	0.352***	0.422***	0.438***	0.493***	0.119	0.658***
Finland	0.23	-0.13	0.458*	-0.146	-0.044	-0.178
Constant	1.745*	-4.368***	0.249	-4.803***	3.105**	-3.583***
Observations	34533	34533	27205	27205	8406	8406
rho (pvalue rho)	-0,351	(0.000)	-0,394	(0.000)	-0,287	(0.000)
W test: rho = 0 (Prob > W)	217.83	(0.000)	205.8	(0.000)	105.8	(0.000)
Wald Chi2 (Prob > chi2)	7380.7	(0.000)	4935.8	(0.000)	2536.36	(0.000)

Note: Robust z statistics estimated; * significant at 10%; ** significant at 5%; *** significant at 1%
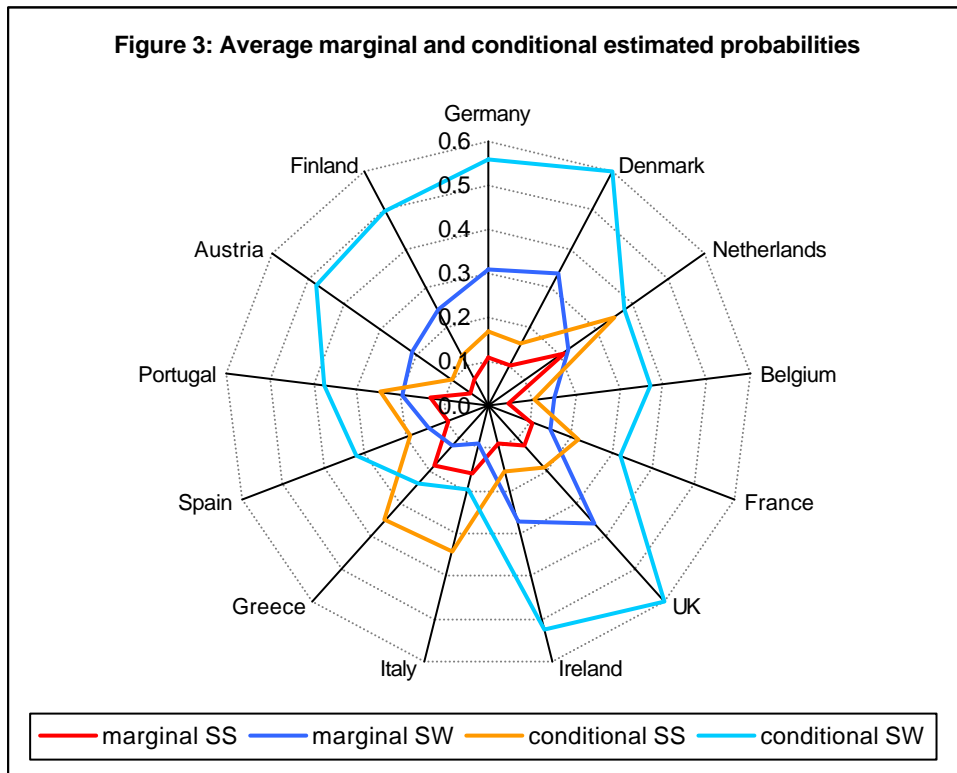Reference: Spanish man with neither fellowship nor private transfers, living with his parents, who have primary education only. Dummies for year of first interview have been omitted
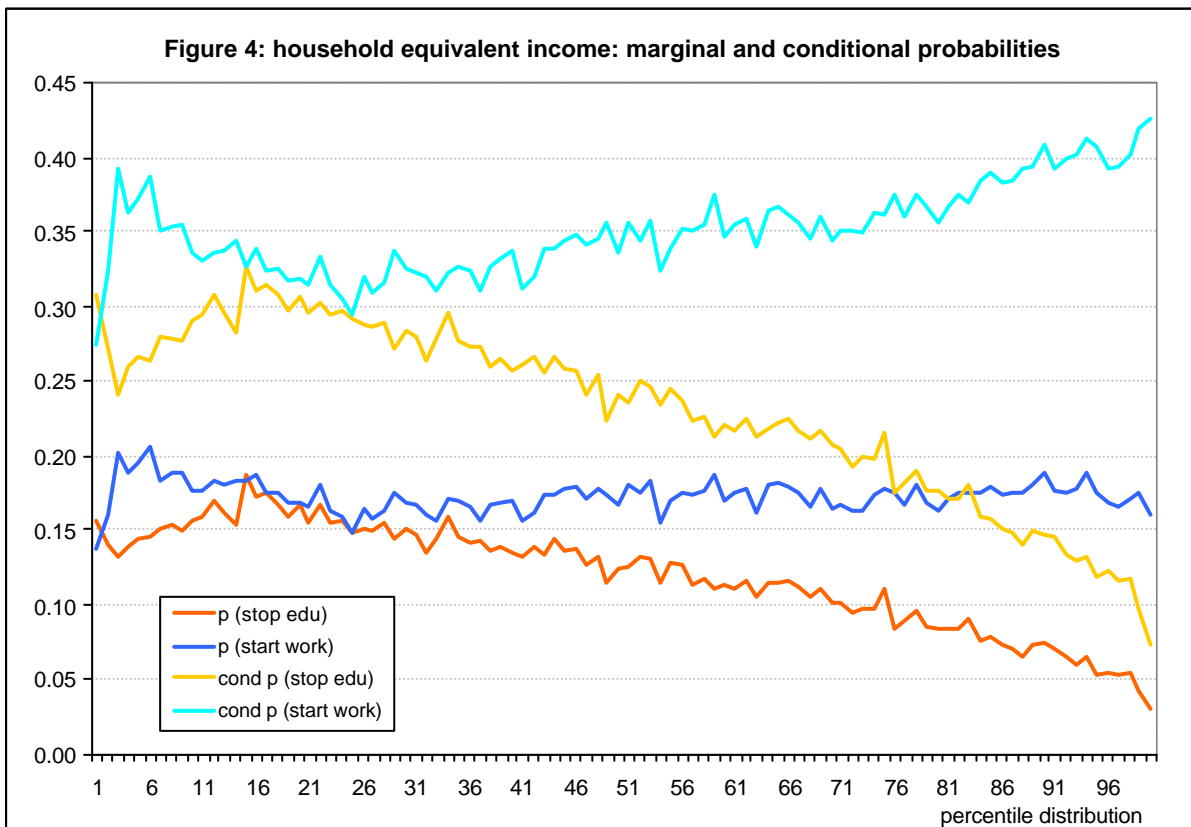Source: ECHP, waves 2 to 7, Eurostat.

T.3. Biprobits: stop studying and start working, differentiating among education levels

	Higher education		Secondary 2nd cycle		Less than 2ndary 2nd cycle	
	Stop study	*start work*	*stop study*	*start work*	*stop study*	*start work*
Women	-0.072	0.032	-0.251***	0.091**	-0.190*	-0.202**
Age	0.090***	0.086***	0.110***	0.025	0.066***	0.02
University long cycle	-0.879***	-0.510***				
University short cycle	-0.940***	-0.667***				
Higher non university	-0.720***	-0.421***				
High vocational	*ref*	*ref*				
General secondary 2nd cycle			-0.311**	-0.339***		
Vocational training centre			-0.108	0.071		
Vocational training dual system			0.23	0.108		
Vocational training other			*ref*	*ref*		
less than second stage secondary					-0.662***	-0.192
vocational training first stage (centre)					-0.631***	-0.142
vocational training first stage (other)					*ref*	*ref*
HHpc income relative to average regional GDP/PP	-0.055**		-0.082***		-0.167***	
Received some fellowship last year	-0.046		-0.335**		-0.151	
Enrolment rate for her age and country	-0.005***		-0.004***		-0.009***	
Recent increase in expenditure on education	-0.001		0.010*		0	
Wage premium if goes on studying	-0.186*		-0.071		0.116	
Unemployment rate for her age and country	0.005		0.005		0.010*	
PPP pc in region logs	-0.428***	0.213**	-0.396***	0.402***	-0.316*	-0.128
Yearly expected income if (non-exper) unemployed	-0.611		3.026**		-0.629	
HOH: higher education attainment	0.052		-0.022		-0.055	
HOH: upper secondary attainment	0.173**		0.13		0.154	
HOH: lower secondary attainment	0.264***		0.397***		0.23	
Lives independently from parental family		0.000		-0.174***		-0.275***
Non-wage personal income logs		-0.001		-0.014**		-0.028***
Employment rate for her age and country		0.006***		0.014***		0.011***
Youth received private transfers		-0.028		0.148		0.059
Former working experience		0.287***		0.300***		0.139
ALMP on youth as a % of GDP		2.001***		1.233		3.058*
Strictness employment protection legislation		-0.133		-0.017		-0.237
Temporary rate for her age and country		0.002		0.004		0.001
% of professionals in youth employment		0.131***		0.101*		0.079
Germany	0.02	0.025	-0.258	0.311	0.337	0.769***
Denmark	0.896	0.12	-1.328*	0.255	0.205	-0.012
Netherlands	1.453***	-0.085	0.695***	-0.482**	0.676**	-0.518**
Belgium	0.236	0.301**	0.242**	0.382**	-0.322	-0.555**
France	0.715***	-0.005	0.516***	0.115	0.211	-0.482
UK	1.410***	-0.333	-1.154	-0.218	0.71	-0.882*
Ireland	0.269	0.12	-0.279	0.558	0.749*	-1.494***
Italy	0.558***	-0.04	0.772***	0.184	0.212	-0.142
Greece	0.926***	-0.089	0.688***	0.069	0.355**	-0.183
Portugal	0.695***	0.291	0.592***	0.317	0.085	-0.208
Austria	-0.188	0.14	0.586***	0.462**	0.659	0.967**
Finland	0.42	-0.048	0.015	0.084	-0.164	-0.626*
Constant	1.268	-5.179***	0.251	-6.458***	1.32	0.092
Observations	16114	16114	13602	13602	4817	4817
rho (pvalue rho)	-0,453	(0.000)	-0,300	(0.000)	-0,214	(0.000)
W test: rho = 0 (Prob > W)	202.3	(0.000)	133.537	(0.000)	28.91	(0.000)
Wald Chi2 (Prob > chi2)	4377.5	(0.000)	4527.64	(0.000)	2194.1	(0.000)

Note: Robust z statistics estimated ; * significant at 10%; ** significant at 5%; *** significant at 1%. Reference: Spanish man with neither fellowship nor private transfers, living with his parents, who have primary education only. Dummies for year of first interview have been omitted. Source: ECHP, waves 1 to 7, Eurostat

Figure 3: Average marginal and conditional estimated probabilities

marginal SS — marginal SW — conditional SS — conditional SW

Source: ECHP (waves 2 to 7), Eurostat.

Figure 4: household equivalent income: marginal and conditional probabilities

p (stop edu)
p (start work)
cond p (stop edu)
cond p (start work)

percentile distribution

Source: ECHP (waves 2 to 7), Eurostat