THE EFFECTS OF LABOR MARKET CONDITIONS AND FAMILY BACKGROUNDS ON EDUCATION ATTAINMENT OF SPANISH YOUNGSTERS[†]

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ABSTRACT

The aim of this paper is to study the impact of family background and labor market conditions on educational attainment of Spanish youngsters using a new sample of data drawn for the first seven waves of the European Community Household Panel (ECHP). Our results show that family background variables are strong determinants of the number of young adults that attained post-compulsory education. More specifically, we obtain that children's educational achievement is strongly related to parental education. Moreover, the results suggest that unemployment prospects aspect the demand for education through diminishing costs more than increasing returns to education. It could indicate that unemployment rate push people to enroll in tertiary education.

JEL Classification: I2, I21.

Keywords: educational attainment; family backgrounds; unemployment rate.

RESUMEN

El objetivo de este trabajo es analizar el impacto del entorno familiar y las condiciones del mercado laboral en las decisiones de educación de los jóvenes españoles. Para ello, vamos a usar una nueva muestra de datos obtenida de las primeras siete olas del panel de hogares europeo (phogue). Nuestros resultados muestran que las variables familiares tienen un fuerte impacto en el número de jóvenes que alcanzan educación superior. En concreto, obtenemos que la educación de los padres juega un papel muy importante. Además, nuestros resultados sugieren que las tasas de desempleo afectan a la decisión educativa disminuyendo los costes educativos pero no se observa evidencia de que incrementen los rendimientos de la educación. Estos resultados indican que las altas tasas de desempleo fomentan que los jóvenes realicen estudios universitarios.

Palabras clave: decisión de educación, tasas de desempleo, probit ordenado.

1 Introduction.

In the last decade successive cohorts of Spanish children had been experimenting rising enrollment rates in terciary education[1] and increasing educational attainment. In this sense, terciary education has risen between 1995 and 2002 by more than 20 per cent. This spectacular increase can only be compared to Ireland (see Table 1 of the Appendix 2). By contrast, secondary school rates were stagnant: 65 per cent of 20 to 24 year old of Spanish youngsters have only lower secondary school qualifications and are not in education (see Table 2 of the Appendix 2), although OECD recommends 90 per cent. These two phenomena together have given rise to a major puzzle in Spain: the unbalanced increase of educational attainment.

An increasing rate of growth of educational attainment yields major benefits both at individual level and at the social level. Better educated workers not only earn more but also experience a range of other benefits such as lower unemployment and better health. For the economy as a whole, it leads ultimately to greater economic growth. However, the unbalanced nature of this growth is a cause of serious concern. It has provoked an overeducation phenomenon in the sense that workers' educational attainments are higher than the skill requirements of jobs, as it was pointed out by Dolado et al. (2000).

The aim of this paper is to study the impact of family background and labor market conditions on educational attainment of Spanish youngsters. Our hypothesis is that family background affects the number of young adults who have not attained post-compulsory education and, therefore, it is a key factor to explain why Spanish post-compulsory schooling lags behind OECD standards. On the other hand, we find that higher unemployment rate experimented in Spain push Spanish youngsters who have started post-compulsory education to complete terciary education and, therefore, it is a key factor to explain the spectacular increase in terciary education.

For this purpose, we use a new sample of data from the first seven waves of the European Community Household Panel (ECHP), from 1994 to 2000. To our knowledge, it is the first Spanish study that analyzes the determinants of educational outcomes using a longitudinal dataset. This allows better measurement of family background than previous Spanish studies. The data allow us to assess the association between various aspects of family background, including parents' education, income and family structure and educational attainment.

Another feature of this study is that we take into account the role played by unemployment rate in the educational decision. In the period we analyze, Spain has experimented the highest unemployment rates on its history, affecting mainly youngsters and women [see Graphics 1-3 in the Appendix 2]. For example, unemployment rate for youngsters and women in the South were 65.44 per cent in 1999. For this reason, this period provides an interesting case to analyze the correlation between education and unemployment.

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[1] Terciary education covers both university- level education and high level vocational programmes.

For this purpose, following Rice (1999) and in contrast with previous cross-sectional studies, we use different cohorts of youngsters and we match individuals with the unemployment rate in the year they decided to attend post-compulsory education. In this way, we exploit the fact that the Spanish unemployment has a huge variation both over time and across regions.

The effects of unemployment are analyzed using a wide variety of local unemployment rates in order to disentangle the mechanisms through which unemployment affects educational decisions [see Clark (2002)]. Whereas higher young unemployment rates are expected to have a positive impact on educational attainments through diminishing opportunity costs, higher general unemployment rates are expected to reduce demand for education through lower future wages. Finally, if we distinguish unemployment rates by education level, we can capture the returns to education.

Our results show that family background variables are strong determinants of the number of young adults that attained post-compulsory education. More specifically, we obtain that children's educational achievement is strongly related to parental education, although the presence of marital sorting by schooling [specially in mothers] does not allow us to distinguish whether father's or mother's education play a more important role. Youngsters from poor families find also difficulties in accessing higher levels of education. Moreover, family structure measures are relevant. Our results suggest that single mother's children have a lower probability of obtaining higher education levels.

Moreover, the results suggest that unemployment prospects affect the demand for education through diminishing costs more than increasing returns to education. It could indicate that unemployment rates pushes people to enroll in terciary education. Finally, we provide some evidence that the individuals who live in an area higher unemployment rates than national rates have less probability to access higher levels of education. These results provide clear evidence that high unemployment rates could disturb educational decisions.

In the next section, we present literature review. In section 3, we develop a very simple model in order to illustrate the theoretical framework. The specification of the empirical model is discussed in section 4. In section 5 we describe the data and the variables used in the analysis. In section 6 we present the results. Finally, in Section 7 we present the conclusion.

2   Literature review.

The theoretical starting point are human capital models [Becker (1964)], in which individuals decide the optimal amount of education by weighting up the costs and the benefits of an additional unit of schooling. Explanations can include two categories of factors: those that vary at the individual level [family background] and those that vary at an aggregate level, such as local unemployment rate.

Previous studies for the US have found that family backgrounds and individual characteristics are strong predictors of educational attainment of young

adults [see for example Altonji and Dunn (1996) and Ermisch and Francesconi (2001) for the UK]. In Spain, some studies have analyzed the educational expansion during the eighties finding that family characteristics have played an important role [see González López-Valcárcel and Dávila (1998) and Beneito et al. (2001)]. The problem of these studies relies on the available dataset for this period [Labor Force Survey (LFS), Budget Household Survey (BHS)] not to allow a good measurement of both family background and educational outcomes [see Haveman and Wolfe (1995)].

However, some authors argue that family background on its own cannot explain the expansion of educational attainment [see Card and Lemieux (2000)]. An additional promising explanation can be found on the unemployment rate.

The empirical evidence about the relationship between unemployment and educational decision is mixed. Time series studies for the UK confirm that the unemployment rate is positively correlated with an increase in participation [2] Using micro data, Rice (1999) reports a significant positive relationship between local labor market conditions and participation rates. However, Micklewright (1989) and Gray et al.(1994), have found evidence of a significant negative relationship. More recently, some studies have used a panel data approach such as Card and Lemieux (1999), showing that when they try to explain changes over time, labor market measures lose their explanatory power. By contrast, Card and Lemieux (2000) and Clark (2000) obtain a positive relationship between unemployment and educational outcomes.

Most of the Spanish studies include unemployment controls, since Spain presents one of the highest unemployment rates among the European countries. The evidence is also contradictory. Albert (2000), using the LFS, finds that unemployment prospects do not affect educational outcomes. However, Martinez-Granado and Castillo (2002) obtain a negative effect of regional unemployment on the probability of studying. Finally, Petrongolo and San Segundo (2002), using the LFS find evidence of a positive effect of youth unemployment on the demand for post- compulsory education.

3   The theoretical framework.

We consider a human capital model [Becker (1964) and Card (2001)], in which individuals reach an optimal schooling decision by balancing the benefits of higher education against the cost. We incorporate to this framework the possibility of experiencing unemployment. In this sense, as it was shown by Kodde (1986) and more recently by Rice (1999) and Fernandez and Shioji (2000), unemployment prospects play an important role in this decision.

Consider a two-period model ($i = \{1, 2\}$), where in the first period ($i = 1$), individuals make their educational choice.

Let T be the available time in the first period. Individuals divide it by choosing a $s \in [0, T)$, where s is the time devoted to education and $T - s$ is the time devoted to labor supply. The direct cost of education is denoted by $p_s(\mathbf{x})$,

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[2]See McVicar and Rice (2001) and Robertson et al. (1997).

where $\mathbf{x}$ is a vector reflecting individual characteristics and family background. We assume that individuals can experience unemployment in the first period which is independent of the educational choice, that is, individuals find a job with probability π_1 or become unemployed with probability $1 - \pi_1$, which can be considered as a proxy of "young unemployment" rate. Finally, when individuals work they earn a fixed wage w_1 and no unemployment benefits are considered for this period.

In the second period $(i = 2)$, individual's level of education is given by the decision made in $i = 1$. There also exists unemployment which, in contrast with the previous period, depends on the level of education[3]. More specifically, individuals find a job with probability[4] $j(s)$. Consequently, $1 - j(s)$ is a proxy of "adult unemployment" rate. We assume that individuals' earnings[5] $(f(s))$ increase with the level of education[6] and when individuals are unemployed, they receive a constant amount of social benefits (z).

Finally, an individual receives exogenous transfers from parents in each period (A_i). Moreover, we assume perfect capital markets with interest rate (r).

We now move to specify the budget equation for each period. In both periods, the budget equation depends on unemployment status. Hence, individual's consumption in period i is denoted by c_{ie} and c_{iu} when employed and unemployed, respectively.

In the first period:

$$
\begin{align}
c_{1e} &= -p_s s + w_1(T - s) + A_1 \tag{1} \\
c_{1u} &= -p_s s + A_1 \tag{2}
\end{align}
$$

In the second period:

$$
\begin{align}
c_{2e} &= f(s) + A_2 \tag{3} \\
c_{2u} &= z + A_2 \tag{4}
\end{align}
$$

Therefore, individual's decision reduces to choosing the level of education in the first period to maximize the lifetime expected utility. We assume that individuals have a separable utility function over the two periods:

$$
\begin{align}
U(c_1, c_2) &= EU(c_1) + \beta EU(c_2) = \pi_1 U(c_{1e}) + (1 - \pi_1)U(c_{1u}) + \tag{5} \\
&\quad \beta[j(s)U(c_{2e}) + (1 - j(s))U(c_{2u})]
\end{align}
$$

where $EU(\cdot)$ is individuals' expected utility and β is a positive constant discount factor.

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[3] See Kodde (1986).

[4] Where $\dfrac{\partial j(s)}{\partial s} > 0$ and $\dfrac{\partial^2 j(s)}{\partial s^2} < 0$.

[5] Where $\dfrac{\partial f(s)}{\partial s} > 0$ and $\dfrac{\partial^2 f(s)}{\partial s^2} < 0$.

[6] For simplicity, individuals' earnings are independent of their previous experience.

For the sake of simplicity, we also assume that $U(c_i) = c_i$, which implies that individuals are risk neutral. Substituting (1)-(4) in (5), the solution to this problem is given by the following first order condition (FOC):

$$j'(s^*)[f(s^*) - c] + f'(s^*)j(s^*) = \frac{1}{\beta}(\pi_1 w_1 + p_s) \qquad (6)$$

The left hand side of (6) reflects the marginal benefits of investing in an additional unit of education. An additional unit of education increases the earnings and, secondly, it diminishes the probability of becoming unemployed in the second period. The right hand side of (6) gives the marginal cost. It is composed of tuition costs and foregone earnings, which are affected by the possibility of experiencing unemployment in the first period.

Let us see how our model can help to analyze how unemployment rate affects educational decisions (see Appendix 1). Firstly, we can see that "young unemployment" encourages additional education through lowering the opportunity cost of education. The effect of "adult unemployment" on the optimal level of education is the opposite of "young unemployment". More specifically, higher adult unemployment reduces optimal investment in education because earnings of young workers are expected to fall in the future. In addition, under certain conditions, higher probability of finding a job stimulates college-going behavior. Finally, higher tuition costs discourage demand for education.

4 Empirical strategy.

In this section we describe the procedure to estimate the theoretical model presented in section 2.

We model educational choice using a discrete ordered probit model[7], which can be used to estimate the human capital model under some assumptions as it was shown by Cameron and Heckman (1998). This specification implies the non existence of grade specific-shocks under transitions and that the education choices are governed by just only one unobservable. A vast number of empirical works have used the ordered probit to estimate the final educational attainment [see Lauer (2000)), Ferri et al. (2002), Ermisch and Francesconi (2002) among others].

This approach is suitable to explain the unbalanced educational attainment of Spanish youngsters since the final educational attainment can be estimated as the result of sequential decisions which depend on any past individual event. An alternative approach used in the literature is to divide the educational career into a finite number of transitions and to analyze the probability of the final educational attainment as the product of transition probabilities[8]. However, as a main disadvantage, this latter approach ignores the cumulative nature of

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[7] Although in our theoretical model s, the level of education, is defined as continuous, in our empirical model we define it as discrete because in the ECHP is offered in this way.

[8] See Mare (1980).

schooling decisions since it is assumed that each transition is independent of the choice made in previous years[9].

The educational attainment of individuals is modelled using the following equation:

$$s^*_{irc} = \boldsymbol{\beta}_x \mathbf{x}'_{irc} + \boldsymbol{\beta}_z \mathbf{z}'_{rc} + u_{irc}, \tag{7}$$

where s^*_{irc} is a latent variable that represents the optimal level of schooling of the ith individual in local market r that takes the decision in cohort c, $\mathbf{x}'_{irc}$ include individual level variables such as family background characteristics, $\mathbf{z}'_{rc}$ includes cohort and location-specific effects that affect in a different way cost and returns $(\pi_1,\ j(s))$. $\boldsymbol{\beta}_x$ and $\boldsymbol{\beta}_z$ reflect the effects of family background and labor market conditions on educational attainment, respectively. Finally, u_{irc} is the error term normally distributed with mean zero and variance one. Using this specification we can exploit the longitudinal structure of the ECHP and analyze educational decisions for different cohorts during the nineties.

We do not observe the latent variable, but the observed optimal educational choice can be modelled in the following way:

$$s_{ir} = l \text{ if } \mu_{l-1} < s^*_{ir} < \mu_l, \tag{8}$$

where $l = 1, 2, ..., L$ are educational levels and μ_l are the cut-off levels in the ordered probit model, with $\mu_0 = -\infty$ and $\mu_l = +\infty$ and $\mu_1 < \mu_2 < .... < \mu_L$ [see Maddala (1983)]. For more details about the measure of educational attainment, see section 3.

From the ordered probit model we can predict the probability of a person to be in every qualification level as:

$$\Pr(s_{ir} = l \mid \mathbf{x}_{ir}, \mathbf{z}_r) = \Phi[(\mu_l - [\boldsymbol{\beta}_x \mathbf{x}'_{ir} + \boldsymbol{\beta}_z \mathbf{z}'_r]] - \Phi[(\mu_{l-1} - [\boldsymbol{\beta}_x \mathbf{x}'_{ir} + \boldsymbol{\beta}_z \mathbf{z}'_r]] \tag{9}$$

where Φ is the cumulative distribution of the normal distribution.

5   Data and variables.

The estimation of the former model requires data on individual's characteristics, family background and labor market variables. For the first two types of variables, data is taken from the seven waves of ECHP (1994-2000). Since 1994, the ECHP has been designed to compare different aspects of European countries as labor market dynamics, income, health, education, etc., and annually interviews a representative sample of 80.000 households, of which 8.000 are Spanish. Sample individuals are reinterviewed each successive year, and if they leave their original household to form a new one, all adults' members of these new households are also interviewed. Similarly, children in original households are interviewed when they are sixteen.

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[9] As a result, we cannot interpret the transitions in the context of human capital models. Moreover, it yields selectivity bias since it focuses on a non random sample of individuals.

The ECHP is the unique longitudinal dataset available for the Spanish economy, which clearly provides a better measurement of family background than the Spanish Labor force Survey (LFS), the other dataset available for this period. Moreover, another advantage of the ECHP over the LFS is that the former allows to control for some events occurred during the childhood.

In order to capture the different effects associated with unemployment prospects, individual record files are matched with several unemployment rates at the age individuals take their decision. We use the unemployment rate for people aged "16-19" [by area, sex and year], which is collected from the statistics published by the National Institute of Statistics (INE). We also use unemployment rates disaggregated by different educational degrees that were obtained from the Human Capital Database from the IVIE [also disaggregated by sex, area and year]. See the next subsection for a detailed description of these variables.

The information of family background is obtained directly from parents' records[10]. Therefore, some caution is needed to select the individuals' sample.

We follow the approach adopted by Ermisch and Francesconi (2002) measuring the endogenous variable and the family background in different years[11]. In this sense, we exploit the longitudinal dimension of the data to construct the variables.

We focus on individuals aged 15-19 in December of 1994 or 1995, who live with at least one biological, adoptive or step-parent. Then, we obtain in these years the family background measures. In this way, we obtain the determinants at the moment they are relevant[12]. Moreover, our sample is random since 95 per cent of individuals of the sample live with their parents when aged 15-19.

The educational attainment is measured in the last wave we observe the individuals. Therefore, we obtain this measure when most individuals have finished their studies already.

The individuals aged 15-19 in 1994-1995 are 2,240. The former restrictions together with some incomplete information produce that 20.5 per cent of the sample were excluded. Firstly, we exclude 394 observations (16.15 per cent) for missing values about individual information and because their schooling records are seriously uncompleted and also confused. Secondly, 105 individuals (4.3 per cent) are eliminated since it is not available information about their parents records. The final sample is 1,941 individuals.

5.1 Variables.

In this section we describe explanatory and endogenous variables. Descriptive statistics of variables are presented in Table 1.

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[10] Young adults are matched with information about their mother (father)-figure. The mother (father)-figure is the natural or adoptive in the case the family remains intact, but will be a step-mother (father) in other cases. For short, we shall refer to mother-figures as mother (father).

[11] This approach has been widely used in the economic literature, see Haveman and Wolfe (1995). An alternative could be to use a panel data approach, but in this case the sample size becomes quite small.

[12] See Cameron and Heckman (1998) and Haveman and Wolfe (1995).

Educational attainment of the child is measured as the current schooling level and it is grouped in five classes in ascending order[13]: primary school [no qualifications and first-stage of secondary], lower vocational school, high school, upper vocational school and university degree.

Next, we proceed to describe the explanatory variables we use. Our purpose is to study the impact of family background and labor market conditions on the unbalanced educational attainment of Spanish youngsters. For this purpose, we use a certain number of controls not introduced previously in the Spanish literature. Furthermore, special effort is devoted to variables reflecting parental situation during childhood.

A set of dummies indicating the age of youngsters are included to observe the cohort effects. Moreover, we include a dummy for gender and several regional dummies.

We generate a set of dummies for the level of education of the mother and the father, measured as the highest completed academic qualifications, and they are grouped into four classes in descendant order: degree qualifications, secondary school second-stage, secondary first-stage and no qualifications (include primary education).

We also include some interaction terms between mother's and father's education to capture whether assortative mating of parents affect the educational outcomes of children. In this sense, Currie and Moretti (2002) emphasize that more educated women and men tend to marry each other, provoking some problems to observe direct effects of parents' education in children outcomes. As it is shown in Graphics 4 and 5 in the Appendix 2, marital sorting for women in Spain strongly depends on schooling. We observe that about 70 per cent of women are married with a partner with the same educational level. By contrast, only 41 per cent of men with higher qualification are married with women who have the same level of education.

Financial situation of the family is a clear determinant of schooling attainment [see Cameron and Heckman (1998)]. To measure parental income we use the household income in 1993 and 1994[14]. We divide family income into four groups based on percentiles. Moreover, the ECPH contains information about parents' economic situation, which may be used as an indicator of the probable permanent income during childhood as well as social status. For these reasons, a set of dummies variables has been constructed to describe the employment situation of the parents during the past five years: "father (mother) in employment past five years", "father (mother) not in employment past five years" and "father (mother) out of the labor force past five years". Missing values are replaced for "out of the labor force".

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[13] In 1990, a new educational law (LOGSE) was approved, but the implementation of the new program has been gradual. By the year 2002, the new primary and secondary education have completely replaced by the previous one. The measures of educational attainment are obtained using the LOGSE.

[14] Information of a single year is a crude proxy for the financial situation of the child when growing up (see Haveman and Wolfe (1995)), but it can be argued that this variable is more likely to be relevant when the individual is nearly sixteen.

Some economic and sociological research have recently devoted a lot of attention to the relevance of family structure in children's educational outcomes However, there are no previous studies for the Spanish case tackling the relationship between education and family structure. The social science literature poses a great number of mechanisms relating family structure and children's outcomes[15]. Social control theory focuses on the fact that an intact family supervises and monitors children better than only-parent families. Finally, other authors focus on the fact that family income is lower in an only-parent family. We analyze this issue constructing several measures of family composition. Firstly, we generate a dummy indicating if children live in a lone-parent family. Moreover, we also distinguish among four child development stages[16]: 0-5, 6-10, 11-16 and +16[17], since the ECHP[18] allows us to observe the timing on the start to live in a lone parent family.

Ermisch and Francesconi (2001) show that the age in which mother and father gave birth is also relevant. For this reason, we generate dummy variables that pick up these effects. Following Ermisch and Francesconi (2001), we generate dummy variables for the cases where the mother's (father's) age at birth was below or equal to 21 and greater or equal to 35. It is important to note that these are variables that reflect environment during childhood.

Moreover, we also take into account the relationship between sib-ship structure and educational outcome [Iacovou (2001)]. We compute the number of siblings and generate a dummy to indicate if the children are only child.

We also study the impact of labor market conditions on the educational attainment by including different measures of unemployment rates. A key point in this analysis is the period we compute the unemployment rates. Following Rice (1999) and Petrongolo and San Segundo (2002), we match individuals records with several unemployment measures at the age they take their decisions. This is possible since the ECHP records the age individuals decide to start attending post-compulsory education.

In this sense, we assume that the expected return of post-compulsory education is strongly influenced by the conditions currently prevailing in the labor market [see Dominitz and Manski (1996) and Lauer (2000)]. Moreover, as we observe the individuals take their decision during different years (between 1991 and 1997[19]), we obtain a huge variation in unemployment that can be adequately be considered to observe the impact of the unemployment rates on the educational attainment[20].

The nineties [see Graphics 1-3 in Appendix 2] provide an interesting case

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[15] See Macklanahan and Sandefur (1994).

[16] We make this classification on the basis of the distribution of this variable in the sample.

[17] If the child was born outside a live-in partnership, this variable takes zero value.

[18] The ECHP does not allow to control for different changes in family structure. We only can incorporate the last change. Although this measure is far from being precise, it is better than to measure the family structure only the current year.

[19] Some observations are dropped because individuals take their decision out of the period 1991-1997.

[20] By contrast, short-term variations of the unemployment rate are suitable to estimate the dropout rates.

to analyze correlation between education and employment. Firstly, in this period Spain experimented the highest unemployment rates in its history, affecting mainly youngsters and women. For example, unemployment rate for youngsters and women in the South was 65.44 per cent in 1999. Moreover, cross-regional variation is really huge in Spain. To sum up, the Spanish unemployment rate presents a huge variation both over time and across regions, offering a unique opportunity to investigate the impact of unemployment on educational attainment.

As a measure of the "opportunity cost" of participation in compulsory education, we focus on the unemployment rate for "16-19 years old". Following the model proposed in section 2, we expect this variable to have a positive sign. For this measure, we also use the unemployment rate of primary workers. We expect this variable to have a positive effect, since it diminishes foregone earnings of education but it also increases the expected returns of education. In order to observe the expected returns to education, we include the unemployment rate of the university degree workers. We should expect a negative sign of this variable. It is important to note that data of unemployment rate by education levels and age intervals are not available. Consequently, this measure can be contaminated by young unemployment and we could obtain mixed effects. Finally, deviations of unemployment rate from the general one are used to contrast the fact that higher unemployment rates make people poorer in general. In this case, we expect a negative sign.

6 Results.

6.1 Family Backgrounds.

In this subsection, we show the estimates obtained using only individual controls, family background variables and family composition. We abstract from the effects of labor market conditions, which will be examined in the next subsection.

In Table 2 we present the results for equation (7). We specify four models. In model I, we control by age, family structure, sex, income, regional controls and employment situation of the parents. In model II, we introduce mother and father's education. In model III, we additionally control whether mother's (father) age at birth is below 21 or greater to 35, if the youngsters are only child and the number of siblings. We also introduce some variables in order to observe (for lone parents' families) the timing at which the household is broken. Finally, in model IV, we omit income and employment dummies of the parents as controls.

In model I of Table 2, we observe that income has a strong impact on the educational attainment of youngsters. The unemployment and inactivity state of the parents affect negatively the outcome of the youngsters, although the effects of mother's employment status are smaller. Furthermore, the effects of living in a broken household have a strong negatively effect in educational at-

11

tainment. In model II, we introduce education of the parents. These estimates are statistically significant and quantitatively important. It is important to note that this fact produces that the effect of income strongly diminishes and also affects parents' employment status, although household income in 25th percentile remains significant. Surprisingly, father's completion college is more relevant than mother's completion, although mother's secondary school is more important than father's. We will investigate these facts below. In model III, we try to observe whether household composition is also relevant. To assess the role of living in a one-parent family, we introduce variables measuring the timing at which child's family structure changes. We can observe two important facts. First, we find evidence that exists a negative relationship between children outcomes and early family disruption when child was aged 0-5 but also more than sixteen. Furthermore, the mother's age at birth lower or equal than 21 is also relevant. The former findings may also suggest that the effect of single mother plays an important role. Finally, in model IV, we exclude family permanent income variables and we observe that the effects of mother's education and father's university degrees increase, revealing linkages between university degrees and income. A more interesting result is that the coefficients on the family structure are hardly affected. This fact provides evidence that the linkage between family structure and outcomes of the children does not depend on financial opportunities.

Table 3 shows the impact of parental education in children outcomes. It is interesting to note that mother's secondary school second-stage is associated with a significantly higher probability of achieving a university degree (0.503), while father's is associated with less probability of achieving a university degree (0.400). However, if we consider father's university degree, we obtain a higher probability (0.570) than mother's (0.526). From these results it cannot be inferred whether father's or mother's education plays a more important role. Plug (2004) observes that, after controlling for endogeneity, mother's education is less important than father's.

In Table 4, we analyze whether there exists indirect effects of father and mother education coming through assortative mating. In model I and II we perform the regressions using only mother's (father's) education. In models III we use interaction terms of parental education. In models I-II, we can observe that both coefficients and $t - statistics$ are highly affected when we consider only mother's and father's education. These could be interpreted as evidence that assortative mating of parents is disturbing our results. It can be observed in model III that interaction effects are strong predictors of children educational choices. More specifically, there exists clear evidence that children living in a family with both parents with university degree have higher educational attainment, although this is also true in families with father's university degree.

A comparison with other Spanish studies is complicated by differences in specification. These differences include: sample construction, outcome measures, estimation techniques and different controls. Nevertheless, below we proceed to compare these findings with similar European and American works.

In conclusion, our findings are:

12

- Young adults from poorer families have lower educational attainments. This result is consistent with Ermisch and Francesconi (2001) for England and also for a lot of American studies [see Haveman and Wolfe (1995)]. Previous studies for the Spanish case [González Lopez-Varcarcel and Dávila (1998)] and Martinez (1999) find that income is a strong determinant, although it is one of the least important of a set of economics variables. The problem of these studies is that they measure the determinants when the individuals are older than twenty, which can underestimate the effects of family income [see Cameron and Heckman (1998) for a study of these questions].

- There exists evidence that the father's employment status [unemployment and out of the labor force] affects negatively the outcome. Moreover, this effect is reinforced if the parent is currently out of work. These results are consistent with other American studies. The effect of the mother's employment is more ambiguous. We obtain a negative and statistically significant relationship between mother's unemployment pattern and children outcomes, but there is little evidence that mother being out of work affects children outcomes. The effects of mother's work on children's educational choices found for other research is mixed, suggesting a negative effect of the loss of the child care time.

- Educational levels of the parents appear as strong determinants of educational attainment. Moreover, the results show that education of the mother is more relevant if the mother has secondary school and father's education is more relevant if he has a university degree. However, there exists some evidence [see Table 4] that marital sorting by schooling for mothers is disturbing our results.

- Several measures of family structure reveal themselves as very important in educational decisions, although we control for other family background variables. Other Spanish research, Albert (2000) and Martinez (1999) do not find evidence of the relationship between living in a lone parent family and educational attainment. This difference arises from the fact that they focus on analyzing the decision of enrolling in the university and this could cause sample selection problems. However, in all the American studies that included information on family structure, growing up in a one-parent family is negatively related [see MacLanahan and Sandefur (1994) for reviews of past researches]. Moreover, it is important to note that the effect of only parent structure is more relevant if the break is produced when children are 0-5 years old. Furthermore, when the mother's age at births is lower or equal than 21 is also relevant. They also might indicate a single mother effect. By contrast, we obtain that family structure does not affect dropout schooling.

We can, therefore, conclude that adverse family background variables affect the number of young adults who have not attained post-compulsory education

13

and, therefore, it is a key factor to explain why Spanish post-compulsory schooling lags behind OECD standards.

6.2   Labor Market Conditions.

We test the effects of labor market conditions in the educational decision [see the model develop in section II]. Our objective is to capture the effect of unemployment on educational achievement, but also to analyze through which ways unemployment affects the education outcomes of the children [i.e."opportunity cost" versus "expectative effect"]. Our empirical strategy is the following. Firstly, in model I, II, III , we observe the effect of each measure of unemployment rate. Secondly, in models IV, V and VI, we consider two unemployment rates simultaneously, in order to distinguish more accurately the different effects of unemployment prospects on education. Tables 5 and 6 contain the former models for men and women[21]. At the bottom of these tables (and the following tables), we list the *p-value* for the additional controls included in the different models.

In models I-III of Table 5, we observe that unemployment rates of young men and primary workers exhibit the expected sign and they are significant. However, the unemployment rate of university degree workers has also a positive effect while we expected a negative impact. These results are consistent with our theoretical model in the sense that they indicate that unemployment rate affect schooling outcomes changing the cost of education, rather than returns to education.

In model IV, we introduce unemployment rate of young workers and deviations for the regional unemployment to the general one. We observe a significant and negative of the deviation that we can interpret as a "long-run" effect, and also "wealth effect", in the sense that living in poor areas dismiss return to education.

These results are similar to Rice (1999), which observes a positive effect of unemployment rate on the enrollment decision of young males. MacVicar and Rice (2001) provides the same evidence using time series data.

In order to distinguish more properly the different effects of unemployment prospects on education, we consider two unemployment rates simultaneously. Firstly, we consider unemployment of university and primary workers in model V. This model allows us to contrast in a complete manner the "return effect of unemployment". In model VI, we include unemployment of university degrees and young unemployment in order to isolate the effect of unemployment of university degree of adults.

We can observe in both models that the unemployment rate is significant and it has a positive effect although both coefficients are smaller. These results reinforce the presence of "opportunity cost effects".

In Table 5 we can observe that the pattern of labor market effects described above is repeated in the data of young women, although some coefficients differ.

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[21]We compute the Chow test and it accepts the existence of two groups, one for women and other for men.

Petrongolo and San Segundo (2000) showed, using a sample of individuals aged 16-17 in 1987, 1991 and 1996 that staying on school responds in fact positively to youth adult unemployment and negatively to adult unemployment. Moreover, Fernandez and Shioji (2000), using a panel data for 1983 to 1994 observe that unemployment of university degree has a negative effect, since unemployment has a positive effect. We obtain positive effect of all unemployment rates, but a negative effect of the deviation of unemployment rate.

We can conclude that high unemployment prospects experimented in Spain push Spanish youngsters who have started post-compulsory education to complete terciary education and, therefore, it is a key factor to explain the spectacular increase in terciary education levels.

6.3   Specification Checks.

Given the way we select the sample, we try to avoid many potential problems of sample selection. We select children between 15-19 years old in 1994/95 and measure the determinants some years later. The unique potential bias we can have comes from including children who have not completed their education at time of the survey[22]. In order to test if this bias is relevant, we carry out some specification checks.

Firstly, we use other endogenous variable that considers the final attainment level as the level actually completed by individuals. We also consider five groups of educational attainment.

When we consider the endogenous variable, the main results remain (see Table 7) to the first measure. Firstly, when we control by education of the parents and family structure, income effects are less important, although it is observed that there exist difficulties for children from poorer families. This is reinforced by the fact that father unemployment status and father out of work are negative and statistically significant. Furthermore, living in a lone parent family is associated with a significant lower educational attainment. Moreover, if we introduce several dummies to indicate the age at which the household is broken, we obtain the same results that in the former outcome: there exists an important negative association between schooling and experience in a single family when young adults were aged 0-5. Moreover, it is important to note that mother's completion of higher education plays a more important role than father's completion, although father's completion of a university degree has a stronger impact than mother's.

Secondly, we minimize this potential biases by means of including further dummies which are constructed by interacting the former ages variables with an additional dummy, still in school. In this case, all former results remain.

Therefore, we can conclude that we have no bias by the way we select the sample.

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[22] This problem could be eliminated by restricting the sample to older cohort, but we could not obtain the determinants at the age they are more relevant.

7   Conclusions.

The aim of this paper is to study the impact of family background and labor market conditions on the unbalanced educational attainment of Spanish youngsters.

Our results show that family background variables are strong determinants of the number of young adults that attained post-compulsory education. More specifically, we obtain that children's educational achievement is strongly related to parental education, although the presence of marital sorting by schooling [specially in mothers] does not allow us to distinguish whether father's or mother's education play a more important role. Youngsters from poor families find also difficulties in accessing higher levels of education. Moreover, family structure measures are relevant. Our results suggest that single mother's children have a lower probability of obtaining higher education levels.

Moreover, the results suggest that unemployment affects the demand for education through diminishing costs more than increasing returns to education. It could indicate that unemployment rate push people to enroll in terciary education. Finally, we provide some evidence that the individuals who live in an area with higher unemployment rates than national rates have less probability to access higher levels of education. These results provide clear evidence that high unemployment rates could disturb educational decisions.

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Table 1.
Descriptive Statistics.

Variable	Mean	Standard desviations	Range
Current school level			
Primary school (no qualifications)	0.285	0.451	0-1
Middle vocational school	0.158	0.365	0-1
Higher education	0.097	0.296	0-1
Upper Vocational school	0.117	0.322	0-1
University degrees	0.343	0.475	0-1
Highest academic qualifications			
Primary school	0.320	0.467	0-1
Lower vocational degrees	0.103	0.304	0-1
Upper Vocational school	0.133	0.340	0-1
Higher education	0.258	0.438	0-1
University degrees	0.185	0.388	0-1
Individuals controls			
Woman	0.477	0.500	0-1
Age 15[a] (reference category)	0.148	0.355	0-1
Age 16	0.157	0.364	0-1
Age 17	0.183	0.387	0-1
Age 18	0.179	0.383	0-1
Age 19	0.166	0.372	0-1
Age 20	0.168	0.374	0-1
North-east	0.126	0.332	0-1
North-west	0.162	0.369	0-1
Madrid (reference category)	0.099	0.299	0-1
Centre	0.134	0.341	0-1
East	0.190	0.392	0-1
South	0.208	0.406	0-1
Canarian Island	0.074	0.262	0-1
Family background			
Household income[b] (in euros)	15,981.39	11,765.18	107,228.05
25th percentile	9,195.15		
50th percentile	13,734.93		
75th percentile	19,914.37		
Mother's education[c]			
No qualifications (reference category)	0.699	0.459	0-1
Secondary school first-stage	0.167	0.373	0-1
Secondary school second-stage	0.059	0.235	0-1
Degree qualifications	0.074	0.263	0-1
Father's education[d]			
No qualifications (reference category)	0.617	0.486	0-1
Secondary school first-stage	0.146	0.354	0-1
Secondary school second-stage	0.111	0.315	0-1
Degree qualifications	0.123	0.328	0-1
Mother's employment status past five years (LFS)[e]			
in employment (reference category)	0.337	0.473	0-1
not in employment	0.124	0.329	0-1
out of the labor force	0.539	0.499	0-1
Father's employment status past five years (LFS)[f]			
in employment (reference category)	0.790	0.408	0-1
not in employment	0.095	0.294	0-1
out of the labor force	0.112	0.316	0-1

Household composition

Mother's age at birth[g]			
less or equal than 21	0.093	0.291	0-1
more or equal than 35	0.158	0.365	0-1
Father's age at birth[h]			
less or equal than 21	0.027	0.162	0-1
more or equal than 35	0.294	0.456	0-1
Number of siblings	1.727	1.185	0-8
Only child	0.099	0.299	0-1
Lone-parent family	0.105	0.214	0-1
Child's age household is broken[i]			
Age 0-5	0.175	0.381	0-1
Age 6-11	0.211	0.409	0-1
Age 12-16	0.442	0.497	0-1
Age +16	0.170	0.377	0-1

[a] Age in 1994.

[b] Missing values are replaced with reference category.

[c, e, g] Computed for individuals with available mother's information. Missing values are replaced with reference category.

[d, f, h] Computed for individuals with available father's information. Missing values are replaced with reference category.

[i] Computed only for lone-parent families.

TABLE 2: DETERMINANTS OF CURRENT SCHOOL ATTAINMENT.

	Model I	Model II	Model III	Model IV
Woman	0.350***	0.387***	0.391***	0.388***
	(6.72)	(7.31)	(7.34)	(7.33)
Household income				
25th percentile	-0.653***	-0.216**	-0.236**	
	(7.13)	(2.20)	(2.34)	
50th percentile	-0.491***	-0.110	-0.119	
	(5.80)	(1.24)	(1.32)	
75th percentile	-0.427***	-0.096	-0.093	
	(4.98)	(1.06)	(1.02)	
Father not in employment past five years	-0.372***	-0.321***	-0.306***	
	(3.62)	(3.17)	(3.02)	
Father out of the labor force past five years	-0.529***	-0.412***	-0.461***	
	(5.35)	(4.19)	(4.18)	
Mother not in employment	-0.152	-0.092	-0.076	
	(1.53)	(0.90)	(0.75)	
Mother out of the labour force	-0.159**	-0.025	-0.024	
	(2.40)	(0.36)	(0.33)	
Lone-parent family	-0.330***	-0.263***		
	(3.28)	(2.73)		
Mother Secondary school first-stage		0.493***	0.463***	0.490***
		(5.74)	(5.40)	(5.87)
Mother Secondary school second-stage		0.667***	0.634***	0.660***
		(4.85)	(4.61)	(5.04)
Degree qualifications		0.724***	0.678***	0.782***
		(4.76)	(4.35)	(5.27)
Father Secondary school first-stage		0.078	0.074	0.123
		(0.92)	(0.88)	(1.48)
Father Secondary school second-stage		0.322***	0.357***	0.397***
		(3.00)	(3.34)	(3.77)
Father Degree qualifications		0.726***	0.766***	0.878***
		(5.71)	(5.93)	(7.05)
Only child			-0.039	-0.099
			(0.36)	(0.93)
Number of sibling			-0.115***	-0.113***
			(3.94)	(3.86)
Mother's age at birth less or equal 21			-0.282***	-0.309***
			(2.77)	(3.06)
Mother's age at birth more or equal 35			0.080	0.021
			(0.82)	(0.23)
Father's age at birth less or equal 21			-0.201	-0.201
			(1.06)	(1.06)
Father's age at birth more or equal 35			-0.022	-0.085
			(0.27)	(1.09)
Child's age household is broken[k]				
Age 0-5			-0.464**	-0.412**
			(2.45)	(2.23)
Age 6-10			-0.178	-0.131
			(0.98)	(0.75)
Age 11-16			-0.167	-0.144
			(1.35)	(1.22)
Age +16			-0.527***	-0.504**
			(2.62)	(2.56)
Observations	1941	1941	1941	1941
Regional controls	0.00	0.00	0.00	0.00
Age controls	0.61	0.50	0.33	0.30

Note: z-statistics in brackets. They are computed using White (1982) for heterocedasticity and cluster for family. * Significant at 10%; ** significant at 5%; *** significant at 1%.

TABLE 3. PREDICTED PROBABILITIES OF EDUCATIONAL ATTAINMENT.
THE EFFECTS OF PARENTS' EDUCATION.

	Primary School	Middle Vocational School	Higher Education	Upper vocational school	University degrees
Mother secondary school first-stage	0.166	0.152	0.105	0.141	0.436
Mother secondary school second-stage	0.127	0.133	0.098	0.139	0.503
Mother University Degree	0.115	0.126	0.095	0.137	0.526
Father secondary school first-stage	0.272	0.184	0.111	0.133	0.300
Father secondary school second-stage	0.190	0.161	0.108	0.141	0.400
Father University Degree	0.095	0.113	0.089	0.133	0.570

Note: Value of predicted probability evaluated in the mean of independent variables and using estimates of model II.

TABLE 4.
**ESTIMATES OF THE EFFECTS OF MOTHER'S AND FATHER'S SCHOOLING
ON CHILDREN EDUCATIONAL OUTCOMES**

	(I) (Nives)	(II) (Nives)	(III) (Nives)
Father Secondary school first-stage	0.194**		
	(2.40)		
Father Secondary school second-stage	0.552***		
	(5.39)		
Father Degree qualifications	1.129***		
	(9.74)		
Mother Secondary school first-stage		0.586***	
		(7.23)	
Mother Secondary school second-stage		0.877***	
		(6.84)	
Mother Degree qualifications		1.006***	
		(7.23)	
Father Secondary school first-stage*			
Mother Secondary school first-stage			0.223*
			(1.85)
Mother Secondary school second-stage			0.591**
			(2.35)
Mother Degree qualifications			0.851**
			(2.16)
Father Secondary school second- stage*			
Mother Secondary school first-stage			0.623***
			(3.86)
Mother Secondary school second-stage			0.686***
			(2.99)
Mother Degree qualifications			0.957**
			(2.06)
Father University degree*			
Mother Secondary school first-stage			1.195***
			(6.65)
Mother Secondary school second-stage			1.161***
			(4.66)
Mother Degree qualifications			1.027***
			(5.98)
Observations	1941	1941	1941
Family backgrounds	0.00	0.00	0.00
Regional controls	0.00	0.00	0.00
Sex controls	0.00	0.00	0.00
Age controls	0.37	0.64	0.52

Note: robust z statistics in parentheses. They are robust in the same sense that Table 2 Family background controls include the following dummies: employment situation of the mother's father's, lone parent family and income. We also include number of siblings.

TABLE 5. THE EFFECTS OF UNEMPLOYMENT RATE IN EDUCATIONAL ATTAINMENT. MEN

	Model I	Model II	Model III	Model IV	Model V	Model VI
Unemployment rates of primary workers	0.149*** (11.03)					0.025 (1.28)
Unemployment rates of university degrees		0.305*** (14.62)			0.203*** (6.39)	0.279*** (9.29)
Unemployment rates of young			0.082*** (13.69)	0.095*** (15.07)	0.040*** (4.41)	
Deviations of general rate				-0.088*** (6.41)		
Observations	994	994	994	994	994	994
Regional controls	0.00	0.00	0.00	0.72	0.00	0.00
Family backgrounds	0.00	0.00	0.00	0.00	0.00	0.00

Note: Family backgrounds controls include the following dummies: employment situation of the mother's father's. lone parent family and income. We include number of siblings. Robust z statistics in parentheses.* Significant at 10%; ** significant at 5%; *** significant at 1%.

TABLE 6. THE EFFECTS OF UNEMPLOYMENT RATES IN EDUCATIONAL ATTAINMENT. WOMEN

	Model I	Model II	Model III	Model IV	Model V	Model VI
Unemployment rates of primary workers	0.169*** (11.78)					0.072*** (3.66)
Unemployment rates of university degrees		0.242*** (14.39)			0.165*** (7.56)	0.177*** (7.42)
Unemployment rates of young			0.087*** (13.32)	0.112*** (15.88)	0.047*** (5.49)	
Deviations of general rate				-0.108*** (8.07)		
Observations	914	914	914	914	914	914
Regional controls	0.00	0.00	0.00	0.06	0.00	0.00
Family backgrounds	0.00	0.00	0.00	0.00	0.00	0.00

Note: Family backgrounds controls include the following dummies: employment situation of the mother's father's. lone parent family and income. We include number of siblings. Robust z statistics in parentheses.* Significant at 10%; ** significant at 5%; *** significant at 1%.

SPECIFICATION CHECKS.

TABLE 7: DETERMINANTS OF FINAL SCHOOL ATTAINMENT.

	Model I	Model II	Model III	Model IV
Woman	0.416***	0.454***	0.456***	0.454***
	(8.25)	(8.89)	(8.88)	(8.83)
Household income				
25th percentile	-0.568***	-0.178*	-0.194**	
	(6.45)	(1.86)	(2.00)	
50th percentile	-0.480***	-0.143	-0.153*	
	(5.93)	(1.64)	(1.74)	
75th percentile	-0.337***	-0.041	-0.039	
	(4.16)	(0.48)	(0.46)	
Father not in employment	-0.399***	-0.356***	-0.346***	
	(3.97)	(3.58)	(3.50)	
Father out of the labour force	-0.532***	-0.427***	-0.468***	
	(5.42)	(4.35)	(4.20)	
Mother not in employment	-0.149	-0.098	-0.086	
	(1.52)	(0.98)	(0.88)	
Mother out of the labour force	-0.145**	-0.032	-0.030	
	(2.23)	(0.47)	(0.42)	
Lone-parent family	-0.272***	-0.198**		
	(2.63)	(1.97)		
Mother Secondary school first-stage		0.424***	0.400***	0.426***
		(4.90)	(4.62)	(5.05)
Mother Secondary school second-stage		0.565***	0.528***	0.553***
		(4.82)	(4.49)	(4.93)
Degree qualifications		0.514***	0.474***	0.573***
		(3.98)	(3.54)	(4.48)
Father Secondary school first-stage		0.092	0.086	0.130
		(1.09)	(1.02)	(1.55)
Father Secondary school second-stage		0.288***	0.310***	0.352***
		(2.75)	(2.93)	(3.33)
Father Degree qualifications		0.631***	0.666***	0.773***
		(5.48)	(5.72)	(7.02)
Only child			-0.026	-0.078
			(0.24)	(0.73)
Number of sibling			-0.097***	-0.094***
			(3.27)	(3.14)
Mother's age at birth less or equal 21			-0.251**	-0.279***
			(2.41)	(2.69)
Mother's age at birth more or equal 35			0.066	0.009
			(0.70)	(0.10)
Father's age at birth less or equal 21			-0.149	-0.158
			(0.80)	(0.84)
Father's age at birth more or equal 35			-0.023	-0.088
			(0.28)	(1.16)
Child's age household is broken[k]				
Age 0-5			-0.468**	-0.407**
			(2.27)	(2.04)
Age 6-10			-0.205	-0.154
			(1.28)	(1.02)
Age 11-16			-0.078	-0.046
			(0.58)	(0.36)
Age +16			-0.348	-0.323
			(1.56)	(1.48)
Observations	1941	1941	1941	1941
Regional controls	0.00	0.01	0.01	0.00
Age controls	0.00	0.00	0.00	0.00

Note: z-statistics in brackets. They are computed using White (1982) for heterocedasticity and cluster for family. * Significant at 10%; ** significant at 5%; *** significant at 1%.

TABLE 8: DETERMINANTS OF THE CURRENT SCHOOL ATTAINMENT.
 Including interaction terms

	Model I	Model II	Model III	Model IV
Woman	0.287***	0.314***	0.313***	0.307***
	(5.41)	(5.86)	(5.80)	(5.72)
Household income				
25th percentile	-0.441***	-0.141	-0.161	
	(4.74)	(1.43)	(1.59)	
50th percentile	-0.339***	-0.063	-0.077	
	(3.93)	(0.70)	(0.84)	
75th percentile	-0.288***	-0.049	-0.054	
	(3.30)	(0.53)	(0.58)	
Father not in employment past five years	-0.267***	-0.240**	-0.219**	
	(2.75)	(2.50)	(2.28)	
Father out of the labour force past five years	-0.390***	-0.318***	-0.306***	
	(3.92)	(3.24)	(2.77)	
Mother not in employment past five years	-0.117	-0.072	-0.062	
	(1.17)	(0.71)	(0.61)	
Mother out of the labour force past five years	-0.104	-0.010	0.007	
	(1.59)	(0.14)	(0.09)	
Lone-parent family	-0.260***	-0.235**		
	(2.68)	(2.49)		
Mother Secondary school first-stage		0.376***	0.352***	0.365***
		(4.32)	(4.02)	(4.22)
Mother Secondary school second-stage		0.606***	0.573***	0.582***
		(4.04)	(3.80)	(4.03)
Degree qualifications		0.495***	0.457***	0.509***
		(3.18)	(2.88)	(3.39)
Father Secondary school first-stage		-0.038	-0.047	-0.014
		(0.45)	(0.56)	(0.17)
Father Secondary school second-stage		0.162	0.181	0.204+
		(1.48)	(1.64)	(1.88)
Father Degree qualifications		0.561***	0.590***	0.665***
		(4.18)	(4.35)	(4.97)
Only child			-0.051	-0.091
			(0.45)	(0.82)
Number of sibling			-0.085***	-0.083***
			(2.74)	(2.67)
Mother's age at birth less or equal 21			-0.274***	-0.293***
			(2.60)	(2.82)
Mother's age at birth more or equal 35			0.023	-0.013
			(0.23)	(0.14)
Father's age at birth less or equal 21			-0.136	-0.137
			(0.69)	(0.70)
Father's age at birth more or equal 35			-0.094	-0.135+
			(1.17)	(1.75)
Child's age household is broken[k]				
Age 0-5			-0.555***	-0.532**
			(2.58)	(2.49)
Age 6-10			-0.247	-0.226
			(1.62)	(1.50)
Age 11-16			-0.083	-0.075
			(0.70)	(0.66)
Age +16			-0.366	-0.354
			(1.52)	(1.47)
Observations	1941	1941	1941	1941
Regional controls	0.03	0.06	0.05	0.02
Age controls x still in school	0.00	0.00	0.00	0.00

Note: z-statistics in brackets. They are computed using White (1982) for heterocedasticity and cluster for family. * Significant at 10%; ** significant at 5%; *** significant at 1% .

APPENDIX 1

Let us see how our model can help to analyze the different effects of unemployment on educational attainment. We first consider the simple case in which the probability of finding a job in the second period is equal to 1, i.e. $j(s) = j = 1$. In this case, the FOC (10) reduces to:

$$\pi_1 w_1 + p_s = \frac{1}{\beta} f'(s) \tag{1}$$

We also assume perfect capital markets, which implies that the discount rate is equal to R^{-1}. Notice that in this case marginal schooling costs are given by foregone earnings and tuition costs, but, in contrast with traditional human capital theory, they are offset by the probability of becoming unemployed when individuals are young. It is important to note that the foregone earnings depend on the probability of becoming unemployed when the individual is young[1]. More specifically, let $f(s) = s^\gamma$, with $0 < \gamma < 1$. Then:

$$s^* = \left[\frac{R^{-1}(\pi_1 w_1 + p_s)}{\gamma}\right]^{\frac{1}{\gamma-1}} \tag{2}$$

Therefore, the impact of youth unemployment and tuition cost on the optimal level of education, are given by, respectively:

$$\frac{\partial s^*}{\partial \pi_1} = -\frac{R^{-1}}{\gamma(1-\gamma)}\left[\frac{R^{-1}(\pi_1 w_1 + p_s)}{\gamma}\right]^{\frac{2-\gamma}{\gamma-1}} w_1 < 0 \tag{3}$$

$$\frac{\partial s^*}{\partial p_s} = -\frac{R^{-1}}{\gamma(1-\gamma)}\left[\frac{R^{-1}(\pi_1 w_1 + p_s)}{\gamma}\right]^{\frac{2-\gamma}{\gamma-1}} < 0 \tag{4}$$

On the one hand, "youth unemployment" encourages additional education through lowering the opportunity cost of education. On the other hand, higher tuition costs discourage individuals' enrollment.

We move now to another extreme position in which the probability of finding a job in the second period does not depend on the level of education, that is, $j(s) = j$, and therefore $j'(s) = 0$. Furthermore, we rule out young unemployment, i.e., $\pi_1 = 1$. Then, FOC (10) transforms into:

$$p_s + w_1 = Rjf'(s) \tag{5}$$

Using the former earnings function:

$$s^* = \left[\frac{R^{-1}(w_1 + p_s)}{j\gamma}\right]^{\frac{1}{\gamma-1}} \tag{6}$$

In this case, we can evaluate the impact of "adult unemployment" and tuition cost, respectively:

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[1] Notice that this result differs from human traditional theory (Willis (1986), Card (2000)).

$$\frac{\partial s^*}{\partial j} = \frac{R^{-1}(w_1 + p_s)}{\gamma(1-\gamma)j^2}\left[\frac{R^{-1}(w_1 + p_s)}{j\gamma}\right]^{\frac{2-\gamma}{\gamma-1}} > 0 \tag{7}$$

$$\frac{\partial s^*}{\partial p_s} = -\frac{R^{-1}}{\gamma(1-\gamma)j}\left[\frac{R^{-1}(w_1 + p_s)}{j\gamma}\right]^{\frac{2-\gamma}{\gamma-1}} < 0 \tag{8}$$

The effect of "adult unemployment" on the optimal level of education is the opposite to "young unemployment". This is so because higher adult unemployment diminishes returns to education and, hence, reduces optimal investment in education. The effect of tuition cost is the same as before. The same result is obtained by Kodde (1986) using a more general function.

Finally, we assume that the labor market outcomes of investing in education depends on the probability of becoming employed[2], $j(s)$. More precisely, consider the following function, $j(s) = [1 - e^{-\phi s}]$, with $0 < \phi < 1$. Furthermore, we also assume that earnings are independent of s, i.e., $f(s) = B$ and "youth unemployment" is ruled out , i.e., $\pi_1 = 1$. Therefore, the FOC (10) is given by:

$$p_s + w_1 = R\phi e^{-\phi s}(B - z) \tag{9}$$

The effects of unemployment-education elasticity, ϕ, and tuition costs, respectively, are evaluated by the following expressions:

$$\frac{\partial s^*}{\partial \phi} = \frac{1}{\phi^2}\left[1 + \ln\left[\frac{R^{-1}(p_s + w_1)}{\phi(B - z)}\right]\right] > 0 \tag{10}$$

$$\frac{\partial s^*}{\partial p_s} = -\frac{1}{\phi}\left[\ln\frac{R^{-1}(p_s + w_1)}{\phi(B - z)}\right] < 0 \tag{11}$$

A higher probability of finding a job if an individual has post-compulsory education stimulates college-going behavior[3]. By contrast, as before, higher tuition costs decrease the demand for education[4].

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[2] See Kodde (1986) and, more recently, Card (1995).

[3] It must hold that if $\phi < \frac{R(p_s + w_1)}{(B - z}$.

[4] Providing $\phi < \frac{R(p_s + w_1)}{(B - z}$.

APPENDIX 2.
Table 1. Trends in educational attainment at tertiary level (1991-2001)
Percentage of the population of 25 to 34-year-olds that has attained tertiary education, by gender.

|	Year										
	1991	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**
OECD countries											
Australia	23	m	23	24	25	25	26	28	29	31	34
Austria	8	8	m	9	9	9	12	13	13	15	14
Belgium	27	27	29	30	30	32	33	34	34	36	38
Canada	32	33	35	38	40	42	44	45	47	48	51
Czech Republic	m	m	m	12	12	11	11	10	11	11	11
Denmark	m	m	m	m	m	m	m	27	29	29	29
Finland	33	33	m	34	35	35	36	36	37	38	38
France	20	22	23	24	25	26	28	30	31	32	34
Germany	21	20	m	20	21	20	21	22	22	22	22
Greece	m	m	m	25	26	28	22	24	25	24	24
Hungary	m	m	m	m	m	14	12	14	14	15	15
Iceland	m	m	m	m	m	24	23	24	28	28	26
Ireland	20	21	m	24	27	31	33	29	41	47	48
Italy	7	7	m	8	8	8	m	9	10	10	12
Japan	m	m	m	m	m	m	45	45	45	47	48
Korea	m	m	m	m	29	30	m	34	35	37	40
Luxembourg	m	m	m	m	m	m	m	m	21	23	23
Mexico	m	m	m	m	m	m	17	17	16	17	18
Netherlands	22	24	m	24	25	25	m	27	25	27	27
New Zealand	23	23	m	21	24	m	25	26	26	27	29
Norway	27	28	m	31	32	30	30	33	35	35	38
Poland	m	m	m	m	10	m	10	12	12	14	15
Portugal	9	m	m	13	14	14	m	11	11	12	14
Slovak Republic	m	m	m	13	12	12	10	11	11	11	12
Spain	16	22	m	25	27	29	30	32	33	34	36
Sweden	27	27	m	27	29	28	29	31	32	34	37
Switzerland	21	21	m	22	22	23	25	25	26	26	26
Turkey	6	6	m	7	8	m	7	8	8	9	10
United Kingdom	19	21	m	23	23	24	25	26	27	29	29
United States	30	30	m	32	34	35	36	36	37	38	39

Source: OECD. (www.oecd.org/edu/eag2003).

Table 2. Population that has attained at least upper secondary education (2001)
Percentage of the population that has attained at least upper secondary education[1],
*by age group.*

| | Age group | | | | |
	25-64	25-34	35-44	45-54	55-64
OECD countries					
Australia	59	71	60	55	44
Austria	77	84	81	73	65
Belgium	59	76	64	53	39
Canada	82	89	85	81	67
Czech Republic	86	92	90	84	76
Denmark	80	86	80	80	72
Finland	74	87	84	70	51
France[2]	64	78	67	58	46
Germany	83	85	86	83	76
Greece	51	73	60	43	28
Hungary	70	81	79	72	44
Iceland	57	61	60	56	46
Ireland	58	73	62	48	35
Italy	43	57	49	39	22
Japan	83	94	94	81	63
Korea	68	95	77	49	30
Luxembourg	53	59	57	47	42
Mexico	22	25	25	17	11
Netherlands	65	75	69	61	50
New Zealand	76	82	80	75	60
Norway	86	94	91	82	71
Poland	46	52	48	44	36
Portugal	20	32	20	14	9
Slovakia	85	94	90	83	66
Spain	40	57	45	29	17
Sweden	81	91	86	78	65
Switzerland	87	92	90	85	81
Turkey	24	30	24	19	13
United Kingdom[2]	63	68	65	61	55
United States	88	88	89	89	83

Source: **OECD**

Graph 1. Unemployment rate for young-workers with primary studies by area and sex. 1991-1997.
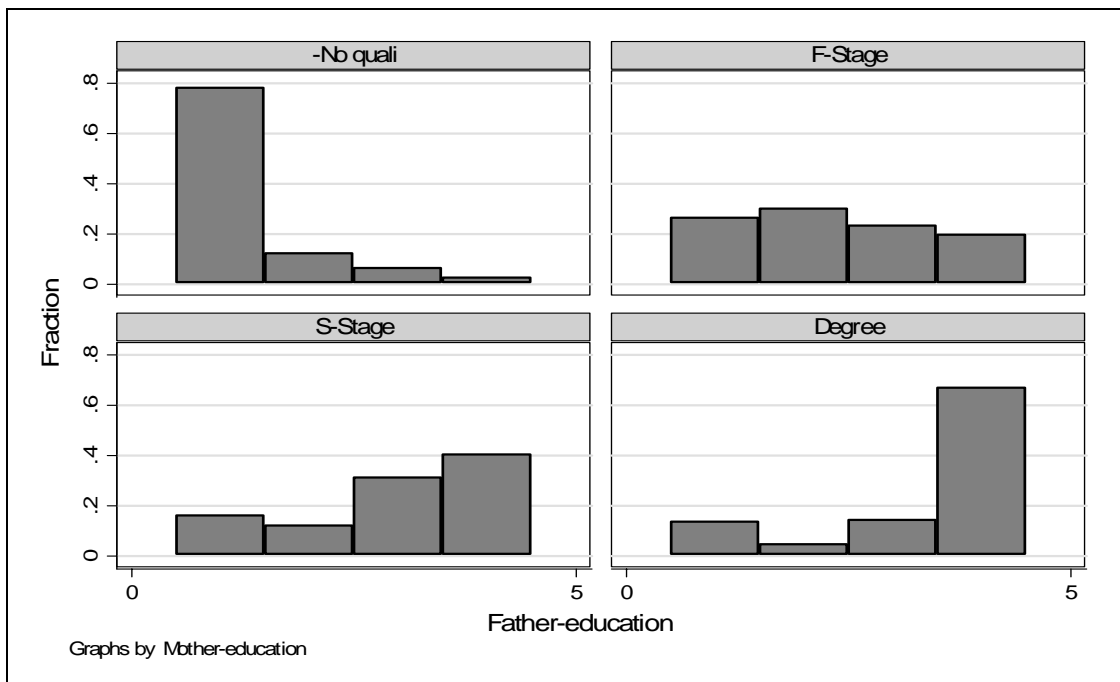

Graphs by reg
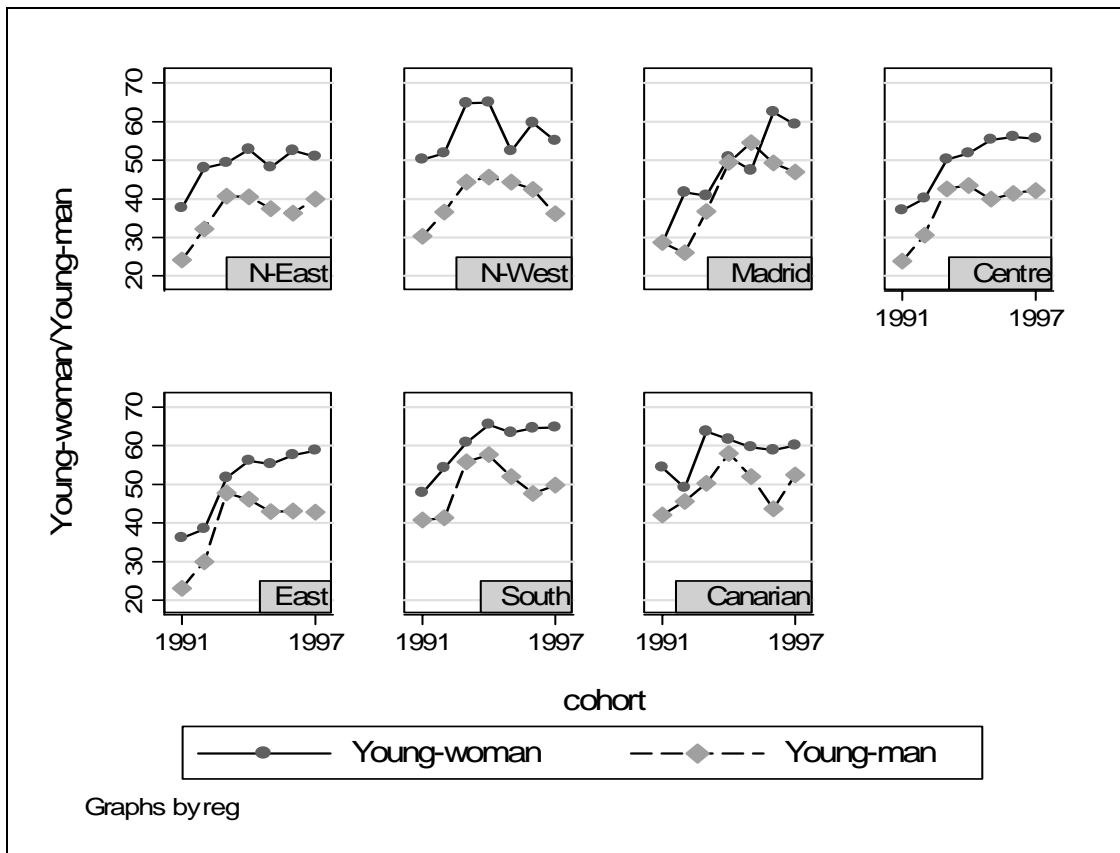
Graph 2. Unemployment rate for workers with primary studies by area and sex. 1991-1997.

Graphs by reg
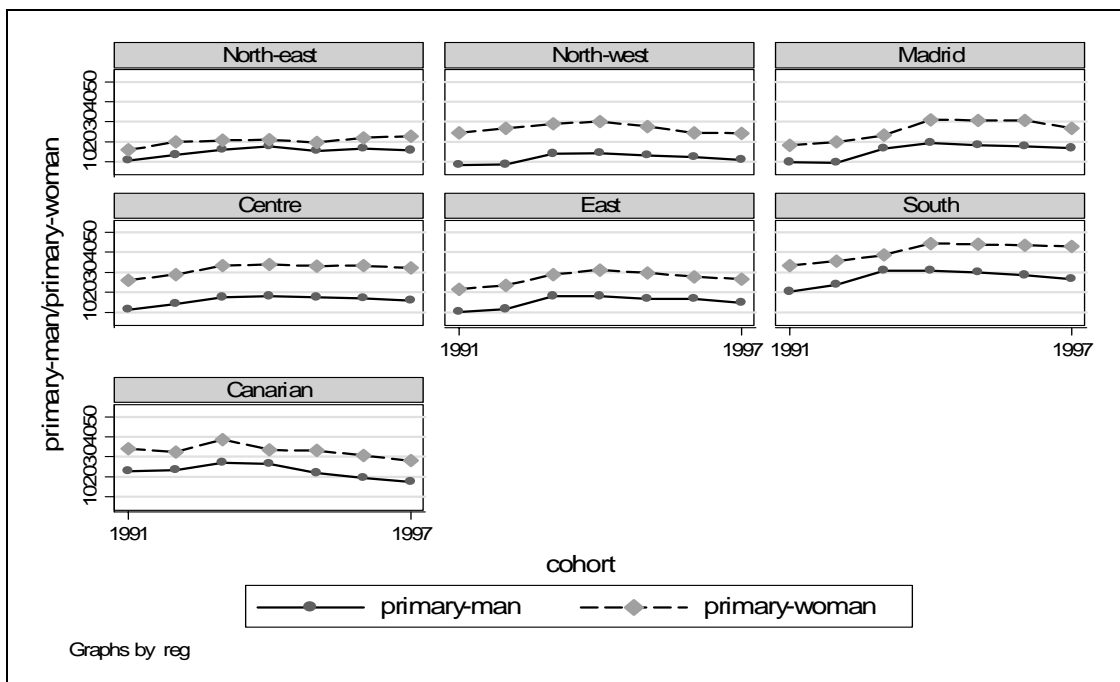
Graph 3. Unemployment rate for workers with university degrees by area and sex. 1991-1997.

Graphs by reg
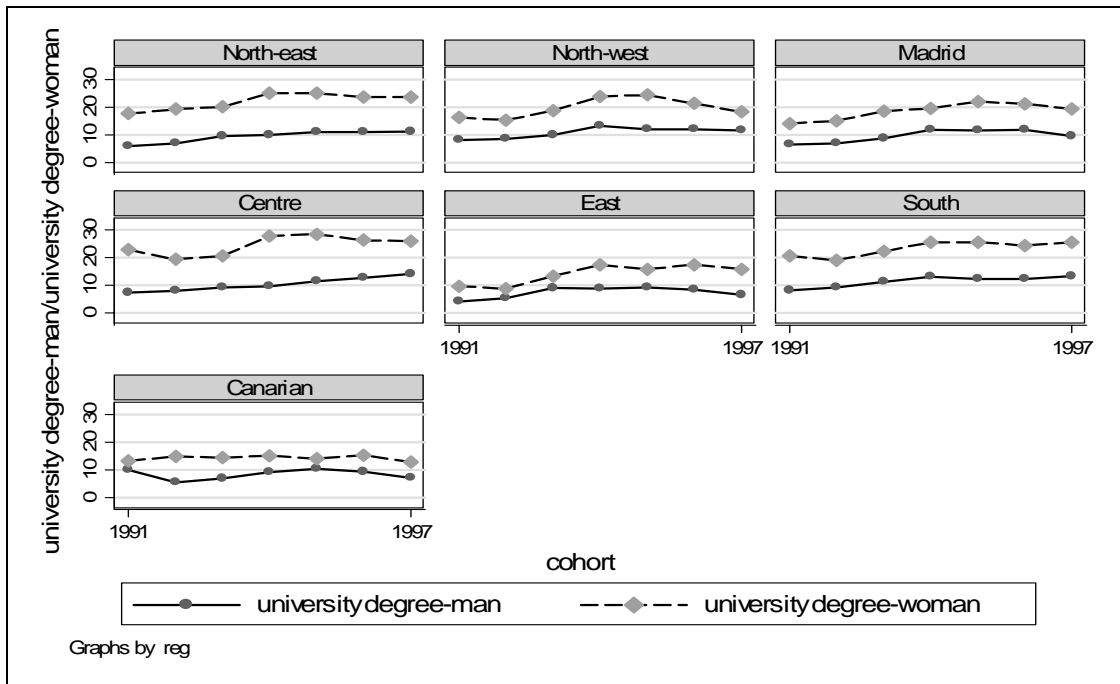
Graph 4: Father's education by mother's education

Graphs by Mother-education

Graph 5: Mother's education by father's education.

Graphs by Father-education