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# The determinants of post-compulsory education in Spain

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In this article we explain why Spain is at the bottom of the developed countries in secondary education. We have made use of extensive information contained in the ECHP supplemented with labour market data. We find that higher rates of unemployment diminish the probability of investing in post-compulsory education and this effect differs across the population. Our results suggest that a 'poverty effect' makes access more difficult to secondary education in Spain.

## I. Introduction

Spain presents a severe educational gap compared to most OECD countries in secondary education graduation rates. In 2005, 33% of Spanish<sup>1</sup> youngsters did not complete secondary education, sharply contrasting with Germany, Greece (3%) and France (18%).<sup>2</sup> The low level of secondary education should be a cause of serious concern, since upper secondary level is often considered the minimum credential for successful labour market entry. Youngsters that do not complete secondary education are more likely to experience unemployment, to hold unstable jobs, and to enjoy lower earnings growth along their careers (Stern *et al.*, 1989).

In this article we address this evidence by studying the impact of family background and labour market conditions on the decision to attend post-compulsory education by Spanish youngsters.

For this purpose, we use seven cross-sections of youth (born during 1977–1985) drawn for the first seven waves of the European Community

Household Panel (ECHP) for Spain matched with the general unemployment rate. This approach allows us to observe variations across cohorts and regions and obtain better estimates than previous studies.<sup>3</sup> The period analysed provides an interesting case of study since Spain has experienced a steep fall in the unemployment rate [see Fig. 2 in the Appendix].

For the United States and England, there are a lot of empirical studies that analyse the determinants of participation in compulsory education. In this sense, Rice (1999) finds important effects for school type, parental education and parental socio-economic groups. She also finds that unemployment has fairly strong effects, although its effect differs according to population group. Clark (2002), using a panel data approach, finds that the increase in exam achievement and youth unemployment affect participation rates. For the Spanish case, previous work has mainly focused on the determinants of the demand for higher education [see Albert (2000) and Casquel and Uriel (2004)].

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<sup>1</sup> See OECD (2005).

<sup>2</sup> In fact, among OECD countries, only the Slovak Republic, Turkey and Mexico present worse figures.

<sup>3</sup> Petrongolo and San Segundo (2002) also analyse the impact of family characteristics and local market conditions on the demand for post-compulsory education. However, they use a cross-section approach.

In the next section, we present the econometric model. In Section III we describe the data and variables. In Section IV we present the results. Finally, in Section V we present the conclusion.

## II. The Econometric Model

We conduct a binomial probit regression analysis of the probability that an individual will attend post-compulsory education. The regression adopts the following form:

$$P_{irt} = \beta_x X'_{irt} + \beta_z Z'_{rt-1} + D_r + U_{irt} \quad (1)$$

where  $P_{irt}$  is a variable that takes the value 1 if the individual is attending post-compulsory education in period  $t$  in local market  $r$  and takes the value 0 otherwise,  $X'_{irt}$  include individual level variables such as family background characteristics,  $Z'_{rt-1}$  include period and location-specific measures of unemployment rates,  $D_r$  includes region dummy variables and  $\beta_x$  and  $\beta_z$  reflect the effects on educational outcomes of family backgrounds and labour market conditions, respectively. Finally,  $U_{irt}$  is the error term normally distributed with mean zero and variance one. In this way, we exploit the longitudinal nature of our data.

## III. Data and Variables

The estimation of the former model requires data on individual's characteristics, family background and labour 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 such as labour market dynamics, education, etc. and annually interviews a representative sample of 80 000 households, of which 8 000 are Spanish. Sample individuals are re-interviewed each successive year and children in the original households are interviewed when they are 16.

In order to capture the effects of unemployment, individual record files are matched with general unemployment rate [by area, sex and year], which is collected from the statistics published by the National Institute of Statistics (INE).

We restrict our analysis to individuals (i) aged 16–17 in December of each wave, (ii) who live with

at least one biological, adoptive or step-parent (iii) whose educational attainment can be observed. Condition (ii) is imposed in order to match the data on family backgrounds from the parents' records to that from their children. Since 98% of the sample individuals live with their parents when aged 15–16, this condition should not affect the randomness of the sample. In this way, we allow the unemployment rate to vary across regions and across time. Our final sample consists of 1516 individuals.

We choose as the endogenous variable an indicator that is equal to one if the individual has undertaken further general education at the age of 16–17 and zero if the individual leaves the educational system.<sup>4</sup>

As controls, we include a gender dummy, individual age, regional dummies and a set of dummies for the educational level of education of the mother (father) measured as the highest completed academic qualification.

To measure parental income we use the household income the year before we obtain the educational outcome. We divide family income into four groups based on percentiles. We also generate a set of dummies indicating the employment situation of the parents.

We also include a dummy variable that is equal to one if the individual lives in a one-parent family, dummy variables for the cases where the mother's (father's) age at the child's birth was below or equal to 21 and above or equal to 35. Finally, we also compute the number of siblings.

Descriptive statistics of the variables are presented in Table 1.

Including the general unemployment rate in the model captures labour market conditions. These allow us to observe how temporary shocks affect educational decisions. It is not easy to predict how the unemployment rate affects participation in post-compulsory education. While high expected unemployment would reduce the benefits of the schooling investment, high current unemployment would reduce the opportunity cost of education [see Casquel and Uriel (2004)].

As we can see in Fig. 2 in the Appendix, the period analysed is characterized by a steep fall in the unemployment rate, both for women and men. From 1993–1999, the unemployment rate for men fell by up to 9% in the north-west, 6% in Madrid and 10% in the south of Spain. The unemployment rate for women also experienced a steep decline. However, there still exist marked differences among regions [we can observe the highest unemployment

<sup>4</sup>In the period analysed, the educational system (LOGSE) establishes that youngsters are not allowed to enter the labour market before age 16.

**Table 1. Descriptive statistics**

	Mean	SD
Attending post-compulsory education	0.569	0.495
Age 16	0.141	0.348
Age 17	0.859	0.348
Woman	0.472	0.499
Income 25th	1.02E+04	0
Income 50th	1.55E+04	0
Income 75th	2.33E+04	0
One parent family	0.119	0.324
Father labour market status		
Employed	0.737	0.441
Unemployed	0.06	0.238
Out of the labour force	0.094	0.291
Mother labour market status		
Employed	0.365	0.482
Unemployed	0.116	0.32
Out of the labour force	0.505	0.5
Mother education		
No qualifications	0.116	0.32
Secondary education 1st stage	0.577	0.494
Secondary education 2nd stage	0.232	0.422
University degree	0.092	0.289
Father education		
No qualifications	0.083	0.276
Secondary education 1st stage	0.48	0.5
Secondary education 2nd stage	0.186	0.389
University degree	0.109	0.312
Number of siblings	1.422	0.98
Mother's age at birth <21	0.094	0.292
Age at birth >35	0.168	0.374
Father's age at birth <21	0.032	0.177
Age at birth >35	0.304	0.46
North-East	0.144	0.351
North-West	0.144	0.352
Madrid (reference category)	0.098	0.298
Centre	0.139	0.346
East	0.185	0.388
South	0.211	0.408
Canarian	0.073	0.259

rate in the south]. It should be noted that women's unemployment rate was considerably higher than men's.

#### IV. Results

The results of the determinants of demand for post-compulsory education are presented in Tables 2 and 3. Preliminary analyses suggested that the effects of most family controls were similar for men and for women, thus we present the results

obtained from the pooled data set.<sup>5</sup> At the bottom of each table, we list the *p*-value for additional controls included in our regressions.

In Table 2 we present the marginal effects of four different specifications.

In model I, we include as controls sex, family structure, income and the employment situation of the parents. In this model we observe that income has a strong effect on the demand for education. Belonging to a poor family with income in the lowest percentile (25th) decreases by 23% the probability of attending post-compulsory education. Moreover, the employment situation of the father plays an important role.

It can be observed that 16-year-old women are more likely to remain in the schooling system than males. However, living in a one-parent family does not have a significant impact. This result differs from previous studies that analyse the determinants of educational attainment, in which it can be observed that living in a one-parent family plays an important role [see Casquel and Uriel (2004)]. Regional fixed effects are jointly significant (*p*-value = 0.02), indicating that permanent differences exist between regions.

In model II, we include parental education. We can observe that parental education appears as a strong determinant of enrolment in post-compulsory education, but it is important to note that although the effect of income diminishes, it continues to be relevant.

In model III, we additionally control whether the mother's (father's) age is below 21 or over 35 and the number of siblings. We can observe that family size has a negative and significant impact. All the results obtained reinforce the idea that education is strongly influenced by the financial situation of the parents. However, the mother's (father's) age at birth has no significant impact.

In model IV, we replace regional controls with the regional unemployment rate. We detect a negative effect of the local unemployment rate on the participation decision. This may indicate that those who live in poor areas are less likely to attend post-compulsory education.

In our results, we observe that income is a strong determinant of participation in post-compulsory education. Other controls such as the number of siblings and the employment situation of the parents reinforce this idea. Moreover, we obtain that unemployment rate has a negative effect. This can

<sup>5</sup> We perform a Chow test in order to observe the differences between men and women.

**Table 2. Participation in post-compulsory education**

	Model I	Model II	Model III	Model IV
Woman	0.093*** (3.57)	0.105*** (3.99)	0.105*** (3.96)	0.213*** (5.31)
Income 25th	-0.231*** (5.91)	-0.142*** (3.28)	-0.160*** (3.57)	-0.100*** (2.22)
Income 50th	-0.178*** (4.60)	-0.087** (2.09)	-0.104** (2.40)	-0.046 (1.07)
Income 75th	-0.123*** (3.25)	-0.065 (1.59)	-0.078* (1.89)	-0.045 (1.09)
Father unemployed	-0.133** (2.35)	-0.092 (1.61)	-0.085 (1.47)	-0.095 (1.64)
Father out of the labour force	-0.127*** (2.83)	-0.074 (1.59)	-0.079 (1.59)	-0.064 (1.30)
Mother unemployed	-0.067 (1.51)	-0.053 (1.15)	-0.049 (1.07)	-0.041 (0.88)
Mother out of the labour force	-0.044 (1.52)	0.002 (0.05)	0.002 (0.06)	0.010 (0.33)
Lone parent family		0.059 (1.34)	0.055 (1.24)	0.046 (1.02)
Mother secondary education 1st stage		0.122*** (3.59)	0.117*** (3.39)	0.090*** (2.60)
Mother secondary education 2nd stage		0.179*** (3.59)	0.166*** (3.26)	0.154*** (3.04)
Mother university degree		0.173*** (2.91)	0.161*** (2.66)	0.211*** (3.49)
Father secondary education 1st stage		0.069* (1.88)	0.070* (1.87)	0.067* (1.79)
Father secondary education 2nd stage		0.112** (2.43)	0.111** (2.38)	0.099** (2.11)
Father university degree		0.155*** (2.91)	0.159*** (2.97)	0.180*** (3.35)
Number of siblings			-0.038*** (2.65)	-0.022 (1.58)
Mother's age at birth <21			-0.041 (0.80)	-0.027 (0.53)
Mother's age at birth >35			0.006 (0.13)	-0.007 (0.16)
Father's age at birth <21			-0.040 (0.46)	-0.046 (0.53)
Father's age at birth >35			0.005 (0.14)	0.018 (0.48)
Unemployment rate				-0.008*** (3.60)
Observations	1516	1516	1516	1516
Regional controls	0.02	0.01	0.00	No
Chi squared	14.73	16.54	19.14	No

Notes: Robust *z* statistics in parentheses.

\*, \*\* and \*\*\*Significant at 10, 5 and 1% levels, respectively. As reference category we use income higher percentile, father (mother) employed, father (mother) no qualifications and Madrid.

**Table 3. Post-compulsory education by income group – marginal effects**

	< 25th	< 50th	< 75th	> 75th
Local unemployment rate	-0.011** (2.53)	-0.010** (2.14)	-0.012** (2.54)	-0.004 (0.99)
Family background	0.37	0.12	0.00	0.00
Sex controls	0.00	0.03	0.00	0.02
Observations	379	381	372	375

Notes: Robust *z* statistics in parentheses.

\*, \*\* and \*\*\*Significant at 10, 5 and 1% levels, respectively. As family background we include employment situation of the father (mother), education of the father (mother), number of siblings and father's (mother's) age at birth.

be interpreted as meaning that the unemployment rate diminishes the return to education.

Corak *et al.* (2004) for Canada also obtained that income is an important determinant of educational decisions.

Petrongolo and San Segundo (2002) analyse the demand for compulsory education in Spain using a sample drawn from the Labor Force Survey (LFS), but this survey does not report income. For this reason, their results ought to be interpreted with caution.

Some authors, such as Smith and Naylor (2001) and Rice (1999) argue that the effect of the unemployment rate in demand on education differs

across different groups of students. For these reasons, we perform regressions for each income percentile. We also include all the regressors we have used before. The effect of unemployment by income group is reported in Table 3.

We observe that the marginal effects of the local unemployment rate strongly differ among income groups. Among people that belong to the 25th, 50th and 75th percentiles we observe that the effect of unemployment is negative and statistically significant. By contrast, for youngsters that belong to the higher percentile, the marginal effects are smaller and not significant. We can conclude that

people with higher incomes are not affected by the unemployment rate.

## V. Conclusions

In this study, we explain why Spain is at the bottom of the developed countries in secondary education. For this purpose, we have made use of extensive information contained in the ECHP supplemented with labour market data.

We find that income strongly affects youngsters' decisions. Moreover, and in contrast with previous studies, we find that higher rates of unemployment diminish the probability of investment in post-compulsory education. It is important to note that this effect differs across population. Our results suggest that a 'poverty effect' makes access more difficult to secondary education in Spain.

## Acknowledgements

We thank Javier Ferri and Antoni Cunyat for useful comments. The financial support of the IVIE is gratefully acknowledged.

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## Appendix

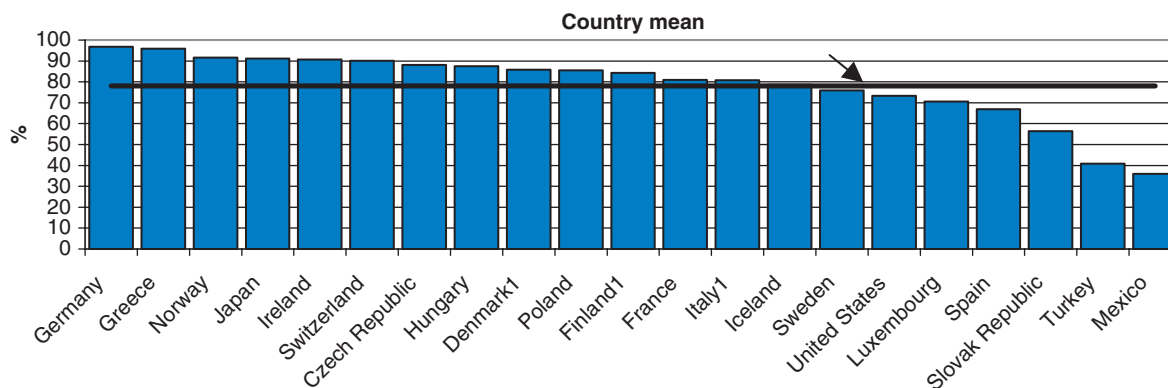


Fig. 1. Percentage of upper secondary graduates to the population at the typical age of graduation

Source: OECD. Table A2.1.

Notes: 1. Year of reference 2002; Countries are ranked in descending order of upper secondary graduation rates.

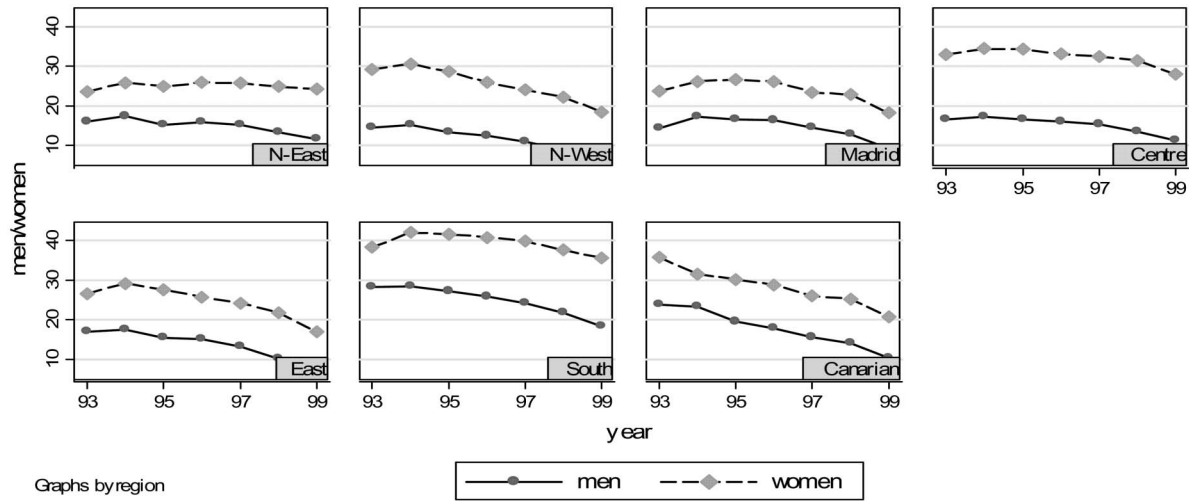


Fig. 2. Unemployment rate by sex and area 1993–1997