

# **HIGHER EDUCATION DEMAND IN SPAIN: THE INFLUENCE OF LABOUR MARKET SIGNALS AND FAMILY BACKGROUND\***

**Cecilia Albert**

WP-EC 98-17

Correspondencia: Universidad de Alcalá de Henares  
Facultad de CC.EE. y EE. Depto. de Fund. de Economía e Historia Económica  
Pl. de la Victoria, 3. 28801 Alcalá de Henares.  
Tel.: 918 854 239 / Fax: 918 854 202 / e-mail: ehcav@funeco.alcala.es

Editor: Instituto Valenciano de Investigaciones Económicas, s.a.  
First Edition July 1998  
ISBN: 84-482-1832-9  
Depósito Legal: V-2718-1998

IVIE working-papers offer in advance the results of economic research under way in order to encourage a discussion process before sending them to scientific journal for their final publication.

---

\* I am grateful to Luis Toharia, Juan Muro, Juan F. Jimeno and Elizabeth Villagómez for helpful comments and advice.

# HIGHER EDUCATION DEMAND IN SPAIN: THE INFLUENCE OF LABOUR MARKET SIGNALS AND FAMILY BACKGROUND

Cecilia Albert Verdú

## ABSTRACT

Like many developed countries, Spain has experienced a growth in the demand for higher education over the last twenty years, despite diverse economic cycles. Since this demand appears not to be slowing in the medium term, the objective of this study is to analyze, from sources since 1977, two potential influences: family characteristics and labour market signals.

I use the human capital theory framework and use discreet choice models, taking into account the selection process of young people through the education system. The chief results are, 1) that youths who have a greater probability of becoming consumers of higher education also have a higher probability of demanding higher education; 2) that family characteristics are, indeed, important elements in the demand for higher education; and 3) that the labour market signals, in the Spanish case, do not have an influence on the demand for higher education.

**Key words:** Demand, higher education, family characteristics, labour market.

## RESUMEN

Al igual que muchos países desarrollados, España ha experimentado un crecimiento en la demanda de educación superior a lo largo de los últimos veinte años que no se ha visto alterado por los diversos ciclos económicos y que además no parece detenerse a medio plazo. El objetivo de este trabajo es estudiar la influencia de las características familiares y las señales del mercado de trabajo en la demanda de educación superior desde los años setenta.

El análisis tiene como marco la teoría del capital humano y los modelos de elección discreta teniendo en cuenta el proceso de selección de los jóvenes a lo largo de todo el proceso educativo. Los tres resultados más destacados del estudio son: 1) los jóvenes que tienen una mayor probabilidad de ser potenciales demandantes de educación superior son los que tienen una mayor probabilidad de demandar estudios universitarios; 2) las características familiares y sobre todo los estudios de los padres son elementos importantes en la demanda de educación superior; 3) las señales del mercado de trabajo no tienen el comportamiento esperado sobre la demanda de estudios superiores.

**Palabras clave:** Demanda, educación superior, características familiares, mercado de trabajo.

## 1. INTRODUCTION

The majority of developed countries have experienced a process of growth in higher education demand, and in recent years a myriad of studies have emerged in economic literature to analyze the factors that play into this phenomenon. Viewing the results of those studies, I submit that there are two basic factors affecting demand: 1) the income and employment expectations that each level of education has to offer, and 2) the family background characteristics of each potential student.

Since the early seventies, Spain has experienced a steady growth in the demand for higher education. Not only has this demand not been affected by economic cycles, but it does not seem to be slowing in the medium term. In this paper I propose the study of higher education in Spain in the last eighteen years, placing special emphasis on the two previously mentioned groups of factors, family background and employment expectations; however, I shall exclude income expectations from the analysis due to data restrictions. It should be noted that the educational decisions of young people determine labour supply qualifications in the medium and long term, and if the behaviour of these young people and their families is very sensitive to market signals (such as employment opportunities or wage expectations) then market equilibrium will be easily reached. If, on the contrary, sociological variables are found to be the ones determining education demand decisions, then the maladjustment between qualified labour demand and higher education demand would persist, and the adjustment in the long run would fall on the demand side and on the corresponding salaries.

Therefore, if the hypothesis is proven that higher education demand corresponds to sociological and to cultural variables and that it follows a process independent from market signals, then one may accept the notion that an adjustment between the educational system and the economic system is futile. Based on the present relationship between qualifications and jobs, "over education" becomes an unavoidable evil (or a blessing) in the very near future (Carabana and Arango 1983).

Few studies have analyzed the combined impact of family background, rent, and employment expectations on education demand, which can, in large part, be explained by the fact that the available data does not offer the full range of information required for such a study. The one exception, and one which can be considered as a benchmark study, is that by Willis and Rosen (1979), where a database of American War Veterans (on whom they have longitudinal

information) was used. In their study, they build a discrete choice model for education demand, deduct a rent-education estimate without bias, and analyze the rent and employment expectations of individuals' choices. Unfortunately, this sample is not representative of the entire population, so any further inferences become impossible. Because of this deficiency the study by Willis and Rosen (1979) has not been replicated for other countries.

In general, education demand has centered on two methodological lines:

- 1) The estimation of an education return rate through a mincerian rent equation.

Besides the known problems associated with this methodology (Griliches, 1977), it bares mentioning that the endogeneity of the education variable is not taken into account. Since the time Mincer (1974) formalized this tool, many studies have estimated the rates of return for different countries at different times, the most famous of which are the various studies by Psacharopoulos (1981, 1985 and 1994). In Spain the studies by Calvo (1985), Corugedo (1994), Alba y San Segundo (1995), De la Rica and Ugidos (1995) and Mora and Vila (1996) are amongst the most representative in which rates of return for education are estimated at a particular point in time and with different data. But in Spain we do not have the relevant information in order to estimate rates of return of education for a sufficiently long periods and thus study their evolution.

- 2) The estimation of discrete choice models which allows me to study the influence of personal, family and labour market characteristics of the individual on the probability to higher education demand.

The book by Manski and Wise (1983) shows a wide repertory of the application of this methodology to different decisions individuals and institutions take with respect to education in an American context. For the Spanish case, the first study using this methodology was that of Modrego (1986) in which the probability of taking university studies is differentiated between short and long cycle programmes by using a sample in the province of Vizcay. Albert (1992, 1996 and 1997) has also presented diverse studies analysing higher education demand using the Spanish Labour Force Survey (EPA, *Encuesta de Población Activa*) for different periods of time and considering different definitions of higher education demand and differentiating by sex. In another study Mora (1997) has estimated higher education demand models with the Family Budget Survey (EPF, *Encuesta de Presupuestos Familiares*).

The study at hand will follow this last methodology in order to understand the factors that play into the demand for higher education in Spain. I will consider the influence of unemployment on the decision (Modrego, 1986 and Kodde, 1986) by taking into account how it affects the entire population of young people at risk and not only those living at home. I will also tackle the problem of self-selection in the sample (Manski and Lerman, 1977) which is present in all the models of higher education demand.

This paper is divided into five parts: Following the introduction, section 2 presents a model for higher education demand. Section 3 presents the data used, a definition of education demand, and the sample section. I continue by analyzing in Section 4 the results from the estimation of the model of higher education demand in which the sample selection has been corrected. Finally, I close with Section 5, the conclusion. In the Appendix 1 one may consult the definition of independent variables used in the model, and in the Appendix 2 one may consult the results of a model estimation without the selection bias correction (A1) as well as the estimation of a demand model for secondary level education, which has been used to estimate the probability of being a potential consumer of higher education (A2).

## **2. A HIGHER EDUCATION DEMAND MODEL, INCLUDING LABOUR MARKET VARIABLES AND SELECTIVITY BIASES**

The traditional approach of human capital theory, which considers direct and opportunity costs (foregone incomes) and future incomes as the principle determinants of education demand, has been extended in order to consider three additional factors: 1) the role consumption factors play in education demand (Blaug, 1976), 2) capital market imperfections (Parson, 1974), and 3) uncertainty about future incomes (Levhari and Weiss, 1974; Eaton and Rosen, 1980; Kodde, 1986). As is widely accepted, forgone incomes and future incomes remain determinant factors in education demand. However, in cases where there is unemployment in the labour market, the income differential between groups of people with different educational levels does not entirely cover the information which individuals will utilise in order to make their decisions. Employment prospects, naturally, become a relevant factor.

For this reason, I turn to the work by Kodde (1988) where a model of education demand is developed and estimated, taking into account forgone incomes, future incomes, the general

unemployment level of the economy, and the different employment opportunities available for the different educational levels. For the Spanish case, Modrego (1986) proposes and estimates a higher education demand model for the province of Vizcay, based on the work by Willis and Roseen (1979), and she incorporates the influence of labour market conditions on education demand.

Following Modrego's (1986) and Kodde's (1986) lead, I am now able to incorporate the influence of labour market conditions into my education demand model, and I adhere to the suggestion by Venti and Wise (1983) to allow sample selection biases in a model which reflects the demand of the students of higher education. (See Section 3 for estimates.) However, I forced to leave out the considerations such as the quality of the school attended and the costs associated to each particular university. Such information is not available for Spain where practically all of higher education is public; individuals provide only twenty percent of tuition and enrolment costs. Rates do not vary much between institutions, though certain disciplines, such as architecture, engineering, or medicine, are much more expensive. It would also be interesting to consider the influence of scholarships, but, again, no data is readily available.

The problem of higher education demand is intrinsically linked to the problem of self-selection in that the process of selection will continue to affect demand. In Diagram 1, I present the range of possible choices in the demand for higher education.

**Diagram 1. The successive education demand decisions**

COMPULSORY	Secondary LEVEL <sup>(*)</sup> (1)	HIGHER EDUCATION (UNIVERSITY) (2)
		NON HIGHER EDUCATION (NON UNIVERSITY)
	NON Secondary LEVEL	

<sup>(\*)</sup> General Programs or Second Level of Vocational Training

Initially, the individual must decide, after finishing compulsory education, whether to continue into secondary education ( $M_i > 0$ ) or whether to enter into the labour market. Only those who finish secondary schooling satisfactorily may have the choice to enter university ( $U_i > 0$ ); the alternative is to enter the labour market.

These two decisions might be expressed as two choice equations:

$$\Pr (M_i > 0) = \Pr (X_{Mi} b_{0i} > - e_{0i}) = 1 - F ( X_{Mi} b_{0i} ) \quad [1]$$

$$\Pr (U_i > 0 / M_i > 0) = \Pr (X_{Ui} b_{1i} > - e_{1i}) = 1 - F ( X_{Ui} b_{1i} ) \quad [2]$$

Where  $X_{Mi}$  and  $X_{Ui}$  are two vectors of exogenous personal characteristics and employment opportunities which respectively influence the decision to continue into secondary education and to attend university. The  $\beta$  terms are unknown parameter vectors; the  $\varepsilon$  terms are unobservable errors, and  $F$  are the associated distribution functions.

As we have mentioned before, the decision of higher education demand is conditioned by the outcome of Equation (1). If we wish to study the influence of the first decision on the decision to demand higher education we may write:

$$P(U_i > 0) = P(U_i > 0 / M_i > 0) * P(M_i > 0) \quad [3]$$

Substituting Equations 1 and 2 into 3, we obtain the following expression:

$$\Pr (U_i > 0) = (1 - F ( X_{Ui} b_{1i} )) * (1 - F ( X_{Mi} b_{0i} )) \quad [4]$$

An important advantage of this model is that it allows the analysis of the relation between the probability of demanding secondary level education and the probability of demanding higher education<sup>1</sup>.

---

<sup>1</sup>See Albert (1996) for a more extensive deterministic and stochastic version of this model based on the revealed preferences and aleatory utility models.

The strategy for estimation of Equation (4) consists in the estimation of a stage logit model in which we assume that the error terms in Equations 1, and 2 are independent, so we can easily extend the Heckman-Lee two-stage estimation methods to this model (Maddala, 1983).

In the first stage we estimate the probability of obtaining completed secondary education. In the second stage we estimate the probability that an individual will demand higher education, including as an explanatory variable the previously estimated probability of obtaining a completed secondary education<sup>2</sup>.

It is evident that parameters  $\beta_{0i}$  and  $\beta_{1i}$  are estimable only if there is at least one non-overlapping variable in either one  $X_{Mi}$  and  $X_{Ui}$ , (Maddala, 1983). Otherwise, we would not know which estimates refer to  $\beta_{0i}$  and which refer to  $\beta_{1i}$ .<sup>3</sup>

### **3. DATA UTILISED, A DEFINITION OF EDUCATION DEMAND AND SAMPLE SELECTION**

The data used corresponds to the second quarter of EPA from 1977 to 1994. In Spain the EPA offers three important advantages with respect to other statistical sources in the study of education demand and its evolution. In the first place, it has information on the highest educational level attained by individuals, and from the second quarter in 1987 it also includes information on the education undertaken in the reference week. In the second place, it gives information on personal, family and labour market characteristics at a regional level. In the third place, all the aforementioned information is available at an individual level and is available in a computer-readable form (since 1977) which allows the analysis of educational demand in the last eighteen years and the update of the study at any time.

One of the first problems we find when studying education demand is with its definition. Normally, this definition is strongly influenced by the information available. In this study we

---

<sup>2</sup> In the Appendix we show the estimation for the first two stages in which the available information has been used with the objective of obtaining the best estimation in each case. The method calls for at least one non-overlapping variable which explains the use of different groupings for the same variable and the inclusion of some variables in the first stage which do not appear in the second stage.

<sup>3</sup> See Amemylla (1981), Maddala (1983), McFadden (1974) and McFadden (1981).



consider that an individual has demanded higher education if he has obtained a higher education degree or is undertaking such education in the reference week.

The period studied corresponds to three methodological changes in the EPA: from 1977 to 1986 we only know the maximum level of education finished and whether or not the individual is a student. From the second quarter in 1987, we may also know the maximum level of studies reached and whether or not the individual is undertaking higher education in the reference week. Finally, from the second quarter in 1992 we know the maximum level of studies by the individual and the studies undertaken in the reference week with a high level of desegregation at the higher levels. In order to obtain a homogenous series for education demand, as we have proposed it, we have had to make some assumptions which are explained in detailed in Figure 1.

**Figure 1. Definition of demand of education from the top level education and the studies being finished for two periods: 1977 - 1986 and 1987 - 1994.**

<b>EDUCATION DEMAND: 1977-1986</b>		
<b>FINISHING DEMAND (Top level of finishing studies)</b>	<b>Are you Students or <i>opositor</i> (*) in the last four weeks?</b>	<b>HIGHER EDUCATION DEMAND (Top of finished studies or studies in process)</b>
Secondary Studies	YES	HIGHER EDUCATION
University Studies	_____	
<b>EDUCATION DEMAND: 1987-1994</b>		
<b>FINISHING DEMAND (Top level of finishing studies)</b>	<b>Where have you received a course or formation in the last four weeks?</b>	<b>HIGHER EDUCATION DEMAND (Top of finished studies or studies in process)</b>
Secondary Studies	In the University	HIGHER EDUCATION
University Studies	In the University	HIGHER EDUCATION
University Studies	Not in the University	HIGHER EDUCATION

(\*) Preparing for public employment examination.

I have accepted the following:

-In the years between 1977 and 1986 we do not know if the young person undertakes academic studies in the reference week, but we do know if the individual is a student or

is preparing for public employment examination (*opositor*). With this information we have assumed that those having reached pre-university or professional training (secondary education) and are students or preparing for public employment examination are in fact university students.

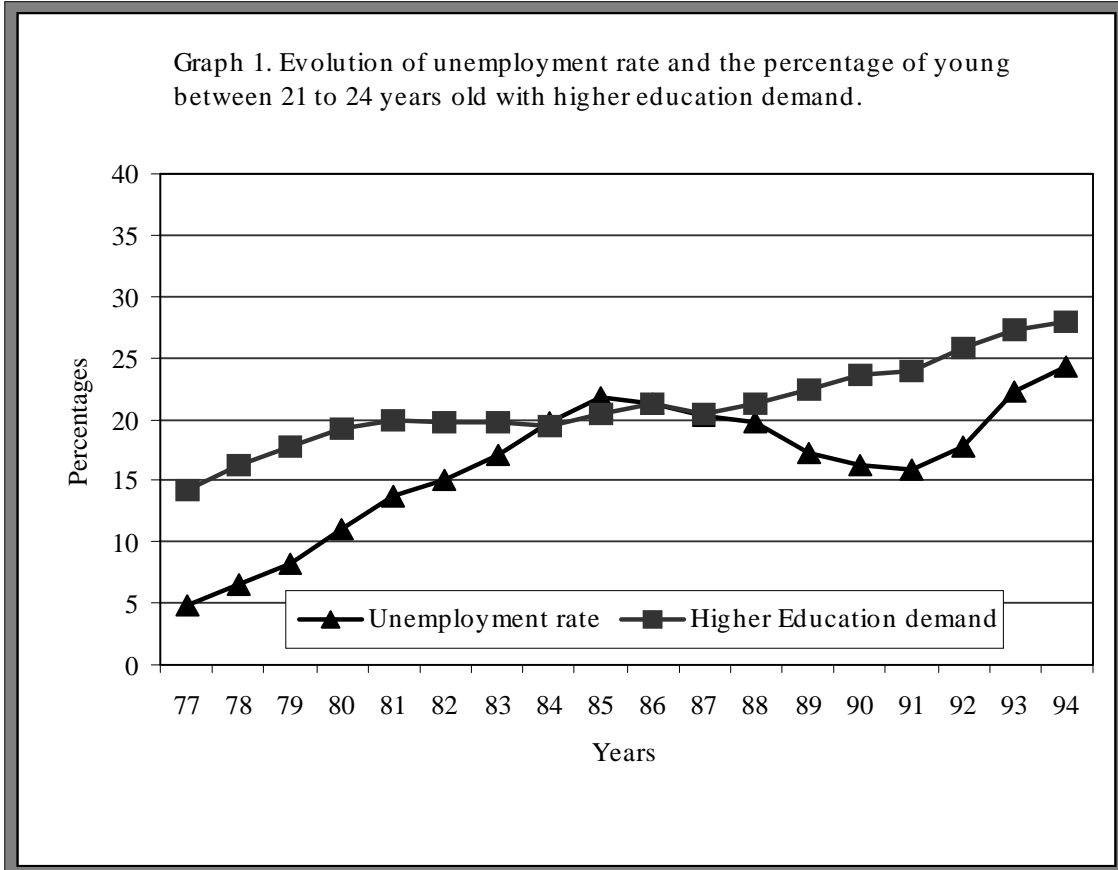
-For the second quarters between 1987 and 1991, the individual will have demanded higher education as long as a degree has been obtained or is in fact undertaking university studies in the reference week.

-From 1992 we adopt the same criterion as between 1987 and 1991 adapting the level of desegregation offered by the EPA from this date to the 1987 aggregation.

The population chosen for the study are young people between the ages of 21 and 24. Such a sample allows two fundamental aspects: first, the guarantee that the individuals have the sufficient age to have covered the corresponding educational levels, and second, that they will be sufficiently young so as to be living at home with their parents where family characteristics may be observed.

However, in my sample selection I have considered the fact that many young individuals in the last eighteen years have opted for an independent life. If I widen the age limit for our sample years, for example, we will find a strong increase in the number of young people living away from home. In 1977, if I cut the age limit at 25 I find that 50% of the young population are no longer living at home, while cutting at 24 this percentage drops to 40%. By 1994 this jump is somewhat smaller, but the levels are quite different, and I find that at 25 the percentage of young people living on their own is 28%, while cutting at 24 it is 20%.

As to the period for analysis, I have chosen only six years from which the high and low points of the economic cycle in Spain may be observed. In Graph 1 I present the evolution of the unemployment rate in Spain and the evolution of higher education demand by individuals between 21 and 24 years of age. The year representing the highest point in the cycle for the period is 1985, and the lowest is 1992. Additionally, I have also included the years 1977 and 1994 since these are the first and last year for which I have data in computer readable form for EPA, 1981 for being a medium point between the initial moment (1977) and the highest peak (1985), and 1987 where I find a methodological break which affects my definition of higher education demand.



Graph 1 also reveals one of the most important events in higher education demand for Spain. I refer to the fact that for the entire period I observe an increasing trend in higher education demand which does not seem to have any relation to the economic cycle. Currently, 30% of young people between the ages of 21 and 24 demand higher education, and nothing seems to indicate that this trend will ease in the medium term, which clearly poses an important challenge to the State since in Spain higher education is strongly subsidised.

**Table 1. Logit regression of Higher Education Demand <sup>(\*)(\*\*)</sup>**

Years	1977	1981	1985	1987	1991	1994
<b>Sex</b>						
Male	-0.33	-0.57	-0.31	-0.22	-0.36	-0.28
	(-5.17)	(-11.18)	(-6.20)	(-4.62)	(-7.96)	(-6.20)
<b>Situation with respect to parents</b>						
Fatherless	0.48	0.24	-0.06	0.33	0.46	0.24
	(2.78)	(1.79)	(-0.43)	(2.47)	(3.83)	(2.31)
Motherless	-0.17	0.14	0.44	0.09	0.05	0.26
	(-0.89)	(0.81)	(2.67)	(0.58)	(0.28)	(1.50)
Does not live with parents	-0.13	-0.33	-0.25	-0.17	-0.33	-0.47
	(-1.30)	(-1.57)	(-1.25)	(-0.89)	(-1.54)	(-2.35)
Does not have siblings	0.08	0.33	0.03	-0.08	0.21	-0.02
	(0.84)	(4.14)	(0.38)	(-1.07)	(2.99)	(-0.29)
<b>Parents' education</b>						
Father more than compulsory education	0.34	0.62	0.29	0.11	0.25	0.34
	(2.49)	(5.88)	(2.98)	(1.29)	(3.11)	(4.77)
Mother more than compulsory education	0.48	0.84	0.59	0.67	0.55	0.50
	(3.18)	(6.86)	(5.20)	(6.96)	(6.32)	(6.07)
<b>Socioeconomical Condition of the father</b>						
Farmer	1.18	0.62	0.55	0.59	0.66	0.30
	(6.85)	(4.61)	(3.76)	(4.45)	(5.02)	(2.60)
Employer	0.66	0.64	0.17	0.14	0.18	0.14
	(4.11)	(5.12)	(1.31)	(1.18)	(1.71)	(1.54)
Professional and Management	0.94	0.62	0.20	0.29	0.59	0.46
	(4.93)	(4.25)	(1.21)	(2.06)	(4.75)	(4.34)
Skilled worker	0.31	0.29	-0.04	0.05	0.06	0.05
	(2.13)	(2.61)	(-0.37)	(0.46)	(0.58)	(0.57)
Others	0.38	1.10	-0.21	0.07	0.30	0.88
	(1.37)	(4.47)	(-0.97)	(0.37)	(1.57)	(2.83)
Unemployed or inactive	0.39	0.34	0.12	0.04	0.17	-0.01
	(2.32)	(2.67)	(0.91)	(0.30)	(1.61)	(-0.09)
<b>Number of siblings who are studying in the reference week</b>						
1 or more	0.17	0.65	0.15	0.11	0.40	0.28
	(1.62)	(7.67)	(1.93)	(1.63)	(6.39)	(4.69)
<b>Proportion of employed and unemployed in the family</b>						
Proportion of employed	-0.73	-0.48	-0.70	-0.69	-0.41	-0.54
	(-3.67)	(-2.87)	(-4.42)	(-4.45)	(-2.94)	(-4.05)

**Table 1. Logit regression of Higher Education Demand <sup>(\*)</sup>(<sup>\*\*</sup>) (CONT.)**

Proportion of unemployed	-1.12	-0.99	-1.85	-0.72	-0.70	-0.82
	(-2.30)	(-3.62)	(-8.15)	(-3.36)	(-3.19)	(-4.71)
<b>Members of the family under 16 years old</b>						
1 members	-0.36	-0.12	2.14	-0.07	0.07	-0.06
	(-0.61)	(-0.40)	(3.89)	(-0.58)	(0.56)	(-0.43)
2 or more members	-0.13	0.21	0.28	0.24	0.11	-0.06
	(-1.26)	(2.64)	(3.48)	(3.89)	(1.79)	(-1.11)
<b>Unemployment rates for education level</b>						
Unempl. of the higher education people	0.04	0.00	0.03	0.00	0.04	0.03
	(2.70)	(0.61)	(5.27)	(-0.57)	(5.69)	(4.39)
Unempl. Of the secondary education young	0.03	0.01	0.03	0.01	0.00	-0.01
	(4.20)	(1.94)	(6.11)	(2.91)	(-0.78)	(-3.13)
<b>Lambda</b>						
Lambda	0.71	-0.19	2.03	1.83	0.76	0.93
	(2.59)	(-0.93)	(9.06)	(8.21)	(3.99)	(4.75)
<b>Constant</b>						
Constant	-0.65	-0.52	-2.47	-1.21	-0.72	-0.13
	(-3.13)	(-1.78)	(-9.66)	(-6.07)	(-4.31)	(-0.61)
<b>N</b>						
N	2969	4258	4582	4630	5299	5810
<b>-2 log L.<sup>(***)</sup></b>						
-2 log L. <sup>(***)</sup>	6226.1	9537.5	10423.9	12258.5	13073.8	15011

(\*)Individual of reference: Woman, with mother and father are primary education or illiterate/without education, his father is an unskilled worker, family of four members, he has sibling but neither is in ruled education during the reference week and neither is under 16 years old .

(\*\*)Values in brackets are T-Students.

(\*\*\*)Is significant at 99% in every years.

#### **4. RESULTS OF THE ESTIMATION OF A HIGHER EDUCATION DEMAND MODEL FOR SPAIN: 1977-1994.**

In this section I present the results of the estimation of the discrete choice model for higher education demand as outlined in the previous section. The dependent variable takes value zero for young people who have not obtained a higher degree or who are not undertaking higher studies in the reference week and value one for those who have finished or are undertaking higher studies in the reference week.

The variables used to explain the probability of having an education demand may be looked up in Appendix 1.

With respect to other studies about higher education demand for Spain (Albert, 1992; Modrego, 1986 or Mora, 1996) in which only individuals living at home with both parents are chosen, I use the entire sample of young people controlling for different situations with respect to parents by using the corresponding dichotomic variables.

In Table 1 I present the estimation of a higher education demand model for 1977, 1981, 1985, 1987, 1991 and 1994.

I note that there is a marked difference in the behaviour of men and women, so that being a man diminishes the probability of demanding higher education in all of the study years.

The father's educational level is a positive and significant variable in four of the six years. Having a mother with secondary or higher education increases the probability that the individual will demand higher education, where this particular effect is larger than the father's educational level.

In Table A1 of Appendix 2 I present an estimation of higher education demand where I have not taken into account the selection bias and where I have not included the variable "lambda" (predicted probability value). Here one can see that the significance of the coefficients for the parents' educational level is increasing. If one takes into account, that the variable "lambda" has been estimated in a secondary level education demand probability model (Table A2 in the Appendix 2) and that the parents' educational level appears as a relevant variable for all our period years, one may then proceed to the conclusion that parents' educational level is more of a

determinant the lower the educational level one is considering. Therefore, parents' educational level is a greater determinant for the decision to attend secondary level education and less important in the decision to demand higher education. If I do not take into account the previous choice of undertaking and successfully finishing secondary level education in the choice of attending university, I will be overvaluing the influence of parental educational levels in the demand for higher education.

The father's socio-economic situation, which reflects the family's economic conditions, reveals consistently for the six years that the children of farmers have a higher probability of demanding higher education than children of unskilled workers. This is also the case for children of professionals, directors and department heads for the years 1977, 1981, 1991 and 1994. I observe that children of employed and unemployed or inactive parents have a higher probability of demanding higher education in 1977 and 1981, while these factors lose significance in the following years. With respect to the father's socio-economic condition one may observe that when including "lambda" this variable loses significance, compared to Table A1 in the Appendix where one observes that, for example, having a father who is an employer increases the probability of demanding higher education for the entire period.

The number of siblings undertaking academic education is a variable which reflects the educational costs for the family. However, contrary to expectations, it appears with a positive sign in 1981 and in the last two years. This may lead into thinking that, at least for these years, Spanish families inclined towards supplying all their children with education. Not considering the selection bias also increases the significance of this variable. In our secondary education demand model (Table A2) the results for this variable reflect a positive relation between the number of siblings undertaking academic education and the demand for post-compulsory education, which also suggest that Spanish families make a big effort in supplying all of their children with an education, such that if one individual has a sibling in school, the probability that she/he will continue in secondary education increases significantly in the last eighteen years.

With the same purpose that I include the variable number of siblings who undertake academic studies, I also include the number of younger siblings (under 16) in order to reflect an additional burden caused by smaller children their presence in a family could negatively affect education demand. In this case, I find that having younger siblings with respect to having none is significant and positive for only one year, 1985, and that having two siblings with respect to having none is also positive and significant in 1981 and 1987. The unexpected sign for this variable, as for the higher education demand model, is difficult to interpret.

The proportion of family members employed and unemployed has a double effect:

- a. An income effect implying that with a higher proportion of employed there will be a higher probability of demanding higher education and that to a higher proportion of unemployed there will be a lesser probability of demanding this level of education,
- b. And a preference by the family for the labour market such that a higher proportion of employed or unemployed will mean a lesser probability of demanding higher education.

The variable reflecting the proportion of employed in the family will have opposite effects, and the sign will show which of the two effects is larger. However, the proportion of unemployed in the family has the same negative effects so that the relative importance may not be appreciated.

Summing up, in the case that these variables pick up family income conditions, one expects the sign of the coefficient of the variable number of unemployed to have a negative sign and the number of employed to have a positive sign. If the effect for the labour market preference dominates, one expects that both variables will have a negative effect on the probability of demanding higher education, since both effects act in opposite directions with respect to the percentage of employed and in the same direction with respect to the proportion of unemployed. Therefore, in Table 1 I observe that a larger proportion of employed decreases the probability of demanding higher education and the preference for the labour market dominates in the family with respect to the income effect. I also observe that a higher proportion of unemployed decreases the probability of demanding higher education where I can not conclude if the labour market preference or the income effect dominate since in this case both variables work in the same direction. These results are repeated for the entire period.

The family situation of children with respect to parents reflects that a fatherless situation had a positive effect in 1977, and from 1987 this positive effect is repeated with respect to having both. Those who does not live with their parents have a lower probability of demanding higher education in 1981, 1985 1991 and 1994 than those living with both parents. The variable with respect to siblings only influences in a positive fashion and is significant in 1981 and 1991.

The unemployment rate for those with higher education degrees of the region where the individual is living reflects employment expectations by the individual if he decides to demand this level of education. Therefore, the higher this rate is, the lower education demand should be since employment expectations for this group worsen. Therefore, one may say, with the results obtained



in my model, that for four of the years in our period, there is evidence of a disequilibrium between higher education demand and qualified labour demand, or that at best, the labour market signals do not influence higher education demand<sup>4</sup>.

This phenomenon may have several explanations. The first and less risky is that the unemployment rates used in the estimations are not representative, or that they do not in fact measure employment expectations of potential higher education consumers. However, this is not the first time the lack of relation between employment expectations and educational demand is found, and also that there is a possible "positive feedback" effect which would mean an increasing discrepancy between those variables, and that higher education is used against the uncertainty that high levels of unemployment create amongst individuals. This result is in tune with the human capital prediction with respect to the rise in uncertainty on education demand (Kodden, 1986). On the other hand, this idea has also been forwarded from a sociological perspective with respect to which a wider discussion can be found in Carabaña (1987) for the Spanish case. The lack of relation between higher education demand and the university graduate unemployment rate was also found by Modrego (1986) using the data from the Census of the Population in 1981 for the province of Vizcay.

With respect to the unemployment rates of those youths with secondary level education, which reflect the opportunity cost of demanding higher education, it is observed that until 1987 an increase in the probability of being unemployed of these young people increased the probability of expressing a demand. The unemployment rate of those with secondary level education does not have the expected sign in 1994 when it is negative. If this sign remains so in years to come and a change in the past tendency is confirmed, one could say that the university has ended its role as a protection against the effects of unemployment for the young population.

I can not end this section without referring to two further issues which explain the relations found between unemployment rates and higher education demand. One of them is the idea that the results obtained may not stand up for different types of higher education; and the other is that the results can be explained in the framework of the screening hypothesis. This hypothesis predicts an inevitable over-education of the population which is not caused by the uncertainty which high unemployment rates may cause, but by a higher necessity for the most

---

<sup>4</sup> Another possible form of measuring employment expectations, such as introducing the differences between the unemployment rates of the population with higher education and that of the secondary level, has been tried but the results have been the same.

productive individuals to signal to the market over those who are not qualified, and this increases as the educational level of the population.

In order to contrast this hypothesis I would need to compare the salaries of employed individuals in each firm and their educational level. But independently from the reason for which individuals demand higher education, according to our findings, I may conclude that if the tendency established in the last eighteen years is not broken, the distance between the labour market and education demand will increase. When evaluating this process, one should not forget that higher education is not uniquely an investment good, and is not intended only as a means to supply a qualified labour force to the labour market. The consumption components and the externalities produced by a higher education of the population can not be forgotten when evaluating the so called "over-education" problem.

Finally I observe that for all the years estimated, except for 1981, the higher the probability of having secondary education (the higher the "lambda") the higher the probability of having higher education demand where this result is in line with that found by Venti and Wise (1983). That is to say, a selection process of the individuals throughout the education system exists which makes it necessary to take into account in the estimations in order to avoid overvaluing the effect of other variables, as I have already noted.

The estimations presented in this section, besides presenting the significance and the signs of the variables, also allow for the presentation of the results in terms of probabilities. In other words, I may calculate the probability of an individual having certain characteristics to demand education. The estimated models assume that the probability of demanding higher education is distributed according to an exponential function. This assumption implies that the calculation of probabilities must be carried out making the corresponding transformations to the logit models<sup>5</sup>.

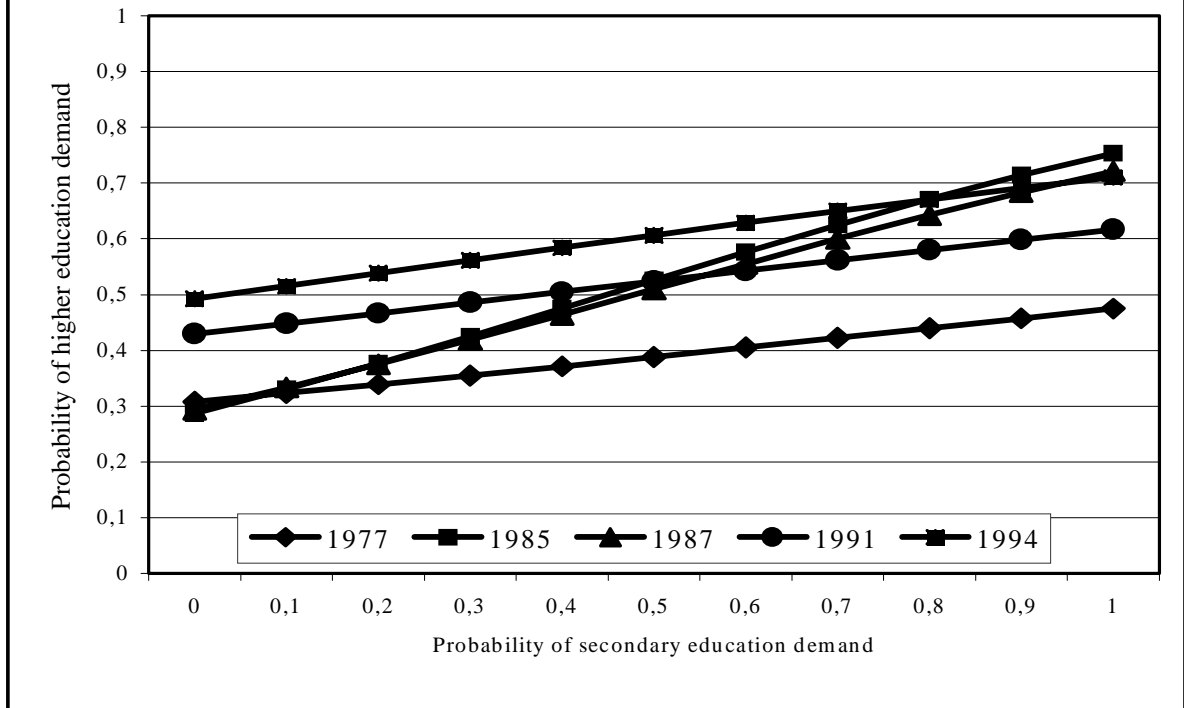
Graph 2 represents the relation between higher education demand<sup>6</sup> and the probability of successfully finishing secondary education for the years in which the variable "lambda" is significant.

---

<sup>5</sup> These probabilities have been estimated for the reference individual of the estimation form Table 1 and evaluating the continual variables in their average values.

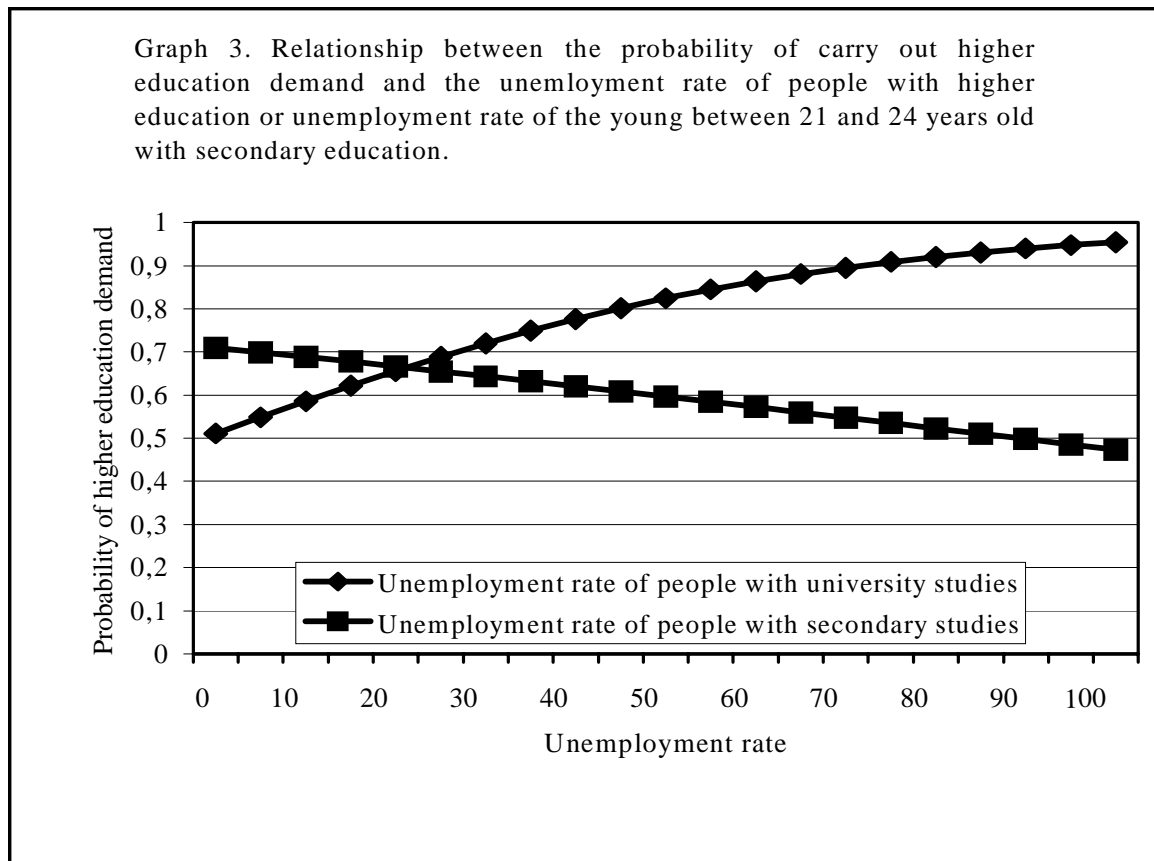
<sup>6</sup> See Maddala (1983).

Graph 2. Relationship between the probability of carry out a higher education demand and the probability of carry out a secondary education demand.



If the average probability of finishing secondary education for the period is found between 0.46 and 0.59 one may see how in this interval higher education demand has moved from 0.3 in the worst of years to 0.5 showing an increase of two points. Therefore, I may say that increases in the probability of finishing secondary education increase the probability of demanding higher education, and that in Spain young people go through a selection process throughout their stay in the education system in which certain family characteristics are present and influence this selection process, such that those with a higher probability of being potential consumers of higher education finally do have a higher probability of actually demanding this educational level.

As to the relation between employment expectations for higher education holders and the opportunity cost (in terms of employment and higher education demand) I have already confirmed that the unemployment rate for the higher education population is significant and positive. In Graph 3 I present the pattern derived from the estimations for 1994 as to the behaviour of education demand with respect to the different unemployment rates.



I observe a positive relation between the probability of demanding higher education and the unemployment rates for the population with higher education. As is predictable, qualified labour supply continues to increase, and if the system does not absorb this increase, this will ultimately increase the unemployment rates of the population with higher education if our results are correct and if the behaviour in the future is represented by the results in 1994. This will result in an increase of qualified labour supply which does not adjust to market signals.

With respect to the relation between the probability of demanding higher education and secondary level unemployment rates, I note that the expected behaviour is only found in the last year and not in the previous years so that the results must be taken with great care. I observe that in the last period, an increase in the unemployment rate of secondary level youth (which means an increase in the opportunity cost of demanding higher education) diminishes the probability of demanding higher education. Although this is not the expected outcome by human capital theory, one may think that the university will not absorb unemployed secondary level youths who will be opting for other alternatives.

## **5. CONCLUSIONS.**

According to human capital theory the demand of education depends on two factors: the employment and income expectations by the education level and the family background. Knowing the relative weight of these two factors may be highly relevant for education and labour market policy. The most relevant conclusion in this study is that the variables which explain higher education demand most convincingly and with the utmost stability throughout the period observed are those variables relating to personal and family characteristics, while employment expectation variables are found to be not influential or else influencing a process of unadjustment between higher education demand and the qualification needs of the labour market. As to the family variables which influence in a stable way throughout the period higher education demand it is worth emphasising the following:

a) Women have been increasing their higher education demand in a continuous manner throughout the period.

b) The mother's education is more determinant than the father's in demanding higher education (This results are in the line of other studies such a Duncan ,1994 or Kodde and Ritzen,1994).

c) Not having a father who is an unskilled worker and having a sibling undertaking academic studies increases the probability of demanding higher education, while a higher percentage of employed and unemployed in the family diminished this probability.

As to the relation between higher education demand and unemployment rates of the population with higher education and of youths with the secondary level attainment (if the model is correct for 1994), I find that there is a maladjustment between the employment signals sent by the market and higher education demand, confirmed in previous findings by Modrego and Carabaña (1987), and further confirming that the tendency towards "over-education" is favoured by the evolution of unemployment.

With the purpose of ameliorating the results obtained pointing to a maladjustment between higher education demand and market signals, it is necessary to make a brief reflection about the events taking place a century ago with regard to the efforts to literate the population. It has been argued that there is a need for co-ordinating the educational system and the labour market due to the need that youths with higher education have in finding a job according to their expectations and, above all, in order to justify the investment made by the Administration in higher education. This debate and these same arguments appeared in our country when the investment in education to end illiteracy were being justified. Today this discussion can disgust many, and even more if it is circumscribed in terms of economic efficiency, since it seems that everyone has the right to be literate (to the point that this right is protected by law). Perhaps, the higher education in Spain as it stands today has moved toward universalization--against all social, administrative and labour market forces--due to the motto: "all parents and their children with higher education degrees".

Finally, is worth mentioning that the probability of finishing secondary level education has increased throughout the period, and this has influenced in a positive manner the probability of demanding higher education (potential consumers of higher education have experienced a selection process in lower educational levels). Thus, I may conclude that the process of universal education in Spain is not affecting all individuals in the same manner, and that, furthermore, individuals select for themselves when deciding for or against higher education. Consequently, the process of universalization in higher education is made in a gradual and, above all, orderly manner.

**APPENDIX 1: The variables used to explain the probability of having an education demand may be grouped into various categories:**

- Personal characteristics: Sex.
  
- Parents' characteristics:
  - Mother's and father's educational level.
  - Labour situation of the mother
  - Father's socio-economic conditions.
  
- Family characteristics:
  - Situation with respects to parents: father and mother alive, mother not present, father not present; youth does not live with parents; and if the individual has or does not have siblings.
  - Proportion of employed and unemployed in the family with respect to the total number of people over 16 years of age.
  - Number of siblings the individual has and who undertake compulsory education in the reference week (excluding the individual herself) and
  - Number of siblings under 16 years of age
  
- Labour market variables:
  - Unemployment rates for people with higher education degree in the autonomous community of the individual.
  - Unemployment rate for young people between 21 and 24 with secondary level degrees in the autonomous community of the individual.
  
- Estimated variable measuring the probability of being a potential consumers of higher education.

## APPENDIX 2

<b>Table A1. Logit regression of Higher Education Demand<sup>(*)(**)</sup></b>						
Years	1977	1981	1995	1987	1991	1994
<b>Sex</b>						
Male	-0.30 (-4.80)	-0.58 (-11.34)	-0.40 (-8.30)	-0.40 (-9.19)	-0.43 (-10.09)	-0.38 (-9.61)
<b>Situation with respect to parents</b>						
Fatherless	0.49 (2.81)	0.24 (1.82)	-0.03 (-0.24)	0.33 (2.49)	0.43 (3.59)	0.22 (2.17)
Motherless	-0.20 (-1.04)	0.14 (0.83)	0.36 (2.19)	0.04 (0.27)	0.00 (-0.02)	0.17 (0.98)
Does not live with parents	-0.41 (-1.64)	-0.33 (-1.57)	-0.34 (-1.7)	-0.24 (-1.26)	-0.31 (-1.47)	-0.42 (-2.1)
Does not have sibling	0.12 (1.31)	0.31 (4.03)	0.15 (2.05)	0.02 (0.27)	0.25 (3.62)	0.05 (0.72)
<b>Parents' education</b>						
Father more than compulsory education	0.53 (4.74)	0.57 (6.31)	0.71 (8.46)	0.48 (6.85)	0.44 (6.66)	0.52 (8.44)
Mother more than compulsory education	0.63 (4.42)	0.80 (6.96)	1.00 (9.53)	1.00 (11.44)	0.69 (8.64)	0.70 (9.67)
<b>Socioeconomical Condition of the father</b>						
Farmer	1.16 (6.74)	0.64 (4.76)	0.31 (2.19)	0.52 (3.92)	0.60 (4.56)	0.27 (2.37)
Employer	0.79 (5.19)	0.62 (5.03)	0.44 (3.42)	0.42 (3.58)	0.23 (2.25)	0.21 (2.29)
Professional and Management	1.13 (6.39)	0.60 (4.15)	0.66 (4.39)	0.64 (4.76)	0.71 (5.89)	0.59 (5.73)
Skilled worker	0.37 (2.61)	0.28 (2.53)	0.09 (0.75)	0.23 (2.09)	0.09 (0.93)	0.11 (1.26)
Others	0.60 (2.24)	1.06 (4.38)	0.02 (0.09)	0.43 (2.20)	0.33 (1.77)	0.86 (2.76)
Unemployed or inactive	0.39 (2.30)	0.36 (2.81)	0.05 (0.43)	0.04 (0.35)	0.12 (1.13)	-0.04 (-0.46)



<b>Table A1. Logit regression of Higher Education Demand<sup>(**)</sup> (CONT.)</b>						
<b>Number of siblings who are studying</b>						
1 or more	0.33	0.61	0.54	0.46	0.52	0.43
	(3.66)	(8.73)	(8.28)	(8.47)	(9.69)	(8.72)
<b>Proportion of employed and unemployed in the family</b>						
Proportion of employed	-0.79	-0.46	-0.70	-0.83	-0.49	-0.60
	(-4.01)	(-2.79)	(-4.40)	(-5.43)	(-3.53)	(-4.58)
Proportion of unemployed	-1.14	-0.96	-2.17	-1.22	-0.90	-1.09
	(-2.35)	(-3.53)	(-9.75)	(-5.97)	(-4.22)	(-6.61)
<b>Members of the family under 16 years old</b>						
1 under	-0.42	-0.11	2.16	-0.11	0.02	-0.10
	(-0.73)	(-0.36)	(3.90)	(-0.99)	(0.17)	(-0.75)
2 or more	-0.10	0.21	0.35	0.29	0.15	-0.02
	(-1.01)	(2.57)	(4.43)	(4.91)	(2.46)	(-0.35)
<b>Unemployment rates for studies levels</b>						
Unempl. of the higher education people	0.04	0.00	0.03	0.01	0.05	0.03
	(2.65)	(0.53)	(5.27)	(0.82)	(6.21)	(4.46)
Unempl. Of the secondary education young	0.02	0.01	0.03	0.00	-0.01	-0.02
	(3.87)	(1.94)	(5.33)	(0.90)	(-1.60)	(-4.32)
Constant	-0.48	-0.57	-1.63	-0.41	-0.35	0.44
	(-2.47)	(-2.01)	(-6.93)	(-2.37)	(-2.53)	(2.42)
N	2969	4258	4582	4630	5299	5810
-2 log L. <sup>(***)</sup>	6232.8	9538.4	10507.4	12326.8	13089.7	15033.5

(\*)Individual of reference: Woman, with mother and father are primary education or illiterate/without education, his father is an unskilled worker, family of four members, he has sibling but neither is in ruled education during the reference week and is neither under 16 years old .

(\*\*)Values in brackets are T-Students.

(\*\*\*)Is significant at 99% in every years.

<b>Table A2. Logit Regression of Secondary Education Demand<sup>(**)</sup></b>						
Years	1977	1981	1985	1987	1991	1994
<b>Sex</b>						
Male	0.36 (8.80)	0.19 (5.61)	-0.21 (-6.70)	-0.45 (-15.08)	-0.47 (-15.61)	-0.57 (-19.60)
<b>Situation with respect to parents</b>						
Fatherless	0.35 (2.82)	0.09 (0.80)	0.08 (0.82)	-0.04 (-0.44)	-0.21 (-2.28)	-0.01 (-0.15)
Motherless	0.38 (2.56)	0.35 (2.77)	0.09 (0.76)	-0.02 (-0.19)	0.02 (0.16)	-0.04 (-0.34)
Does not with parents	0.35 (2.38)	0.19 (1.47)	-0.19 (-1.58)	-0.18 (-1.46)	0.34 (2.49)	0.25 (1.93)
Does not have siblings	0.19 (2.88)	0.17 (2.87)	0.06 (-1.01)	-0.03 (-0.56)	0.16 (2.68)	0.17 (2.84)
<b>Father's education</b>						
Compulsory education	0.54 (6.91)	0.49 (7.40)	0.34 (5.75)	0.37 (6.80)	0.24 (4.40)	0.26 (4.74)
Secondary education	1.54 (10.51)	1.85 (13.97)	1.29 (11.82)	1.08 (12.26)	1.19 (13.29)	0.93 (11.62)
Higher education	2.65 (12.73)	2.02 (11.91)	1.34 (10.06)	1.55 (13.65)	1.89 (15.14)	1.69 (14.35)
<b>Mother's education</b>						
Compulsory education	1.00 (14.83)	1.03 (18.06)	0.74 (14.33)	0.68 (14.23)	0.80 (16.18)	0.76 (15.87)
Secondary education	2.27 (10.46)	2.65 (11.74)	2.23 (12.47)	1.72 (13.89)	2.07 (15.24)	1.77 (16.55)
Higher education	2.73 (9.22)	2.55 (11.49)	2.20 (12.09)	1.72 (12.83)	2.00 (15.00)	2.51 (15.68)
<b>Socioeconomical Condition of the father</b>						
Farmer	-0.08 (-0.82)	-0.08 (-0.89)	-0.26 (-2.93)	-0.05 (-0.55)	-0.24 (-2.89)	0.04 (-0.49)

**Table A2. Logit Regression of Secondary Education Demand<sup>(\*\*\*)</sup> (CONT.)**

Employer	0.88	0.56	0.63	0.62	0.30	0.35
	(9.14)	(6.51)	(7.39)	(8.02)	(4.09)	(5.18)
Professional	1.37	0.54	1.21	0.84	0.68	0.64
	(6.77)	(2.85)	(6.53)	(6.15)	(4.55)	(6.26)
Management	1.56	1.18	2.06	0.93	1.25	0.68
	(8.77)	(7.33)	(10.09)	(6.71)	(8.00)	(4.67)
Skilled worker	0.40	0.29	0.27	0.33	0.17	0.22
	(4.78)	(3.84)	(3.57)	(4.70)	(2.46)	(3.53)
Others	1.65	1.33	0.60	0.84	0.09	-0.17
	(6.75)	(5.94)	(3.29)	(5.60)	(0.60)	(-0.80)
Unemployment			-0.02	-0.04	0.07	-0.04
			(-0.19)	(-0.41)	(0.71)	(-0.52)
Inactive	0.13	-0.20	-0.13	0.00	-0.32	0.04
	(1.23)	(-2.35)	(-1.46)	(-0.02)	(-4.17)	(0.55)
<b>Labour situation of the mother</b>						
Unemployed					0.36	-0.03
					(3.24)	(-0.33)
Inactive	-0.12	-0.14	-0.05	-0.19	0.04	0.09
	(-1.73)	(-2.40)	(-0.89)	(-3.75)	(0.74)	(1.98)
<b>Family-size</b>						
1-2 members	0.30	0.61	0.64	0.68	0.25	0.56
	(3.49)	(8.44)	(8.64)	(8.45)	(3.22)	(7.08)
3 members	-0.19	0.07	0.18	0.12	-0.04	0.06
	(-3.10)	(1.34)	(3.40)	(2.15)	(-0.72)	(0.98)
5 members	-0.37	-0.16	-0.25	-0.17	-0.29	-0.28
	(-6.15)	(-3.11)	(-5.27)	(-3.80)	(-6.62)	(-6.78)
6 members	-0.71	-0.37	-0.41	-0.28	-0.63	-0.53
	(-9.33)	(-5.74)	(-6.99)	(-5.24)	(-11.25)	(-9.69)
7 and more members	-0.96	-0.82	-0.94	-0.64	-1.04	-0.71
	(-11.84)	(-11.52)	(-13.23)	(-9.43)	(-14.63)	(-10.19)

**Table A2. Logit Regression of Secondary Education Demand<sup>(\*)(\*\*)</sup> (CONT.)**

<b>Number of siblings who are studying in the reference week</b>						
1 sibling	1.05	1.13	0.89	0.89	0.75	0.79
	(16.03)	(21.28)	(18.51)	(21.49)	(17.93)	(20.14)
2 sibling	1.96	1.65	1.54	1.06	1.59	1.23
	(14.69)	(15.62)	(16.80)	(13.93)	(20.24)	(17.82)
3 and more sibling	1.90	2.45	1.64	2.04	1.79	1.96
	(8.97)	(12.57)	(9.86)	(12.08)	(11.19)	(13.36)
<b>Numbers of employed of the family</b>						
0 employed	0.00	0.08	-0.15	0.20	0.11	-0.12
	(-0.04)	(1.12)	(-2.07)	(2.96)	(1.57)	(-1.86)
1 employed	0.14	0.15	-0.05	0.12	0.03	0.00
	(2.48)	(3.05)	(-1.07)	(2.66)	(0.61)	(0.03)
3 and more employed	-0.25	-0.23	-0.10	-0.40	-0.26	-0.15
	(-3.31)	(-3.16)	(-1.41)	(-6.20)	(-4.37)	(-2.51)
<b>Numbers of unemployed of the family</b>						
1 unemployed	0.05	-0.16	-0.14	-0.29	-0.39	-0.24
	(0.59)	(-3.36)	(-3.11)	(-7.10)	(-8.30)	(-5.85)
2 unemployed			-0.22	-0.55	-0.57	-0.46
			(-2.70)	(-7.24)	(-6.07)	(-6.22)
<b>Region where the person lives</b>						
Aragón	0.24	0.17	0.21	0.22	0.27	0.20
	(2.03)	(1.74)	(2.28)	(2.48)	(2.88)	(2.14)
Asturias	0.14	0.08	0.23	0.27	0.08	0.33
	(1.16)	(0.75)	(2.38)	(2.87)	(0.82)	(3.57)
Baleares	-0.44	-0.08	-0.23	0.07	-0.27	-0.03
	(-2.05)	(-0.49)	(-1.63)	(0.59)	(-2.20)	(-0.26)
Canarias	0.28	0.09	0.03	-0.16	-0.09	0.01
	(2.52)	(0.92)	(0.35)	(-1.89)	(-1.02)	(0.15)
Cantabria	0.27	0.19	0.04	-0.08	0.16	0.07
	(1.79)	(1.36)	(0.29)	(-0.60)	(1.21)	(0.52)

Table A2. Logit Regression of Secondary Education Demand <sup>(**)</sup> (CONT.)						
Cataluña	0.19	0.07	0.20	0.14	0.29	0.42
	(2.63)	(1.19)	(3.45)	(2.65)	(5.51)	(8.18)
Cast-León	0.21	0.20	0.04	0.14	0.17	0.19
	(2.35)	(2.65)	(0.50)	(2.14)	(2.45)	(2.82)
Cast-La Mancha	0.16	-0.07	-0.06	-0.13	0.02	0.08
	(1.39)	(-0.75)	(-0.68)	(-1.59)	(0.30)	(0.97)
C. Valenciana	-0.06	-0.16	-0.10	-0.13	-0.05	0.15
	(-0.74)	(-2.19)	(-1.56)	(-2.14)	(-0.83)	(2.64)
Extremadura	-0.16	0.09	0.10	-0.10	0.22	0.05
	(-1.09)	(0.75)	(0.94)	(-1.02)	(2.22)	(0.48)
Galicia	-0.07	-0.06	0.02	0.06	0.09	0.19
	(-0.75)	(-0.82)	(0.26)	(0.89)	(1.30)	(2.68)
Madrid	0.68	0.63	0.50	0.29	0.41	0.32
	(9.49)	(10.16)	(8.50)	(5.22)	(7.56)	(5.98)
Murcia	0.26	0.18	-0.20	-0.08	0.08	0.08
	(1.79)	(1.57)	(-1.74)	(-0.72)	(0.79)	(0.89)
Navarra	0.50	0.20	0.08	-0.01	0.06	0.40
	(3.23)	(1.42)	(0.60)	(-0.11)	(0.43)	(3.24)
País Vasco	0.31	0.34	0.40	0.44	0.49	0.51
	(3.41)	(4.45)	(5.54)	(6.44)	(6.97)	(7.53)
La Rioja	-0.49	0.26	-0.25	-0.13	0.16	0.32
	(-1.87)	(1.24)	(-1.23)	(-0.65)	(0.86)	(1.72)
Constant	-2.89	-2.28	-1.45	-1.30	-1.16	-1.15
	(-21.69)	(-20.13)	(-13.33)	(-13.55)	(-12.48)	(-13.20)
N	11333	12246	12854	12667	13075	12552
-2 Log L. <sup>(***)</sup>	16834.69	22281	25018.7	27707.4	27432.5	28824.8

(\*)Individual of reference: Andalusian woman, with mother and father are primary education or illiterate/without education, his father is an unskilled worker, family of four members, two employed and neither unemployed, he has sibling but neither is in ruled studies during the reference week and neither is under 16 years old.

(\*\*)Values in brackets are T-Students.

(\*\*\*) Is significant at 99% in every years.

## REFERENCES

- Alba, A. and San Segundo, M. (1995):** "The Returns to Education in Spain", *Economics of Education Review*, 14 (2), 155-166.
- Albert, C. (1992):** "Estimación de un modelo de demanda de educación superior para España", Mimeo in the Universidad Carlos III of Madrid.
- Abert, C. (1996):** *La demanda de educación superior en España: 1977-1994*. Thesis. University of Alcalá de Henares, Spain. First Premium National of Education Investigation 1996, Ministerio de Educación y Ciencia, Spain.
- Albert, C. (1997):** "La Demanda de educación superior en España: diferencia por sexo" *Información Comercial Española*, 760, 105-116.
- Amemylla, T. (1981):** "Qualitative Response Models: a Survey." *Journal of Economic Literature* XIX(4), 1483-1536.
- Blaug, M. (1976):** "The Empirical Status of Human Capital Theory: A Slightly Jaundiced Survey." *Journal of Economic Literature* 14(3), 827-55.
- Calvo, J.L. (1985):** "Rendimientos del Capital Humano en Educación en España", *Investigaciones Económicas*, XII (3), 473-482.
- Carabaña, J. and Arango, J. (1983):** "La ddemanda de educación universitaria en España". *Revista de Española de Investigaciones Sociológicas*, 24, 66-88.
- Carabaña, J. (1987):** "¿Desplazan en el mercado de trabajo español los que tienen más estudios a los que tienen menos?." *Revista de Educación* 283, 101-130.
- Corugeso, I., García and E. Hernández, J. (1994):** *El sistema educativo en España y la Unión Europea*, Fundación Empresa Pública.
- De la Rica, S. and Ugidos, A., (1995):** "¿Son las diferencias en capital humano determinantes de las diferencias salariales observadas entre hombres y mujeres?" *Investigaciones Económicas*, XIX (3), 395-414.
- Duncan T. (1994):** "Like Father, Like Son, Like Mother, Like Daughter." *The Journal of Human Resources* XXXIX(4), 950-88.
- Eaton, J. and Rosen, H.S. (1980):** "Taxation, Human Capital, and Uncertainty", *The American Economic Review* 70(4), 705-15.
- Griliches, Z. (1977):** "Estimating the returns to Scholing: some Econometric Problems" *Econometrica*. 45,1, 1-22.
- Kodde, D.A. (1986):** "Uncertainty and the Demand for Education." *Review of Economics and Statistics* 68(3), 460-67.

- Kodde, D.A. (1988):** "Unemployment Expectations and Human Capital Formation" *European Economic Review* 32, 1645-1660.
- Kodde, A. and Ritzen, J. (1985):** "The Demand for Education Under Capital Market Imperfections." *European Economic Review* 28, 347-62.
- Kodde, A. and Ritzen, J. (1994):** "Direct and Indirect Effects of Parental Education Level on the Demand for Higher Education." *The Journal of Human Resources* XXVIII(4), 356-71.
- Levhari D. and Weiss, Y. (1974):** "The Effect of Risk on the Investment in Human Capital." *The American Economic Review* 64(6), 950-63.
- Maddala, G.S. (1983):** *Limited-dependent and Qualitative Variables in Econometrics*. Cambridge University Press.
- Manski, C.F. and Lerman, S.R. (1977):** "The Estimation of Choice Probabilities from Choice Based Samples." *Econometric* 45(8), 1977-88.
- Manski, C.F. and Wise, D.A. (1983):** *College choice in America*. Harvard University Press. Cambridge, Massachusetts, and London, England.
- McFadden, D. (1974):** "Conditional Logit analysis of Qualitative Choice Behaviour", in *Economic Theory and Mathematical Economics*, Ed. Paul Zarembka, Academic Press New York, San Francisco.
- McFadden, D. (1981):** "Econometric Models of Probabilistic Choice" in *Structural Analysis of Discrete Data with Econometric Applications*, Ed. By Manski and McFadden.
- Mincer, J. (1974):** *Schooling, Experience, and Earnings*, National Bureau of Economic Research, New York.
- Modrego, A. (1986):** *Determinantes de la demanda de educación superior: Estimación de un modelo de demanda de educación superior para la provincia de Vizcaya*, Thesis University of País Vasco, Spain.
- Mora, J. G. (1997):** "Equity in Spanish higher education." *Higher Education*, 33, 233-249.
- Mora, J.G. and Vila, L. (1996):** "Earnings and Education in Spain: Analysis and Evolution in the 80's", mimeo, Universidad de Valencia.
- Pasacharopoulos, G. (1981):** "Return to Education an Updated International Comparison" in *The Economic Value of education*, Blaug M. The International Library of Critical Writings in Economic., 52-80.
- Pasacharopoulos, G. (1985):** "Returns to Education: a Further International Update and Implications" *The Journal of Human Resource*, XX, 4, 583-604.

- Pasacharopoulos, G. (1994):** "Returns to Investment in Education: A Global Update" *World Development*. 22,9, 1325-1343.
- Parsons, D. (1974):** "The Cost of School Time, Foregone Earnings, y Human Capital Formation." *Journal of Political Economy* 82(2), 251-66.
- Venti, S.F. and Wise, D.A. (1983):** "Individual Attributes and Self-Selection of Higher Education." *Journal of Public Economics* 21, 1-32.
- Williams, J.T. (1979):** "Uncertainty and the Accumulation of Human Capital over the Life Cycle." *Journal of Business* 52(4), 521-48.
- Willis, R.J. and Rosen, S. (1979):** "Education and Self-Selection." *Journal of Political Economy* 87(5), S7-36.