

The Determinants of Non-compulsory Education Demand: An Analysis from the Students' Perspective

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The Determinants of Non-compulsory Education Demand: An Analysis from the Students' Perspective¹

Los determinantes de la demanda de educación postobligatoria: un análisis desde la perspectiva de los estudiantes

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Abstract

In this paper we study the determinants of education demand after compulsory secondary education. We explore how students' perceptions and preferences (subjective variables) affect students' willingness to study. Current contributions that analyze education demand are based on indirect data collected after students have taken a decision. Therefore, they are based on the arguments provided by households to explain their past decisions. On the contrary, in this paper we analyze data collected directly from students when they had to take a decision concerning their future education, in their last year of compulsory education (at the age of 16). This approach allows us to estimate (based on Probit models) to what extent each of the variables affects students' decisions. Additionally, this approach provides an estimate of the probability that a student with certain characteristics will or will not continue with his or her education. Our results confirm those obtained by other authors in Spain, that is, family background and labour market conditions affect students' decisions. However, we go one step further and we show that students' inter-temporal preferences as well as the quality

⁽¹⁾ Authors acknowledge financial support by the Government of the Balearic Islands.

of the information received by students, regarding their alternatives after completing compulsory education, explain students' decisions. Additionally, we find significant differences among students depending on the type of school they attend (public *versus* private schools).

Key words: Schooling, demand for education, subjective information, student's inter-temporal preferences.

Resumen

En este artículo analizamos los determinantes de la demanda de educación tras la Enseñanza Secundaria Obligatoria (ESO). Estudiamos cómo las percepciones y las preferencias de los estudiantes (variables subjetivas) afectan el deseo de los estudiantes de continuar con sus estudios. Las contribuciones actuales en el campo de la demanda educativa se centran en el análisis de información obtenida indirectamente, cuando los estudiantes ya han tomado una decisión. Por el contrario, en este artículo trabajamos con datos obtenidos directamente de los estudiantes en el momento en el que debían tomar una decisión respecto a su futura educación, precisamente en su último curso de enseñanza obligatoria (a los 16 años). En el artículo procedemos a la estimación de modelos Probit, que permiten calcular la importancia relativa de cada una de las variables sobre las decisiones de los estudiantes, así como la probabilidad de que un alumno con unas determinadas características decida estudiar o no. Nuestros resultados confirman aquellos obtenidos por otros autores para el caso español, esto es, que la estructura familiar y las condiciones del mercado de trabajo influyen en las decisiones de los estudiantes. Sin embargo, nuestros resultados van un paso más allá y permiten mostrar que las preferencias intertemporales de los estudiantes, así como la calidad de la información que reciben del centro sobre las distintas alternativas después de la enseñanza obligatoria, también influyen en sus decisiones. Finalmente, también encontramos diferencias estadísticamente significativas entre los estudiantes en función de la naturaleza del centro en el que cursan los estudios (público o concertado).

Palabras clave: escolarización, demanda de educación, información subjetiva, preferencias intertemporales.

Introduction

Since the second part of the 20th century there has been a growing consensus, both from a theoretical as well as from an empirical perspective,

that investing in education provides significant private and social returns. From a labor economics perspective, since the seminal article by Mincer (1974), a positive relationship between human capital and income has been proven to exist and to be robust. According to this literature (Card, 1999, provided a very complete survey on this issue), private returns to schooling are quite high.

Another strand of the human capital literature has focused its analysis on the determinants of the education demand. In this sense, in the last decades there has been a significant increase in the number of contributions that analyze, from an empirical point of view, the demand of education and the role played by family budget constraints (see Chevalier and Lanot, 2002; Acemoglu and Pischke, 2000; Cameron and Taber, 2000; Becker and Tomes, 1986) and family characteristics such as socio-economic status, parental education, etc. (see Cameron and Heckman, 1998, 1999; Ermish and Pronzato, 2010, etc.).

In Spain, the determinants of education and educational attainment have deserved attention of several authors, from different perspectives. Thus, while Serrano (1998 and 2003) analyzed the correlation between economic growth and education (measured as school attainment), Casquet (2003), Martínez-Grada and Ruiz-Castillo (2002), Petrongolo and San Segundo (2002), Marcenaro and Navarro (2001), Beneito et ál. (2001) and Salas (2008) focused their analysis on the demand for education and educational attainment. These contributions were based mainly on the analysis of micro-data on households (or workers) that contain income data, individual characteristics (gender, age, years of schooling, number of siblings) and socio-economic data (individual and parental job status, parental level of education, place of residence –urban versus rural–, unemployment rates, etc.). The availability of data together with the fact that the social science literature posits a great number of mechanisms (relating family structure and children's outcomes²) explains why the list of control variables that have been considered in the literature is very extensive.

Finally, there are several contributions (see Adame and Salvà, 2010, and García et ál., 2011) that analyze the determinants of early school leaving (or school dropout) from a biographical approach (Spanish students). This approach is aimed at reconstructing the subjects' pathways to education and work.

⁽²⁾ Very often the variables are not validated from theoretical models but they are based instead on ad hoc perceptions.

However, papers mentioned above perform an *ex post* analysis, once the individuals have already taken a decision regarding whether to enter the labor market or continuing with their education. However, we argue that the empirical approach followed in the existing literature, when analyzing school dropout, introduces some distortions in the estimates. We think that the approach followed by Mora and Oreopoulos (2011), who use dropout intentions before the decision is taken (*ex ante*), is more appropriate. They analyze Catalanian pupils in Compulsory Secondary Education to explore peer effects on high school aspirations. They conclude non-reciprocating peer's dropout intentions in small and not significant, while the effect on reciprocating friends is much stronger.

Our paper follows a similar approach, in the sense that we perform an *ex ante* analysis based on intentions (instead of using real choices). Our aim is to study the intention of continuing studying after compulsory secondary education. We use subjective and objective data obtained directly from students that were expected to take a decision concerning their education, that is, in their last year of compulsory education (at the age of 16). We argue that students take their decisions conditioned to their socio-economic environment, which is also validated in the existing literature, but also on the quality of information they receive regarding the different alternatives that exist after compulsory education, their preferences on present-future consumption, their perception on the correlation between education and earnings, or their expected chances to find a job in a labor market that is open to unskilled workers (in the Balearic Islands).

One could argue that the analysis of students' expectations, without taken into account their real choices, lessen the value of present research. However, Khoo and Ainley (2005) follow up 13.600 Australian students and conclude that students' intentions are highly correlated with real choices.

Our results, in line with those obtained by other Spanish authors (see Casquet, 2003, García et ál., 2011 and Adame and García, 2010), confirm the relevance of family background and labor market conditions on students' decisions and educational attainment. However, we go one step further and we show that students' perceptions and students' inter-temporal preferences also matter. Students that prefer to obtain low present wages as opposed to higher future wages show a lower probability to continue their education. Finally, we find significant differences among

those students attending public or semi-public schools (these are private schools that receive subsidies that cover 100% of teachers' salaries and a compensation to cover some of their expenses). However, the analysis of the differences between public and semi-public schools is beyond the scope of this paper.

Analyzing how students take their decisions concerning their education is a key issue in order to implement the right public policies aimed at improving the investment in human capital. We think that our results are complementary, and very useful, to those obtained following the biographical approach.

This paper is structured as follows. In the next section, we present the main characteristics of the students in the Balearic Islands and we describe the questionnaire that was presented to them. In section 3 we describe the sample and the main statistical results. In the fourth section, which is directed to readers with a good statistical background, we show the empirical results and the econometric model, which is based on Probit estimations. Finally, in section 5 we present our conclusions.

Education in the Balearic Islands and the data

Most contributions that analyze school dropout and education demand in Spain rely on micro data sets with only objective variables. They analyze the correlation between education and earnings and the relationship between budget constraints and education demand. However, current empirical analysis is based on those individuals who had taken already a decision concerning their level of education.

In this paper we want to follow a different strategy. We want to study the impact of students' preferences on their decision to incorporate to the labor market or to continue studying. In order to do so, we obtained our data from students that were expected to take a decision a few months after responding to our questionnaire.

We restrict our sample to the students that live in the Balearic Islands, with total population of 1.130.000 inhabitants distributed in four islands. We think that this region deserves a special attention because although the literature states that there is a positive correlation between

economic growth and education, macro data for the Balearic Islands show that GDP *per capita* has been well above the Spanish average since the eighties while education indicators referred to students in the Balearic Islands have remained well below the average during the same period.

Data available shows that the enrolment rates drop significantly at the age of 16-17 both in Spain and in the Balearic Islands. In 2008 the enrolment rate in the Balearic Islands for 15-year-old students was 89% (99,7% in Spain), while at the age of 16 it dropped significantly to a lower 81,7%³ (92,8% in Spain) and to an even lower rate of 63.,% (77,8% in Spain) at the age of 17, when education is optional⁴.

Although the Spanish system of education explains part of the low levels in enrollment rates, a traditional argument offered to explain such enrollment rates in the Balearic Islands is that its labor market, in which tourism accounts around 50% of total activity⁵, highly demands low skilled workers. In 2007 (fourth quarter), the rate of unemployment for youngster between 16 to 19 years old reached 25,8%, one of the lowest rates in Spain, while the Spanish average was 31,34%. However, unemployment rates for skilled workers in the Balearic Islands are below Spanish average, meaning that the labor market in the Balearic Islands also demands qualified workers. One of the goals of this paper is to test to which extent the availability of opportunities for low-skilled workers conditions the demand for education.

In May 2008, 1.803 students in their fourth year of secondary education responded a questionnaire aimed at obtaining students' subjective information. These students were expected to take a formal decision by June 2008. This decision might be influenced by socio-economic characteristics as well as by the grades students obtained during compulsory-education. The decision of some of the students, those who were planning to attend the university, might depend also on the expected academic results (either at high school or regarding the university-entry exam) of those exams to be taken in May/June (or September) which would determine their chances to choose the degree they wish.

In order for our data to be representative the students and the schools that responded the questionnaire were selected to represent the current

⁽³⁾ This represents a total of 8.239 students attending the last year of compulsory education.

⁽⁴⁾ Source: Oficina de Estadística del Ministerio de Educación y Ciencia.

⁽⁵⁾ Source: IMPACTUR (2013) «Estudio del impacto económico del turismo sobre la economía y el empleo de las Illes Balears» at <http://exceltur.org/excel01/contenido/portal/files/Impactur%20Illes%20Balears%202009%20web.pdf>

structure of public and private schools; schools at larger cities and small villages; schools at villages next to the coast and schools in villages without coastline (labor market is apparently smaller in these villages).

1.803 students responded the questionnaire out of 8.239 that were currently registered in the last course of compulsory education in the Balearic Islands. This represents 21% of the target population, which indicates that our data is representative. First of all, in order to check whether the questions were clear, the options were relevant and they include all plausible option for all students, a pilot survey was answered by 155 students before preparing the final questionnaire. All the Secondary Education centers in the Balearic Islands were contacted through an email or by telephone to ask them if they wished to participate in the study. If so, the questionnaire was responded in the classroom and there were two possibilities. We offered to the center if they want an interviewer to pass the questionnaire, alternatively, they could pass their questionnaire themselves if it was more convenient for them⁶. They answer the 24 questions in paper and it took 10-15 minutes to explain the instructions, to answer the questionnaire and to collect the responses. The questionnaire was completely anonymous⁷.

The students are asked about their willingness to study after compulsory education. They face two options: *yes* and *no*. Those who respond *yes* they reveal if they want to study: 1) Bachillerato, 2) Vocational training, 3) Others or 4) They are not sure yet. Those who do not want to study are asked about the reasons: 1) They want to work, 2) They do not like to study, 3) They think studying is useless 4) Other reasons (they could mark more than one option).

In a different question they are asked about their willingness to enroll in a university degree in the future.

The survey collects information about the variables that might be relevant to determine education demand. We can classify them into four groups:

- Variables that refer to *socio-economic characteristics and family background*: age, number of siblings, parental education degree and

⁶) Most of them opt for this second option.

⁷) The advantage of an anonymous questionnaire is that students have no incentives to cheat, but it has the inconvenient that it is not possible to follow up the students to check their real choices or to use external information like their real marks.

labor status (distinguishing father and mother), marital status and older siblings who followed non-compulsory studies.

Although we are aware that household income is a key variable for the education demand, this question was omitted in the survey because we assumed that most 15-year-old students did not have a clear idea of their parents' income.

- Variables that reflect students' perceptions on:
 - Quality of information received by students concerning the effects of dropping-out or continuing studies (four levels).
 - Quality of information received by students concerning the different alternatives they faced if they wanted to continue their studies (four levels).
 - Relationship between income and education.
- Questions aimed at capturing students' preferences and their financial situation:
 - Students were asked on their preference to continue studying. First they were asked if they wished to study after Compulsory Secondary Education. In a different question they were asked about their willingness to attend to the university in the future (and if they would choose the University of the Balearic Islands or a different one).
 - Students that responded that they wished to continue with their education after compulsory education specified what they were willing to do. The alternatives were: i) Bachillerato, ii) Vocational training, iii) Others, or iv) They do not know yet
 - Students that responded that they preferred to end their formal education were asked their arguments. The alternatives were: i) Earning money as soon as possible, ii) Their perception of their capability to succeed if they attended higher levels of education, iii) Their perception on the relation between education and labor status, iv), The quality of information available to them concerning the different alternatives after completing compulsory education.
 - Those students that preferred to continue studying were asked whether their parents could afford it or not.

- Students that responded that they wished but could not study were asked the reasons. Alternatives: i) Grades are not sufficient to have access to Higher Education, ii) Their preferred studies were not offered in the Balearic Islands, iii) Parental budget restrictions.
 - Students, which responded that they could not study because their parents could not afford it were asked whether they would change their decisions if they were eligible to receive a grant or a credit.
- Finally, we introduced a question that intended to capture *students' inter-temporal preferences*: we asked students about their willingness to postpone present low earnings in favor of future higher income. We intended to capture the student's opportunity cost of dropping-out or rejecting post-secondary education. This question has a similar structure to one of the questions proposed by Barsky et ál. (1997) where measures of preference parameters relating to risk tolerance and time preference are reported.

We organized the question in two rounds. First, the individual were in an hypothetical situation in which they were asked to choose between continuing studying for another six years (Bachillerato plus a four year bachelor) and getting a future monthly salary of 1.200 euros versus getting a job just after finishing their compulsory education period for a monthly salary of 800 euros. In the second round, they face the same question but the salary they would receive if they decided to continue studying was modified (increased or decreased according to the answer to the first question) in order to analyze if they would change their mind. Students' answers allowed us to classify them into four categories, from less patient students to more patient students (see the Appendix for details).

In accordance with the approach followed in Casquet (2003), the labor market also affects students' decisions. Then, local (city level) unemployment rates are also introduced as control variables. Unfortunately, the Spanish National Institute of Statistics does not offer unemployment rates at the local level. Although the number of unemployed workers is available, we do not know the labor force in each municipality. Nevertheless, we introduce a proxy using the ratio of unemployed people over total population in each municipality (therefore, we are underestimating unemployment rates).

Statistical results

This section is devoted to the description of the sample and the main statistical results.

Table I shows that 77% of the students that responded the questionnaire were enrolled at public schools and 22% at semi-public schools (*educación concertada* as it is known in Spain). Only 1% of the sample represented students enrolled at private schools. This distribution of students is similar to the distribution of students among public, semi-public and private schools who were registered as students at the last year of compulsory education (ESO) in the Balearic Islands in 2008 (60%, 37% and 3% respectively).

TABLE I. Type of School and number of participants that responded the questionnaire

Type of schools	Number of students
Public	1.396
Semi-public	393
Private	14
Total	1.803

Table II contains the main socio-economic characteristics of the students that responded the questionnaire. The first interesting result is that 65% of the students were born in 1992, meaning that 35% of the students had repeated at least a year. This result might influence students' decision to continue studying.

Regarding to family background, the sample is characterized by the following facts. First, 88,47% of the students responded that they had at least one brother or sister, although only 50,17% had at least an elder brother. Second, marital status of the parents corresponds mainly (in 77,37% of the cases) to stable couples (married or cohabiting couples). Third, 55,89% of the students' fathers had completed Secondary Education at least, percentage that is very similar among students' mothers, 55,95%.

TABLE II. Students' socio-economic characteristics

	%
Year of birth	
1989	0,17
1990	8,76
1991	25,89
1992	65,18
Number of siblings	
0	11,53
1	56,3
2	22,94
3	5,71
4	1,68
5	0,67
6	0,67
7	0,17
> 8	0,34
Students with elder brothers	
Yes	50,17
No	49,83
Marital status	
Married or with stable couple	77,37
Divorced or single parent	20,28
Widow	2,35
Father's level of education	
No-studies	8,13
Primary	35,99
Secondary	35,01
University degree	20,53
Others	0,35

Mother's level of education	
No-studies	6,32
Primary	37,73
Secondary	34,66
University degree	20,89
Others	0,4
Father's Labor Status	
Unemployed	1,56
Non-working	0,92
Retired or handicapped	3,00
Working	94,52
Mother's Labor Status	
Unemployed	5,38
Non-working	9,45
Retired or handicapped	1,81
Working	83,36

Finally, data in Table II shows that 94,52% of the students' fathers and 83,36% of the students' mothers were working.

In order to understand this high employment rates among students progenitors, it is important to remark that the questionnaire was responded by May 2008 in a moment when the Balearic Islands' unemployment rate was 9% (8,6% in Spain). However, this situation worsened sharply since the fourth quarter of 2008, and it persists until nowadays because during the first quarter of 2012 the unemployment rate was 28% (24,4% in Spain). Unemployment rates worsened for all strand of the population although it was more intense for youngsters. The unemployment rate for youngsters, from 16 to 19 years old, rose to 40,14% in 2012 in comparison to a 25,88% in 2007. Therefore, from the second part of 2008 students' alternatives were dramatically reduced, which explains the observed increase in attendance rates in post-compulsory education from 2008 to 2011. Nevertheless, the questionnaire was passed in a moment when students had different alternatives after completing compulsory education and their decisions were not influenced by the

current crisis. Still, in order to check the impact of unemployment on students' decisions we introduced local unemployment rates in our estimates.

Table III collects students' responses concerning their preferences to continue studying. The table contains also students' perception regarding the correlation between education and income. Additionally, the table shows students' opinion on the quality of information they receive from teachers and school managers regarding the professional alternatives they will face after completing compulsory education as well as students' opinion concerning the quality of information they receive –if any– that might help them deciding to go on studying (in case they are willing to continue studying).

The main finding observed from this data is that 94,54% of the 1.803 students that responded the questionnaire confirmed that they were willing to continue their education. This means that some of the students in the sample that have repeated one year or two (those born before 1992, which account for 35% of the total) responded that they would be willing to continue their education in spite of their poor academic results.

Another interesting result is that 78,92% of the students perceived a positive relationship between education and income, while 7,36% did not or were not sure about it (13,72%).

Finally, data in Table III also indicate that 83,58% of the students thought that they were offered enough information so that it might help them decide whether to continue studying or not, and what to study. Still, to what refers to the information received about the professional alternatives they would find if they decided not to study, 77,71% of the students perceived that it was adequate. Therefore, data suggests that most of the students think that the school provides them with adequate information that may help them taking their decision concerning their professional and educational alternatives.

TABLE III. Students' preferences and perceptions

	%
Do you want to continue your education?	
Yes	94,54
No	2,28
Do not know	3,18

Dou you think that education might help you to earn a higher wage rate?	
Yes	78,92
No	7,36
Do not know	13,72
Do you think that the school provides you enough information so as to help you deciding whether to continue your education or entering the job market?	
Completely agree	14,8
Agree	68,78
Disagree	13,47
Very disagree	2,95
Do you receive enough support from your school so that you know all the possible professional alternatives if you decided to drop-out?	
Sufficient information	14,64
Good information	63,07
Insufficient information	19,66
The information provided is very bad	2,63

Next, in Table IV we present the main arguments offered by those students that were not willing to continue their formal education: i) 58,5% were willing to earn money as soon as possible, ii) 41,5% did not like to study, iii) 12,2% did not like any of the alternatives available to continue their education. Finally, a small fraction of the students (2,4%) said that continuing their education would not help them to find a good job.

TABLE IV. Arguments offered by those students that declared they did not want to continue their education

I want to earn money	58,54%
I don't like to study	41,46%
It is not useful	2,44%
None of the studies is appealing to me	12,20%

Note: The addition of all percentages is larger to 100% because students might provide different arguments.

Table v collects the students' answers when they were asked if they would be able to go to the university in case they decided to do so. Most of the students, 67%, responded that if they wished to continue their education they could do so. 12% of the students indicated that they could not continue their education because their grades were unsatisfactory. Another 14% of the students declared that they did not know whether their parents could or could not afford it or whether their grades would be high enough.

However, the most important result to be remarked from this data is that only a small fraction of the students (4,33%) answered that their parents could not afford their post-compulsory education. More interestingly, 3,19% argued that they should move to another region –probably because their wished degree was not offered in the Balearic Islands– and they could not afford it, while 1,14% declared that even though they could continue their education in the Balearic Islands, they could not afford it. Finally, 2,51% of the students declared that they should move to the mainland and they were not willing to do so.

TABLEV. If you decided to continue with your education would you be able to go to the university?

Yes	67,46%
No, I must move to the main land and I cannot afford it	3,19%
No, I want to study in Balearic Islands and I cannot afford it	1,14%
No, my grades are not high enough	11,91%
No, I don't want to move and I cannot study what I like Balearic Islands	2,51%
I do not know	13,79%

Finally, data in Table vi describe the variables by type of school used in this section (25 observations were not included in our estimates because the information for all the variables of interest was incomplete).

TABLE VI. Descriptive statistics by type of school

	TOTAL		PUBLIC SCHOOL		SEMI-PUBLIC SCHOOL	
Variable	Mean	SD	Mean	SD	Mean	SD
Go on studying	94,0%		93,0%		98,0%	
Going to Bachillerato	70,0%		66,0%		83,0%	
Going to the university	61,0%		58,0%		71,0%	
Social environment						
Public school	77,0%		100,0%		0,0%	
Unemployment rate	4,1%	0,0096	3,9%	0,0098	4,9%	0
Municipality without coastline	18,0%		23,0%		0,0%	
Family background						
N. of siblings	1,4	1	1,4	1,1	1,3	0,92
Stable couple	77,0%		78,0%		74,0%	
Siblings studying	36,0%	0,48	35,0%	0,48	42,0%	0,49
Parents education						
None of the parents with studies	33,0%		37,0%		16,0%	
1 parent with studies	27,0%		27,0%		27,0%	
Both parents with studies	40,0%		36,0%		57,0%	
Low grades	11,0%		12,0%		8,0%	
Repeating a year	35,0%		37,0%		28,0%	
<i>Rel. between education and wages</i>						
Positive relationship	78,6%		79,2%		76,2%	
No rel.	7,4%		6,8%		9,8%	
Don't know	14,0%		14,0%		14,0%	

No information on alternatives	16,0%	16,0%	18,0%
Male	39,0%	39,0%	40,0%
Time preferences			
Very impatient	2,0%	2,0%	1,8%
Impatient	12,0%	12,0%	11,0%
Patient	3,0%	2,8%	4,1%
Very patient	70,0%	69,0%	74,0%
No answer	13,0%	14,2%	9,1%
N. Observations	1.778	1.375	389

As we mentioned in the previous paragraphs, 94% of the students responded that they expected to continue their education (any of the alternatives). However, only a 74% of those (70% of the total number of students) are willing to attend Bachillerato. The rest of the students who are willing to continue their education provided the following answers: 1) 19% wanted to follow a professional training, 2) less than 1% wanted to study other things and, 3) 10% did not want to study or they did not know yet. As expected, the number of individuals who plan to go to the university is smaller (61%).

Altogether, data suggests that: i) Most students are willing to continue their education, ii) Budget constraints do not bind the decisions of most students, iii) Students are aware of the relationship between education and salaries, iv) Students receive enough information concerning the different alternatives they will face after completing Secondary Education and, v) Even some students with poor academic results are expecting to continue studying.

If these results are valid and students did respond honestly, how can we explain that 94% of the students declare that they are willing to continue their education and the enrolment rate at the age of 17 is 61,1%⁸ in the Balearic Islands? In order to do so, we need to implement more sophisticated statistical techniques.

⁽⁸⁾ Source: Oficina de Estadística del Ministerio de Educación y Ciencia.

In any case, another plausible explanation is that students may change their minds after the final exams in June or September, or they may receive a good job offer. Alternatively, one may argue that students' progenitors do not support students' preferences. We think that these factors could play a significant role concerning students' final decisions⁹.

In addition to that, it must be stressed that the questionnaire was presented to the students by May, which means that those students that became 16 before May could have already dropped-out. Nevertheless, we think that our estimates are still valid because data concerning the students' individual characteristics indicate that at least 35% of the students who responded the questionnaire were 16 years old before May. Therefore, students who are likely to stop studying after compulsory secondary education are also represented in our sample.

Econometric model and results

In this section we explain the methodology we use to analyze the determinants of education demand and we comment our results. Although this section uses statistical technics that are relatively sophisticated, we think that these technics are rather standard and that readers should not have any problem in interpreting the results.

We assume, for simplicity, that students' indirect utility function can be written as a linear function. Let $U_i^s = \beta_s' x_i + e_i^s$ represent the indirect utility function associated to those students that are willing to continue their education beyond compulsory education, where x_i denotes observable students' characteristics and e_i is an error term that includes students' specific factors that might affect their utility. Let $U_i^w = \beta_w' x_i + e_i^w$ denote the indirect utility function of those students that prefer to stop studying after compulsory education.

Given that the indirect utility function cannot be observed directly and we only observe student's willingness to study after compulsory education, we define a dichotomous variable y_i that takes value 1 if the student wants to study and 0 otherwise:

⁽⁹⁾ We agree that analyzing the reasons why there are mismatch between students answer and final decision would be very interesting. Unfortunately, the questionnaire was anonymous and it has been impossible to follow up the respondents.

$$\Pr(y_i = 1 | x_i) = \Pr(U_i^s - U_i^w > 0) = \Pr(\beta'x_i + e_i > 0 | x_i) = \Phi(\beta'x_i) \quad [1]$$

$\Pr(y_i = 1 | x_i)$ represents the probability that an individual i is willing to continue with her education, conditioned to her individual characteristics. If we assume that e_i is distributed following a normal distribution, then $\Phi(\cdot)$ denotes the standard normal cumulative distribution function of a Probit model.

The vector x_i contains variables, and proxies, associated to the determinants of the education demand. According to the literature mentioned in section 2, there is a wide set of variables that might be considered in x_i : family background (household income, parents' education, number of siblings, labor status), environmental conditions (unemployment rates, economic structure –demand for skilled or unskilled labor–), individual characteristics (students' academic results, inter-temporal preferences, etc.). We use explanatory variables or proxies for all of them.

Probit estimations

Table VII shows the effects that the characteristics of the students have on their probability to continue their education.

The dependent variable takes value 1 if the individual prefers to continue studying and zero otherwise. Each column represents a different alternative (willingness): (1) To go on studying, (2) Bachillerato, or (3) Attending the university. We offer the value of the coefficient and the impact of each explanatory variable on the probability (on the right side) that students decide to continue their education. A positive sign would indicate that students with those characteristics have a larger probability to continue studying. A negative sign would denote the opposite.

The explanatory variables that we consider in the three alternatives are the same. Nevertheless, the effect of some of the explanatory variables on the probability changes significantly from one alternative to the other, as it is shown in the table.

TABLE VII. Subjective probability of studying after Secondary School, Going to Bachillerato and Going to the university

VARIABLES	(1)		(2)		(3)	
	GO ON STUDYING		GOTO BACHILLERATO		GOTO THE UNIVERSITY	
	Coef.	Effect. on Prob.	Coef.	Effect. on Prob.	Coef.	Effect. on Prob.
Social environment						
Public school	-0,435** (0,176)	-2,72%	-0,358*** (0,104)	-10,80%	-0,208** (0,0873)	-7,80%
Unemployment rate	1,578 (5,785)	12,10%	12,15*** (3,976)	392,80%	1,949 (3,553)	74,60%
Municipality without coastline	0,210 (0,148)	1,43%	0,178* (0,0967)	5,53%	0,0884 (0,0851)	3,35%
Family background						
N. siblings	-0,131*** (0,0418)	-1,01%	-0,116*** (0,0340)	-3,74%	-0,113*** (0,0316)	-4,33%
Stable couple	-0,0801 (0,127)	-0,59%	-0,0137 (0,0845)	-0,44%	-0,0603 (0,0754)	-2,30%
Siblings studying	0,172 (0,114)	1,26%	0,173** (0,0767)	5,49%	0,190*** (0,0677)	7,21%
<i>Parents education:</i>						
I parent with studies	0,301** (0,134)	2,05%	0,147 (0,0906)	4,64%	0,143* (0,0822)	5,42%
Both parents with studies	0,422*** (0,131)	3,06%	0,422*** (0,0862)	13,20%	0,277*** (0,0767)	10,50%
Students' characteristics						
Male	-0,0239 (0,110)	-0,18%	-0,0291 (0,0735)	-0,94%	-0,0634 (0,0645)	-2,43%
Low grades	-0,227* (0,138)	-2,04%	-1,172*** (0,112)	-43,50%	-0,861*** (0,104)	-33,30%
Repeating a year	-0,572*** (0,112)	-5,24%	-1,048*** (0,0747)	-35,80%	-0,392*** (0,0691)	-15,20%
No information on alternatives	-0,240* (0,130)	-2,13%	-0,0396 (0,0966)	-1,29%	-0,0436 (0,0845)	-1,68%
<i>Rel. between educ. & wages:</i>						

No rel.	-0,469*** (0,165)	-5,13%	-0,423*** (0,132)	-15,00%	-0,00562 (0,121)	-0,22%
Don't know	-0,373*** (0,136)	-3,66%	-0,291*** (0,101)	-9,99%	-0,236*** (0,0909)	-9,19%
Constant	2,339*** (0,361)		0,881*** (0,237)		0,635*** (0,211)	
Observations	1,778	1,778	1,778	1,778	1,778	1,778
Pseudo-R ²	0,148	0,148	0,266	0,266	0,0936	0,0936
Log-likelihood	-330,2	-330,2	-798,0	-798,0	-1079	-1079

Notes: Standard errors in brackets under the coefficients. (*) denotes parameter significant at 10%, (**) significant at 5%, (***) significant at 1%.

Reference groups are: for parents' education 'none of the parents has studies higher than Secondary School', for relation between education and wage 'I believe there is a positive correlation between level of education and wage'.

Effect on probability computes the change in the probability due to an infinitesimal change in each independent, continuous variable and reports the discrete change in the probability for dummy variables.

We will first refer to the results concerning the impact of the social environment on students' decisions. The variable denoted as 'public school' takes value 1 if the student is registered in a public school and 0 otherwise. Results indicate that students that attend public schools have a lower probability to continue their education compared to students registered in semi-public schools. This could indicate an income effect (poorer families tend to attend public schools) and/or a quality effect¹⁰.

The impact of this variable is even larger when we observe students' decision when the alternatives are Bachillerato or university. Results indicate that students attending public schools have a lower probability to attend Bachillerato and university in comparison to those students attending semi-public schools, 10,8% and 7,8%, respectively (in section 4.2 we perform a robustness analysis and we split the sample into subsamples according to the type of school they are registered).

⁽¹⁰⁾ *A priori*, it is difficult to argue that education quality is lower in public schools since, in the Balearic Islands, public expenditure per student in public schools is much larger than public expenditure in semi-public schools. In addition to that, regarding the quality of professors at public schools we must remind that their salaries tend to be higher to those perceived by professors at semi-public schools and that the teachers enrolled at public schools must pass a competitive examination.

Unexpectedly, unemployment rates seem not to influence students' decisions to go on studying or going to the university. However, unemployment has a positive and significant impact on those students that decide to attend Bachillerato.

The fact that students live in a municipality without coast line does not affect students' decisions either. This might be explained by the fact that the island is small and that moving from one corner of the island to the other does not take more than 80 minutes by car.

Secondly, we refer to the impact of those variables related to students' family background, such as the number of siblings. The number of siblings presents two different effects. On the one hand, siblings reduce the probability that a student decides to continue studying. This variable is negative and significant in all regressions. On the other hand, the fact that students have some siblings who are already studying increases the probability that those students decide to attend Bachillerato or university.

In the same group of variables, we find that parental stability does not affect students' decisions in any of the alternatives.

Another variable that is associated to the students' family background is the level of education of student's progenitors. Education is measured through a variable that takes value 1 if the progenitor has a level of education above Secondary School and 0 otherwise. Given that there is a multicollinearity problem between parent's levels of education¹¹, we create a new categorical variable. This variable takes the value 0 if none of the parents has a level of education above Secondary School, 1 if at least one of them has that level of education and 2 if both of them do have it. This variable is introduced as a dummy variable in the regression. We use 'none of the parents have Secondary Education' as a reference value. The fact that at least one of the progenitors has Secondary Education affects the decision of those students that decide to continue their education (although not for Bachillerato and university). As expected, if both parents have Secondary Education the probability that a student decides to continue their education increases. This effect is even larger for those students that decided to attend Bachillerato, although it is not so large for those students that decided to attend university (still, the marginal probability is significant and positive).

⁽¹¹⁾ The variables father's education and mother's education are significant when we use them separately. However, when we regress them together, only mother's education seems to be relevant.

It is worth mentioning that parental labor status and school dummies (we introduced a dummy for each school) were introduced in previous estimates but they were systematically irrelevant and they were discarded from the final estimations.

Finally, we analyze the impact of students' individual characteristics on their decisions. The fact that students think that their grades are not very high plays an important role on students' decisions (this is a subjective variable). The perception of having low grades decreases the student's willingness to continue studying. But this effect is even larger when the decision is going to university or Bachillerato. Students with low grades have a probability to choose attending Bachillerato that is 43,5 points lower compared to those students that think that they have good grades (33 points when the alternative is the university).

Another variable that offers similar results is the one that takes into account whether students have repeated at least one course (the variable takes the value 1 if the student is not attending the course that corresponds to her age and 0 otherwise). As expected, those students that have repeated a year present a lower probability (-5,24 points) to continue their education. This effect is much larger when the decision is Bachillerato (-35,8 points) or university (-15,20 points).

The effect of these two variables suggests that there is some kind of self-selection. Students may discard themselves to continue their education because they might think that it is very likely they will not succeed.

The student's perception concerning the relationship between education and wages has also an impact on her decision. Those students that think that there is no relationship and those who do not know whether this relationship exists show a lower probability to continue studying. On the contrary, those students that do think that this relationship exists show a higher probability to continue their education.

Finally, regarding the variables in this third block of coefficients, results show that the perception on the quality of information offered to students is a variable that does not affect their decisions. However, there is a negative and slightly significant (at the 10% level) effect on the decision to continue studying but not on the other alternatives.

It is important to remark that although most coefficients present the same sign, regardless if the students' are attending Bachillerato or university, the level of signification is lower when the alternative is university. This might be due to the fact that some students that decide to

attend Bachillerato will not attend university, or they do not know yet. Therefore, the decision to attend university is more difficult to predict probably because it is a decision that will be taken in two or three years' time and because students' decisions depends also on the results that they will obtain during the next two years.

Public versus private schools

In the previous section we observed that the variable public school was always significant and with a negative sign. This means that students attending public schools showed a lower probability to continue studying. Additionally, the probability that students attending public schools continued their education in a Bachillerato was 11 points lower compared to students attending semi-public schools (8 points if the decision was to enroll to a university).

These results are very interesting because most private schools in the Balearic Islands are publicly financed. That is why we refer to them as semi-public schools. One may argue that if both types of schools are publicly financed, and if students are evenly distributed across both types of schools¹² the quality of education and the students' results should not vary between one type of school and the other.

In this section we conduct a robustness analysis procedure aimed at understanding the observed differences between students that attend public or semi-public schools. We restrict our analysis to the decision of continuing studying (regardless of the alternative) or stop studying after their compulsory education and we analyze whether there are behavioral differences between students that attend public or semi-public schools.

The first column in Table VIII reproduces the regression included in the first column in Table VII, for comparison purposes only. The second column shows the results for the sub-sample of students registered at public school, while the last column in Table VIII refers to the results obtained at semi-public schools.

It is important to remark that two variables could not be introduced in the regression corresponding to students that attend semi-public schools

⁽¹²⁾ Students are distributed across schools by the regional government according to students' preferences (more precisely by the preferences of their parents). However, do to obvious limits of capacity of each school, some objective criteria are implemented and there is a portion of students that are not accepted at the school that was their first or second choice.

due to perfect multi-colinearity problems. One of them is 'municipality without coastline' because all semi-public schools in the sample were located in Palma¹³ (for the same reason, unemployment rates could not be considered in the estimates either). The other variable is 'marital status'. Unexpectedly, all the interviewed students attending semi-public schools have married or cohabiting parents. This is an interesting result because it denotes a difference in students' family structure, which apparently might affect students' decisions.

When we split the sample we observe that results for students attending public schools are almost identical to those obtained for the whole sample. This is not surprising because this sub-sample accounts for 75% of the students that responded the questionnaire.

To what concerns students attending semi-public schools we see that the signification of the coefficients falls dramatically with respect to results shown in Table VII, which might be due to the fact that there are fewer observations, 287, as opposed to 1.375 in the regression concerning public schools. Another explanation to this result might be that the heterogeneity among students' characteristics in the subsample of students' attending semi-public schools is much lower, as statistics in Table VI suggest. In fact, the variable that refers to parental status (married and stable couples versus divorced or single mothers) indicates that there is no heterogeneity among parents whose children are attending semi-public schools. A similar problem may occur to what concerns the degree of education of the parents. The standard deviation of that variable is much lower for students at semi-public schools in comparison to students attending public schools, which might explain that the coefficient of this variable is not significant when we estimate the regression for those students that attend semi-public schools.

In spite of this fall in signification, two variables remain highly significant. Still, repeating a year is the main factor that reduces students' probability to continue their education. Students that have repeated a year reduce their probability to continue their education by 6.26 points. It must be stressed that this decrease in the probability is larger in comparison to students that were attending public schools (5.49 points). The second variable that is significant is the students' perception on the quality of the information received by students aimed at helping them decide. While this

⁽¹³⁾ In fact, the main private and semi-public schools in the Balearic Islands are located in Palma.

variable is not significant for students attending public schools, the lack of information is significant and negative for students attending semi-public schools. This means that the decision of the students that attend semi-public schools is influenced by the information they receive concerning their future.

All the other variables considered in our analysis were not significant. In particular, it is important to stress that results suggest that students attending semi-public schools are not influenced by their perception on the relationship between education and income. On the contrary, results show that this relationship plays a significant role on the decisions of the students enrolled at public schools. Despite of the fact that the signification of the coefficients in the semipublic regression may be conditioned to the smaller size of the sub-sample, results suggest that there is some kind of evidence that there are differences in the determinants of education demand associated to the type of school students are registered.

TABLE VIII. Subjective probability of studying after Secondary School in the whole sample, in private schools and in public schools

VARIABLES	(1) GO ON STUDYING		(2) GO ON STUDYINGGO ON STUDYING (PUBLIC SCHOOL) (SEMI-PUBLIC)		(3) GO ON STUDYING	
	Coef.	Effect. on Prob.	Coef.	Effect. on Prob.	Coef.	Effect. on Prob.
Social environment						
Public school	-0,435** (0,176)	-2,72%				
Unemployment rate	1,578 (5,785)	12,10%	1,916 (5,834)	18,70%		
Municipality without coastline	0,210 (0,148)	1,43%	0,200 (0,147)	1,78%		
Family background						
N. siblings	-0,131*** (0,0418)	-1,01%	-0,145*** (0,0432)	-1,41%	0,0441 (0,267)	0,06%
Stable couple	-0,0801 (0,127)	-0,59%	0,00678 (0,132)	0,07%		
Siblings studying	0,172 (0,114)	1,26%	0,186 (0,122)	1,74%	0,0961 (0,419)	0,12%

Parents education:						
I parent with studies	0,301** (0,134)	2,05%	0,327** (0,143)	2,84%	0,386 (0,528)	0,39%
Both parents with studies	0,422*** 0,709 (0,131)	3,06% 1,22%	0,400*** (0,139)			
3,59%					(0,471)	
Students' characteristics						
Male	-0,0239 (0,110)	-0,18%	-0,0284 (0,116)	-0,28%	0,145 (0,408)	0,18%
Low grades	-0,227* (0,138)	-2,04%	-0,253* (0,145)	-2,89%	-0,145 (0,520)	-0,22%
Repeating a year	-0,572*** (0,112)	-5,24%	-0,498*** (0,118)	-5,49%	-1,508*** (0,501)	-6,26%
No information on alternatives	-0,240* (0,130)	-2,13%	-0,153 (0,143)	-1,63%	-0,931** (0,451)	-2,77%
Rel. between educ. & wages:						
No rel.	-0,469*** (0,165)	-5,13%	-0,475*** (0,180)	-6,47%	-0,571 (0,489)	-1,36%
Don't know	-0,373*** (0,136)	-3,66%	-0,393*** (0,144)	-4,86%	-0,651 (0,535)	-1,65%
Constant	2,339*** (0,361)		1,794*** (0,288)		2,709*** (0,650)	
Observations	1,778	1,778	1,375	1,375	287	287
Pseudo-R ²	0,148	0,148	0,125	0,125	0,318	0,318
Log-likelihood	-330,2	-330,2	-295,5	-295,5	-27,30	-27,30

Note: See note Table vii for the statistical characteristics of the tests implemented in the estimations.

Time preferences

This sub-section is aimed at analyzing the effect of students' time preferences on their decisions. In Table ix, we show our results concerning the effects of students' time preferences.

In our questionnaire students were asked to choose between two options, studying or end with their formal education after the last year of compulsory education, each of them associated to a present and a future salary (and there were different alternatives of present and future salaries).

Then, students were classified into four categories according to their responses (see section 2 for a better description of the process that was followed in the questionnaire).

In Table vi we present the statistical characteristics of this classification. According to this data 73% of the students seem to be patient (3%) or very patient (70%) and a small 14% seem to be very impatient (2%) or impatient (12%). The other 13% left the question blank. Additionally, we observe some differences among students attending public and semi-public schools. While 71,8% of the students that attend public schools are patient o very patient, this percentage is lower compared to students attending semi-public schools (78,1%).

Once we introduce time preferences in our regressions (see results in Table ix) the coefficients are jointly statistically very significant and the explanatory power increases (the Pseudo- R^2 is higher, denoting that the adjustment and the explanatory power increase). In addition to that, we observe that the signification and the sign of the coefficients hardly change. Only the variable that captured students' perception on the relationship between income and education reduces its signification. Still, the sign of the coefficient is the same and those coefficients that were significant without considering students' time preferences remained significant.

As expected, results show that the more patient the students are the higher the probability they decide to continue their education. The probability that patient students attend Bachillerato is 14,5 points larger with respect to the reference group (if the decision is to attend university the probability is 10,9 points larger). Finally, as we observed in Table vii, effects of the variables and the adjustment of the regression are larger when we analyze the alternative of attending Bachillerato in comparison to attending university.

TABLE IX. Subjective probability of studying after Secondary School with time preferences

VARIABLES	(1)		(2)		(3)	
	GO ON STUDYING		GO ON BACHILLERATO		GO ON UNIVERSITY	
	Coef.	Effect. on Prob.	Coef.	Effect. on Prob.	Coef.	Effect. on Prob.
Social environment						
Public school	-0,399** (0,182)	-2,24%	-0,379*** (0,108)	-11,20%	-0,191** (0,0879)	-7,16%
Unemployment rate	1,297 (6,041)	8,83%	12,74*** (4,068)	405,90%	2,085 (3,564)	79,80%
Municipality without coastline	0,138 (0,154)	0,86%	0,123 (0,0991)	3,82%	0,0529 (0,0857)	2,01%
Family background						
N. siblings	-0,101** (0,0441)	-0,69%	-0,104*** (0,0351)	-3,31%	-0,105*** (0,0321)	-4,01%
Stable couple	-0,0287 (0,130)	-0,19%	0,0130 (0,0863)	0,42%	-0,0502 (0,0757)	-1,91%
Siblings studying	0,137 (0,118)	0,90%	0,154* (0,0787)	4,84%	0,179*** (0,0681)	6,79%
<i>Parents education:</i>						
I parent with studies	0,276** (0,138)	1,68%	0,131 (0,0929)	4,08%	0,136* (0,0826)	5,16%
Both parents with studies	0,406*** (0,136)	2,61%	0,378*** (0,0886)	11,70%	0,261*** (0,0771)	9,89%
Students' characteristics						
Male	-0,0201 (0,113)	-0,14%	-0,0128 (0,0753)	-0,41%	-0,0586 (0,0647)	-2,25%
Low grades	-0,133 (0,142)	-1,00%	-1,074*** (0,114)	-39,70%	-0,813*** (0,105)	-31,60%
Repeating a year	-0,523*** (0,116)	-4,22%	-0,992*** (0,0770)	-33,50%	-0,371*** (0,0706)	-14,30%
No information on alternatives	-0,253* (0,135)	-2,02%	-0,0270 (0,100)	-0,86%	-0,0427 (0,0850)	-1,64%

<i>Rel. between educ. & wages:</i>						
No rel.	-0,337*	-3,00%	-0,303**	-10,40%	0,0444	1,69%
	(0,174)		(0,138)		(0,123)	
Don't know	-0,315**	-2,66%	-0,263**	-8,86%	-0,208**	-8,11%
	(0,141)		(0,104)		(0,0917)	
<i>Intertemporal preference:</i>						
Time preference 1 (more impatient)	-0,683***	-8,38%	-0,636**	-23,40%	-0,232	-9,10%
	(0,263)		(0,284)		(0,251)	
Time preference 2	0,0404	0,27%	-0,403***	-14,00%	0,0814	3,08%
	(0,173)		(0,137)		(0,127)	
Time preference 3	0,431	2,02%	0,0899	2,78%	0,122	4,60%
	(0,313)		(0,221)		(0,200)	
Time preference 4 (more patient)	0,563***	4,84%	0,433***	14,50%	0,281***	10,90%
	(0,144)		(0,104)		(0,0941)	
Constant	1,901***		0,599**		0,389*	
	(0,393)		(0,259)		(0,228)	
Observations	1,778	1,778	1,778	1,778	1,778	1,778
Pseudo-R ²	0,198	0,198	0,302	0,302	0,0997	0,0997
Log-likelihood	-311,1	-311,1	-758,6	-758,6	-1,071	-1,071

Note: See note Table vii for the statistical characteristics of the tests implemented in the estimations.

Conclusions

Current contributions that analyze education demand are based on indirect data that is collected after students have taken a decision. On the contrary, in this paper we analyze data collected directly from students when they had to take a decision concerning their future education, in their last year of compulsory education (at the age of 16). Therefore our results derive from student's expectations rather on students revealed preferences.

Our results confirm those obtained by other authors in Spain that proved the relevance of family background (parent's education, number of siblings, elder siblings who decided to continue their education, etc.) and labor market conditions (parental labor status and unemployment rates) on students' decisions on whether to continue their education or entering in the job market.

However, we go one step further and we show that students' perceptions and students' time preferences also matter.

First, we show that information offered to students concerning the educational and professional alternatives they will face after completing their compulsory education is an important variable to be considered.

Second, we find that another relevant variable are students' perceptions on the relationship between income and education. Those students that think this relationship does not exist and those that do not know whether this relationship exists show a lower probability to continue their education.

Third, we show that students' inter-temporal preferences matter. Students that prefer to obtain low present wages as opposed to higher future wages show a lower probability to continue their education.

Finally, we show that the fact that students repeat at least one year and their perception on the quality of their grades negatively affect their decision to continue their education. Therefore, we observe some kind of self-selection among students. Some of those who think that their grades are not high enough and those who have repeated a course seem to self-discard to continue their education.

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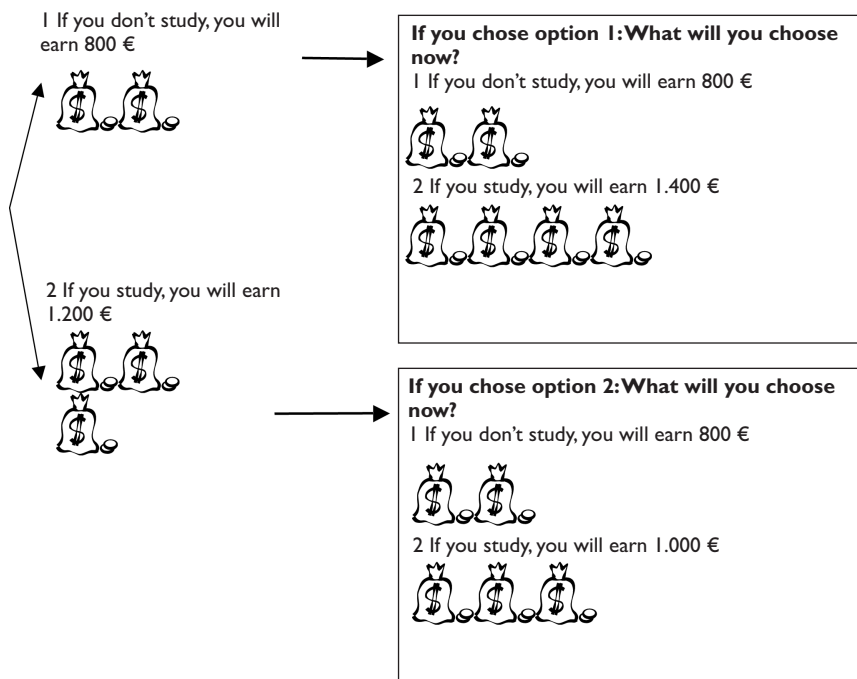
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Appendix

In order to approximate time preferences, we asked individuals about their willingness to delay their participation in the labor market which would allow them to obtain a higher lifetime income in return. According to the methodology of Barsky et ál. (1997), we posit the following question to the interviewees:

Imagine education is for free. Suppose that if you decide to continue your education, although you will not obtain any income in the next six years, suppose however that once you obtain a degree you will be able to get a salary the rest of your life and that this salary is higher to the one you would obtain were you incorporated in the labor market at present. Choose the choice you find more interesting.

In the pilot survey we offered students a wide range of different salaries. Taking into account their answers and plausible labor market conditions, in the final questionnaire we opt for the choices that are described below:



Students' answers allowed us to classify students into four categories, from less patient (denoted as time preference 1 in the table) to more patient (denoted as time preference 4). More patient students are those who decide to study even when by doing so they would only earn 200 additional euros than if they decided to work at present. More impatient students are those who prefer to work now even when they know that if they study a degree they will almost twofold the present salary.