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decisions on institution type and leaving home”**

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NÚCLEO DE INVESTIGAÇÃO EM POLÍTICAS ECONÓMICAS
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Higher education (related) choices in Portugal: joint decisions on institution type and leaving home[§]

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Abstract

The aim of this paper is twofold. We want to further investigate the type of higher education institution choice using individual level data on first year students, on the one hand, and to establish the link between subsystem choice and leaving home decision, on the other hand. The analysis was performed for Portuguese higher education by means of a bivariate probit model. Results indicated gender differences in the type of higher education institution choice. Socio-economic background appeared to constrain student choices and accessibility did play a role in their decisions. When it comes to the leaving home decision, the higher the income group and the higher the parents' literacy, the more likely students stayed at home. Students with strong preferences over leisure activities tended to leave home to attend higher education.

Keywords: university, polytechnic institute, leaving home, accessibility

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1. Introduction

Over the last quarter of the twentieth century, in most European countries, participation in higher education has reached levels never experienced before, with important implications on the mix of students, who are nowadays recruited from a variety of socio-economic, cultural and educational backgrounds, and who differ in the way they experience higher education life. One of the key facets of this process is that students are leaving home ever later, a phenomenon of major relevance in Southern European countries. According to the Eurostudent report, in 2006, about 73% of the Italian higher education students lived with parents or relatives; whereas in Spain, that share was 64% (HIS, 2008). In that study Portugal ranked third concerning home living students that represented about 55% of the higher education student population. This proportion went up to almost 60% for students aged less than 21.

The leaving home decision is a sign that transition into completely independent living is taking place. Whether to stay at home or not is mainly a financial decision; but it is also determined by family resources, community ties and aspirations and expectations (Patiniotis and Holdsworth, 2005). Late home leaving has important implications for individuals' educational career. Namely, the higher education institution choice of those students staying at home is more likely to be geographically constrained than the choices of the other students and more dependent on the spatial distribution of higher education institutions. This brings accessibility issues to the centre of the analysis and suggests the simultaneous investigation of the determinants of the choice of higher education and the leaving home decisions.

The aim of this paper is twofold. We wanted to further investigate the type of higher education institution (i.e. subsystem) choice using individual level data on first year students, on the one hand, and to establish the link between subsystem choice and leaving home decision, on the other hand. Particular emphasis was put on geographical inequalities, and student geographic mobility was analysed. Possible inequalities at the socio-economic background level, the cultural background level and geographical level were identified and explored.

The analysis was performed on the Portuguese higher education system. The research benefited from a data set on all first time/first year students entering higher education in the academic year 2006/2007, which included information on several relevant variables, that go from cultural and socio-economic background to the reasons behind student decisions.

We estimated a bivariate probit model, which linked the choice on the type of higher education institution (university versus polytechnic institute) and the leaving home decision. Estimation results pointed out gender differences in the choice of the type of higher education institution. Socio-economic background appeared to constrain student choices and accessibility did play a role in their decisions. When it comes to the leaving home decision, the higher the income group and the higher the parents' literacy, the more likely students stayed at home. Leaving home students were more likely to attend a university rather than a polytechnic institution.

The paper unfolds as follows. Section 2 reviews the literature related to those two decisions: which subsystem and whether to leave home. Section 3

describes the Portuguese context, the methods and the data, and Section 4 presents the results of the study. Section 5 concludes.

2. Higher education (related) choices

Demand for higher education has long been analysed, for different countries and educational contexts, and its multiple dimensions and related decisions have been investigated. Whether to apply to higher education, the choice of the institution type, the institution to attend, and the field of study, are among the most studied decisions. The choice of a higher education institution to attend is a rather complex process, involving tensions that are, simultaneously, internal and external, personal and social, individual and from the reference group. Individual choices reflect socio-economic and cultural contexts, intelligence, competences, values and interests in the construction of vocational aspirations, self-esteem. But choices comprise a complex set of expectations, aspirations, desires and representations on the future as well. Nevertheless, those complexities involved in the choice process are not easily dealt with in applied work.

The present study concentrated on the choice of the type of higher education institution to attend. It linked that choice with the leaving home decision, which individuals make in their transition into adulthood. The analysis has been restricted to a set of choice determinants, which do not exhaust the choice analysis but allow for the mapping of the general choice process.

Institution type

The issue of selecting a higher education institution has been extensively analysed in the literature. Depending on the educational system under analysis, colleges and technical schools, two-year and four-year colleges, as well as non-school options took part in the set of available alternatives. Investment and consumption motives have been pointed out as being among the main reasons behind student choices. From a human capital standpoint, prospective students aimed at improving their future labour market outcomes, whereas from a consumption point of view, students were attracted by local amenities and leisure facilities. Some studies have emphasized different perspectives of the choice, by combining financial variables, as predicted by the human capital theory, with non-pecuniary variables, as suggested, for instance, by the theory of vocational personalities and work environments (Holland, 1997). According to Holland's theory (i.e., the person-environment fit theory), students looked for environments that matched their personality in terms of skills and abilities.

Student ability, peer group effects, gender, schooling costs and price, and family income were among the most analysed choice determinants, but their effects were not always consensual across the studies.

Student ability was expected to have an impact on post-secondary choices. Empirical work has used the secondary education grade point average as a proxy for ability, as that was not easy to measure. Rouse (1994) has concluded that, in the US, students starting in a junior college showed lower measured ability when compared to those attending a four-year college. Sá et al. (2006) have found a similar result for the Netherlands; namely, the grade point average

appeared to have the biggest marginal effect on the odds of choosing a university option rather than a professional college or a non-school alternative.

Under uncertainty, it might be reasonable that students obtain information from the decisions of other students, who had to decide in comparable situations. Peer group effects were likely to exist and have been documented in several studies. Amado Tavares et al. (2008) recognised the opinions of friends and family as the main factors influencing the choice decisions of the Portuguese students in higher education. Other studies took ability as the observed peer characteristic that might influence the others behaviour (Winston and Zimmerman, 2004).

Gender appeared to play a role in post-secondary education decisions, but results were not uniform across studies (see, for instance, Amado Tavares et al., 2008; Sá et al., 2006; Ordozensky, 1995).

Some studies have identified a negative effect of the direct costs of a schooling alternative (such as tuition and books) on the choice of that alternative (see Manski and Wise, 1983). There was, however, evidence that direct costs did not play a role on the choice of a post-secondary alternative. For instance, Ordozensky (1995) found that direct costs of education alternatives had not a significant effect on the choice between vocational and academic programmes at colleges and universities. When it comes to costs, the role of tuition fees has been probably the most explored aspect of higher education demand. The relative tuition of higher education alternatives has been supported as a determinant of college enrolment composition (Rouse, 1994).

Household income was another important determinant of higher education choices. Parental occupation and/or education were often used as proxies for

income, but also to capture the independent positive effect it might have on students' decisions (Nguyen and Taylor, 2003).

On top of that, results from previous studies showed that there was a prominent spatial dimension to the choice behaviour of high school graduates. Depending on accessibility to higher education institutions, students might opt for attending higher education in their home region or for moving to another region. Sá et al. (2006) concluded that geographic accessibility did play a role in determining student choices; namely, accessibility to professional colleges had a positive influence on going to professional college, while accessibility to university institutions exerted a positive influence on decisions to continue to university.

Leaving home decision

Although the economics of household behaviour has emphasized the interdependence between human capital investments, labour supply and family arrangements, only recently studies started looking at them simultaneously (see Sá et al., 2007 for the Netherlands; Giannelli and Monfardini, 2000, 2003 for Italy; Martinez-Granado and Ruiz-Castillo, 2002 for Spain).

For many students, attending higher education meant the first opportunity to leave home and to develop a taste for independence (Mulder and Clark, 2002). The decision to move out of home to attend university or college has been analysed at the aggregate level, that is, at the city-level or state-level, and at the individual level. Some studies went further by relating the leaving home decision to attend higher education with higher education graduate mobility (see for instance, Faggian et al., 2006; McCann and Sheppard, 2001).

Literature has referred housing rents as one of the main factors behind the decision to stay at parents' house (Ermisch and Di Salvo, 1997; Ermisch, 1999; Giannelli and Monfardini, 2000, 2003; Holdsworth et al., 2002; Martínez-Granado and Ruiz-Castillo, 2003). It appeared that higher house prices delayed home leaving and encouraged returns to the parental home (Ermisch, 1999).

Some family related aspects were also determinants of student choices. Family socio-economic background and its structure were among the most analysed aspects (Manacorda and Moretti, 2006). According to Ermisch (1999), higher parental income made it more likely that the adult child stayed living at home. Student's own income also affected the manner in which youngsters left home as well as the age of departure (Ermisch and Di Salvo, 1997). Gierveld et al. (1991) distinguished between transferable and non-transferable resources and concluded that high levels of the former facilitated leaving home decisions, whereas high levels of the latter slowed down the home leaving process. In the same line of results, Giannelli and Monfardini (2003) concluded that Italian family background played a major role in shaping young adults' decisions.

Some gender and age differences have been found as well. According to Giannelli and Monfardini (2003), if the father had a university degree the probability of his adult child living with his/her parents nearly doubled for males and increased by twenty percentage points for females. Other decisions youngsters make, such as working and studying decisions seemed to have also a strong relationship with living arrangement choices. For instance, living independently had a positive effect on the propensity to work (Martínez-Granado and Ruiz-Castillo, 2003). Recently, in a study that disentangles

economic from cultural effects, Giuliano (2007) concluded for the major role of culture in determining living arrangements and leaving home decisions.

Summing up, there is a group of studies that looked at the decision of whether to move away from home or not, whereas another group of studies aimed at analysing the choice of type of higher education institution by accounting for mobility issues (namely, including distance and accessibility). In the present study, we tried to combine both lines of research by simultaneously modelling two decisions: whether to apply to university education or polytechnic education and whether to leave home.

3. Empirical setting

3.1. The Portuguese higher education setting

The Portuguese higher education system is a binary system, with universities and polytechnic institutes as the main providers. Universities offer academic training, whereas polytechnics offer professionally oriented programmes. In both cases, there are public and private institutions. Some institutions include both a university and a polytechnic branch. In the school year 2006/2007, the public sector comprised 14 universities, 5 non-integrated university institutions, 15 polytechnic Institutes, and 16 non-integrated polytechnic schools; whereas for the private sector the numbers were 13, 35, 2 and 60 institutions, respectively (MCTES, 2006).

This structure was the result of recent policies aiming at assuring regional diversity and equity in access. In the eighties, the geographical expansion of the higher education system was given special attention, with public polytechnic

institutes being created in most districts. As a result, public polytechnic institutes are better spread all over the country than public universities, and private institutions do not play a major role in geographic decentralization (Teixeira et al., 2009).

3.2. Methods

The present analysis aimed at studying two simultaneous decisions high school graduates made when applying to higher education: whether to attend a university or a polytechnic institute, and whether to leave home. Therefore each student ended up choosing among four pairs of alternatives: university and staying at home, university and leaving home, polytechnic institute and staying at home, polytechnic institute and leaving home.

A bivariate probit model has been applied, in which two equations were considered, one for each choice. Each individual was classified with respect to these two dichotomous variables. The model specification was:

$$y_{i1}^* = \beta_1' x_{i1} + \varepsilon_{i1}, \quad y_{1i} = 1 \text{ if } y_{i1}^* > 0, 0 \text{ otherwise}$$

$$y_{i2}^* = \beta_{21}' x_{i2} + \varepsilon_{i2}, \quad y_{2i} = 1 \text{ if } y_{i2}^* > 0, 0 \text{ otherwise}$$

$$E(\varepsilon_{i1}) = E(\varepsilon_{i2}) = 0$$

$$Var(\varepsilon_{i1}) = Var(\varepsilon_{i2}) = 1$$

$$Cov(\varepsilon_{i1}, \varepsilon_{i2}) = \rho$$

$$(\varepsilon_{i1}, \varepsilon_{i2}) \sim N_2(0,0,1,1, \rho)$$

where y_{i1}^* and y_{i2}^* denoted latent variables; y_{1i} and y_{2i} denoted binary choice variables for higher education institution type and leaving home, respectively; x_{i1} and x_{i2} were vectors containing the variables that may affect those decisions

(to be presented in Section 3.3); β_1' and β_2' were vectors of coefficients to be estimated; N_2 stood for the bivariate normal distribution.

3.3. Data and sample characteristics

The data used in this study resulted from a survey conducted in the beginning of the academic year 2006/2007 among all first-time students in each and every cycle.¹ Public and private higher education institutions, as well as university and polytechnic first-time students are in the sample. We have restricted our sample to first-time, first cycle students, as we believed there was a specific choice process to each cycle of studies, which should be analysed separately. After eliminating missing data on all relevant variables, there were 13,527 students remaining in the sample.

We derived information on personal characteristics from the questionnaire, including gender, age, and citizenship. Parents' education, family income, and sources of funding for higher education studies (student funding and external funding) were proxies for the cultural and socio-economic background. Usually parents' education and family income was found to be highly correlated, which might cause estimators to have undesirable properties. In the present case, the problem was not so relevant, as we did not consider all educational levels; instead we just made the distinction between parents who did have a higher education diploma and those who did not.² Furthermore, those variables might proxy different aspects of the students' background with influence on their

¹ The questionnaire had to be filled in and sent back at the moment of the registration in higher education. All questionnaires have been collected by the higher education institution, which was in charge of sending it back to the Department of Higher Education of the Ministry of Science, Technology and Higher Education (MCTES, *Ministério da Ciência, Tecnologia e Ensino Superior*).

² The actual correlation between both variables is 0.52.

choices. Income is a proxy for the economic background of the family, which may be related to the capacity that the family can send the student to study outside the living area. Despite the high correlation between parents' education and income, parents with a higher education diploma might have a role on its own. In fact, most of the parents holding a higher education diploma in our dataset studied in universities, as they have probably attended higher education in the 1970s or in the early 1980s, when polytechnic institutes were just starting their activity. It then might be the case that higher education parents may favour a university option rather than a polytechnic alternative, based on their own experience.

Students applying for the first time to a given programme had usually similar schooling, but they might differ in their stock of human capital. In order to control for differences in the human capital stock at entrance, we used information on the application grade point average.

There was information on student decisions in the data. Regarding higher education choices, we knew whether the student had registered in a university or in a polytechnic institute, which higher education institution and which study programme. Study programmes were organized in 10 fields, as defined by the Ministry of Science, Technology and Higher Education (MSTHE, *Ministério da Ciência, Tecnologia e Ensino Superior*): Agriculture, Hard Sciences, Architecture, Economics and Business, Sports and Arts, Education, Law and Social Sciences, Health, Technologies, and Humanities. The main reasons behind the choice of institution and programme were also known; namely, whether the student valued some institutional characteristics like leisure, prestige, employability and location, and whether family and friends opinions

were relevant for the choice. The data included information on whether the institution/programme was the first option, or, whether it was a second best alternative.

Higher education choices are interrelated with other choices individuals make in their transition into adulthood. Whether individuals work or not and whether they leave home could be seen as higher education related choices that were covered in the dataset. For empirical purposes the working decisions were taken as exogenous.

Finally, our study gave special attention to the spatial dimension by means of two measures of spatial accessibility to universities and polytechnic institutes. There was a large range of accessibility measures that could be applied to the higher education choices' context. In the present paper, we wanted to characterize the overall accessibility to universities and polytechnic institutes, which required the use of a gravity-type measure. Following Sá et al. (2006), accessibility to universities was defined as:

$$accessibility\ universities_i = \sum_{j=1}^U \frac{1}{d_{ij}}$$

where U was the total number of universities and d_{ij} was the distance between the home district and the district where the university is located.³ The accessibility to polytechnic institutes was defined by analogy. Accessibility measures were strictly positive, and the higher its value, the higher the accessibility. As suggested in the literature, both measures entered the model in the logarithmic form (Rietveld and Bruinsma, 1998). On top of those

³ Intrazonal distances, required whenever both the family residence region and the institution location region coincide, are computed using the formula: $d_j = ((\pi - 1)/\pi)\sqrt{s_j/\pi}$, where s_j is the area of region j measured in square meters (see Rietveld and Bruinsma, 1998).

accessibility measures, we used a dummy variable equal to 1 if the higher education institution attended was located in the region where the student's family lived.

< Place Table 1 here >

Table 1 shows the complete list of the variables in use, their description and some basic statistics. It reveals that about 54.4% and 53.6% of the students, respectively, opted for university education and for leaving home. Female students represented 58.6% of the students; about 31% of the students were in the highest family income group. As expected, on average, accessibility to polytechnic institutes was higher than accessibility to universities. Employability was positively valued by about 86% of the students, and prestige by 75% of them. Half of the students valued location, whereas 43.6% gave leisure a positive rating.

4. Results

Using the variables described in previous section, we estimated a bivariate probit model for the decisions on the higher education subsystem and on whether to leave home, as explained in Section 3.2. The estimation results are shown in Table 2. Before looking at the results, it is important to note that the correlation parameter (*rho*) was statistically significantly different from zero, giving reason to the use of a bivariate probit model. That is, the bivariate probit model was preferable over two separate probit models.

Several interesting results emerge from Table 2, which in most cases confirmed our expectations. Starting with the university choice equation, in accordance

with previous studies, the student's high school performance, as measured by the grade point average, had unequivocally a positive effect on the odds of choosing the university option. It seemed that there was a self-selection mechanism at work, with students with the highest GPA preferring universities rather than polytechnic institutes. This result was in accordance with previous studies for other countries (see, for instance, Sá et al., 2006, for the Netherlands; and Rouse, 1994, for the US).

With respect to individual characteristics, there was a tendency for female students to attend polytechnic institutes. The older the student, the less likely was that he/she attended university, corroborating the results of Sá et al. (2006) for the Netherlands. The nationality had no discernible effect.

< Place table 2 here >

The effect of the student cultural and socio-economic background has been included in the model, by means of the family income and parent's education level. We confirmed the relevance of the income status in explaining the higher education subsystem choice. Low income was among the reasons behind the decision to opt for attending a polytechnic institute. As income increased, the more likely the student was to choose university education, which was in line with the results of Amado Tavares et al. (2008). Parental education also had an impact on student choices, since those with parents holding a higher education diploma were more likely to choose a university.

As the human capital theory predicts, students had to bear education (related) costs, which brought funding availability to the centre of the analysis. Students benefiting from external funding (e.g. scholarships, loans) seemed to prefer

university rather than polytechnic programmes. Whether the student paid or not for his studying expenses, did not appear to have a statistically significant effect.

There were obvious differences among fields of study. Note that each coefficient showed the difference between a given field of study and Law and Social Sciences, which has been taken as the baseline category. As such, students in the fields of Hard Sciences and Humanities showed higher probability of choosing a university alternative when compared to those in Law and Social Sciences. For all the remaining fields we got the opposite result. This result might be due to the field composition of university and polytechnic institutes' programme supply.⁴

When making higher education choices, students might look at several attributes of the programme and the institution. In the present model we have accounted for location, prestige, leisure and employability. Students valuing positively location and prestige tended to attend universities, whereas those with stronger preference over leisure and employability would rather prefer polytechnic institutes. These results confirmed those previously obtained by Amado Tavares et al. (2008).

Notwithstanding its unequivocal role in the higher education institution choice, as shown in previous studies (Amado Tavares et al., 2008), when it comes to subsystem choice, family and friends' opinions did not appear to be statistically significant. Although family and friends' opinions seemed relevant for the choice of a given higher education institution, that information pathway did not appear

⁴ It is important to highlight that even though the programme composition of those areas is quite heterogeneous, we opt for including them as control variables.

relevant in explaining the choice between university and polytechnic institutes. That is, those effects worked in the same way for both polytechnic institute and university options. This result might also hide the fact that when making their decisions, narrative students might weight differently the various sources of information in a way that reflected their general social/cultural objectives (e.g. distancing themselves from the perceived influence of parents).

Geographic accessibility did play a role in determining the student choices of the higher education subsystem. Accessibility to polytechnic institutes exerted a positive impact on the decision to attend polytechnic, while accessibility to university institutions had a positive influence on going to university. This confirmed the results of Sá et al. (2006) for the Netherlands.

Whether to work and whether to leave home, were higher education-related decisions, which were taken into account in this equation. Results suggested that students that simultaneously worked chose polytechnic programmes, as did students who decided to stay at home. Working students and those students who wanted to stay with their parents were less mobile, meaning that they would prefer to attend a close by higher education institution. Given that polytechnic institutes are more evenly distributed over space, this result came as no surprise.

Looking at the leaving home equation, it appeared that gender, nationality and external funding were not statistically significant. The tendency to leave home decreased with age. As far as cultural and socio-economic background go, income and parental education have been shown to play a role in determining the decision of leaving home to attend higher education. Students in the higher

income groups were more likely to stay at home, as were adult children of parents holding a higher education diploma.

Students that were more concerned with the leisure supply at the higher education institution location tended to leave home. As expected, whenever the institution location coincided with the district where the student's family lived, there was a high probability that the student stayed at home. Finally, working students appeared to be less mobile than non-working students.

We end this discussion of the estimation results by looking more closely at the results of gender, income group, parents' education, and the role of private institutions in accessibility. Namely, we discuss the predicted probabilities of choice for different groups of students according to those dimensions.

Table 3 shows the predicted probabilities of the subsystem choice and leaving home decision, for both male and female students. It suggests that the probability that a male student chose university education was almost 10 percentage points higher than its female counterpart, *ceteris paribus*. This means that if we take two students that were similar in terms of all variables in the model except that one of them was male and the other one was female, the former's probability of being at university was about 10 percentage points higher than the latter's.

< Place Table 3 here >

A possible explanation for this result is the relation between gender differences in the choice of the field of study and the programme supply composition. Studies have recognized that there were gender differences in the choice of the field of study. In Portugal, polytechnic institutes and universities differ in their

programme composition. For instance, in 2006, about 93% of the places available in the field of Hard Sciences were offered at universities, whereas in the field of Education 62% of the vacancies went for polytechnic institute programmes.

Gender differences in the probability of being away from home were very small, although the chances of leaving home were marginally higher for female than for male students. According to HIS (2008), the proportion of female students living with parents was about 4 percentage points lower than the male's proportion. This study, as well as most of previous studies reporting similar results, referred, however, to the whole higher education student population, rather than first year students.

< Place Table 4 here >

Analogous computations for each income group are shown in Table 4. According to Table 4, the likelihood of attending university increased with income. The difference in the probability of choosing a university alternative between individuals in the highest and the lowest income groups was about 17 percentage points. A difference of about 24 percentage points, but with the opposite sign, was found regarding the probability of leaving home. A possible explanation for that is the one that established a link between individuals' education and their residential choices. High educated and high income individuals tended to live in the highly urbanized coastal areas, where most higher education institutions were located, as well as the best. Therefore, their adult children did not need to leave home to attend higher education.

Results for parental education went in the same direction of those obtained for family income (see Table 5). The probability of university attendance of the adult children of parents with higher education diploma was about 66%, whereas it was about 52% for students whose parents had no higher education diploma. This might have to do with the type of institution attended by the parents themselves. Most of the parents of the students in this sample had a university diploma, since they studied at most in the early 1980s, when polytechnic institutes were starting their activity. However, we should be cautious when analysing the results related to both income and parents higher education variables as those variables are correlated.

< Place Table 5 here >

Finally, we predicted the probabilities of each choice by simulating a situation in which private higher education institutions of both types (universities and polytechnics) no longer existed. This would imply a change in accessibility measures such that accessibility would refer only to public higher education institutions. Results in Table 6 show that closing down private institutions would make university alternatives more likely. In such a hypothetical situation almost 70% of the students would attend university and only 30% would opt for a polytechnic alternative. This would represent a considerable increase when compared to the actual proportion of university students in our working sub-sample of about 54% (Table 1).

< Place Table 6 here >

Furthermore, about 55% of the students would leave parental home. When we compared this proportion with the actual proportion of home leavers in our sub-

sample (see Table 1), we realized that would correspond to an increase of about 1 percentage point. This meant that even without private higher education institutions, students would be able to attend a higher education institution without leaving home. In other words, private higher education institutions were not driving the spatial distribution of the higher education supply. Most private institutions were located in cities/towns where public institutions already existed, and as such did not contribute to expand the geographic accessibility to higher education.

5. Concluding remarks

In the present study, the higher education sector and living arrangement decisions have been simultaneously analysed. Results showed that although there were gender differences concerning the sector choice, those were not significant when it comes to the decision on whether to live with parents.

High cultural and socio-economic background was associated with higher probability of choosing university education, as well as with lower chances of leaving home. It is important to highlight that students from disadvantaged economic backgrounds appeared to be more constrained in their choices than any other students. In pursuing its objective of giving low income students the same options as their counterparts in choosing where to attend higher education, government should provide students with sufficient financial help to enable them to freely choose.

Accessibility to each type of higher education institution played a major role in determining student choices. Older and working students usually preferred

polytechnic programmes and were less mobile. Students attracted by leisure activities had preference for leaving home.

We are aware of some shortcomings of our study. Firstly, although the empirical approach accounted for a significant group of choice determinants, the choice process is not dealt with in all its complexities. Although, we cannot claim that our empirical approach explored all choice dimensions, we can still argue that it provides a useful description of what is going on in terms of higher education choice. Secondly, we have treated the working decision as exogenous. It would be more accurate if the working decision was taken as being determined in conjunction with the subsystem and leaving home decisions. This option has been taken as no data was available to deal with it.

The present analysis can be obviously extended as the choice of the higher education subsystem did not exhaust the topic of higher education decisions. In a time of increasing access to higher education, differences in labour market outcomes among higher education graduates might be determined by the study programme choice. Earning and unemployment differentials, and lack of workers in high demand fields, call for an investigation of the choice of a field of study.

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Table 1: Descriptive statistics

Variable	Description	mean	st.dev.
university	1 if university, 0 if polytechnic	0.544	
leaving home	1 if leaving home, 0 otherwise	0.536	
GPA	application grade point avergae	142.100	(20.179)
portuguese	1 if portuguese nationality	0.977	
female	1 if female, 0 otherwise	0.586	
age	age	19.887	(4.062)
income1	1 if income below €375	0.051	
income2	1 if income between €375 and €750	0.234	
income3	1 if income between €750 and €1125	0.245	
income4	1 if income between €1125 and €1500	0.163	
income5	1 if income over €1500	0.307	
parents HE	1 if parents finished higher education	0.288	
student funding	1 if student funds himself	0.091	
external funding	1 if student plans to apply to external funding	0.076	
work	1 if working, 0 otherwise	0.110	
1st option	1 if registering in the 1st option	0.673	
Agriculture	1 if Agriculture is the field of study	0.037	
Architecture	1 if Architecture is the field of study	0.049	
Hard Sciences	1 if Hard Sciences is the field of study	0.049	
Law & Social Sciences	1 if Law and Social Sciences is the field of study	0.195	
Economics and Business	1 if Economics and Business is the field of study	0.143	
Sports & Arts	1 if Sports and Arts is the field of study	0.024	
Education	1 if Education is the field of study	0.046	
Humanities	1 if Humanities is the field of study	0.038	
Health	1 if Health is the field of study	0.234	
Technologies	1 if Technologies is the field of study	0.185	
location	1 if location is positively valuated	0.498	
prestige	1 if prestige is positively valuated	0.751	
leisure	1 if lazer is positively valuated	0.436	
employability	1 if employability is positively valuated	0.856	
family & friends	1 if influenced by family and friends	0.488	
accessibility universities	accessibility to the whole university network	0.192	(0.050)
accessibility polytechnics	accessibility to the whole polytechnic network	0.246	(0.047)
same region	1 if the HEI is located in the region where the student's family lives	0.505	
Nr of observations		13527	

Table 2: Bivariate probit estimation results for the sector choice and leaving home decision

Variable	University choice			leaving home decision		
	mean		st.err.	mean		st.err.
GPA	0.024	***	(0.001)			
portuguese	0.051		(0.083)	-0.117		(0.083)
female	-0.247	***	(0.027)	0.006		(0.026)
age	-0.033	***	(0.005)	-0.009	**	(0.005)
income2	0.048		(0.058)	-0.201	***	(0.066)
income3	0.192	***	(0.059)	-0.410	***	(0.066)
income4	0.285	***	(0.062)	-0.482	***	(0.069)
income5	0.442	***	(0.061)	-0.618	***	(0.068)
parents HE	0.358	***	(0.032)	-0.116	***	(0.032)
student funding	0.009		(0.071)	-0.312	***	(0.074)
external funding	0.151	***	(0.047)	0.083	*	(0.049)
work	-0.137	**	(0.059)	-0.327	***	(0.060)
1st option	0.102	***	(0.027)	-0.248	***	(0.027)
Agriculture	-0.422	***	(0.065)			
Architecture	-0.761	***	(0.060)			
Hard Sciences	0.776	***	(0.073)			
Economics and Business	-0.184	***	(0.041)			
Sports & Arts	-0.185	**	(0.078)			
Education	-0.641	***	(0.064)			
Humanities	1.020	***	(0.080)			
Health	-1.034	***	(0.042)			
Technologies	-0.018		(0.041)			
location	0.066	*	(0.035)			
prestige	0.079	***	(0.029)			
leisure	-0.093	***	(0.036)	0.122	***	(0.025)
employability	-0.109	***	(0.036)			
family & friends	0.011		(0.024)			
log accessibility universities	1.630	***	(0.079)			
log accessibility polytechnics	-2.089	***	(0.098)			
same region				-1.595	***	(0.025)
leaving home	0.248	***	(0.045)			
constant	-2.975	***	(0.196)	1.849	***	(0.137)
rho	-0,229 *** (0,030)					

Note: 1. Significance at the 1, 5 and 10% level is indicated with ***, ** and *, respectively. 2. Robust standard errors in parenthesis. 3. Results obtained with a sample of 13527 observations.

Table 3: Predicted probabilities by gender

Female		Leaving home		Total
		Yes	No	
Sector	University	25.3%	27.1%	52.4%
	Polytechnic	29.9%	17.7%	47.6%
Total		55.2%	44.8%	100.0%

Male		Leaving home		Total
		Yes	No	
Sector	University	30.7%	31.4%	62.1%
	Polytechnic	24.3%	13.6%	37.9%
Total		55.0%	45.0%	100.0%

Table 4: Predicted probabilities by income group

income < €375		Leaving home		Total
		Yes	No	
Sector	University	30.0%	16.9%	46.9%
	Polytechnic	40.7%	12.4%	53.1%
Total		70.7%	29.3%	100.0%

€375 ≤ income < €750		Leaving home		Total
		Yes	No	
Sector	University	27.5%	21.3%	48.8%
	Polytechnic	35.9%	15.3%	51.2%
Total		63.4%	36.6%	100.0%

€750 ≤ income < €1125		Leaving home		Total
		Yes	No	
Sector	University	26.6%	28.0%	54.5%
	Polytechnic	28.8%	16.7%	45.5%
Total		55.3%	44.7%	100.0%

€1125 ≤ income < €1500		Leaving home		Total
		Yes	No	
Sector	University	27.0%	31.2%	58.2%
	Polytechnic	25.5%	16.3%	41.8%
Total		52.5%	47.5%	100.0%

income ≥ €1500		Leaving home		Total
		Yes	No	
Sector	University	26.8%	37.4%	64.2%
	Polytechnic	20.3%	15.5%	35.8%
Total		47.1%	52.9%	100.0%

Table 5: Predicted probabilities by parents' education

parents with HE diploma		Leaving home		Total
		Yes	No	
Sector	University	31.0%	35.2%	66.2%
	Polytechnic	20.9%	12.9%	33.8%
Total		51.8%	48.2%	100.0%
parents without HE diploma		Leaving home		Total
		Yes	No	
Sector	University	26.0%	26.4%	52.4%
	Polytechnic	30.5%	17.1%	47.6%
Total		56.4%	43.6%	100.0%

Table 6: Predicted probabilities if only public institutions exist

no private institutions		Leaving home		Total
		Yes	No	
Sector	University	35.0%	34.3%	69.3%
	Polytechnic	20.1%	10.6%	30.7%
Total		55.1%	44.9%	100.0%

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