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ABSTRACT

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This study examines factors predicting participation in study abroad programs using a bivariate probit selection model where the probabilities of attending university and studying abroad are jointly estimated. Given that unobserved variables influencing these two sequential events are likely to be correlated, this model provides estimates that are less contaminated by misspecification bias compared to those from a conventional univariate probit model of study abroad participation. Using data from an Italian nationally representative survey, the results emphasise the importance of controlling for unobservables. They indicate that the relationship between type of upper secondary school and study abroad participation disappears once selectivity bias is accounted for.

JEL Classification: I23, I24

Keywords: study abroad, unobservables, bivariate probit selection model

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1. Introduction

In recent decades, the number of students who have had a study abroad experience by being temporarily enrolled at a foreign higher education institution[1] has been rising worldwide. For example, between 2014 and 2020, Eramus+, the European Union (UE)'s flagship student mobility program, is expected to have helped over 1.5 million students to study abroad[2]. This more than doubles the study abroad opportunities offered by the EU in the previous 30 years (European Commission, 2020). The popularity of studying abroad is also set to increase in the next years as the European Commission and the European Parliament have already put forward plans to boost the budget for the next Erasmus+ program.

Many studies indicate that spending time abroad during university studies is desirable as this offers students the possibility to grow professionally and personally (Di Pietro, 2019; Zimmermann and Neyer, 2013). They have the opportunity to acquire a wide range of skills (e.g. intercultural competence, global awareness, foreign language skills) that will enable them to successfully compete in the labour market. Furthermore, it is also suggested that studying abroad may help students become more confident, mature and self-reliant.

A large body of research investigates the characteristics of students who participate in study abroad programs as compared to those who remain in their home country, and the majority of works focus on mobility during bachelor study. The evidence indicates that both demographic (observable) and personality factors impact the decision to study abroad. As regard the former variables, being female (e.g. Böttcher et al., 2016), coming from a more advantaged background (e.g. Messer and Wolter, 2007) and studying humanities or social sciences (e.g. Di

[1] This type of student mobility is called 'credit mobility' as opposed to 'degree mobility' that occurs when students are enrolled as regular students at a higher education institution located in a different country from the one where they have obtained their upper secondary qualification.

[2] Although Erasmus+ is not the only way students can travel abroad, it is certainly the most important one in Europe. In 2017, about half of the EU credit mobility graduates studied abroad thanks to the Erasmus or other EU programs (European Commission, 2019).

Pietro, 2020) are typically associated with a higher probability of studying abroad. Well-known positive predictors among personality characteristics include high degree of extraversion and openness (e.g. Bakalis and Joiner, 2004; Deviney et al., 2014), interest in cross-cultural issues (e.g. Stroud, 2010) and aspirations to travel (e.g. Van Hoof and Verbeeten, 2005). Nevertheless, as observed by Holtbrügge and Engelhard (2016), a shortcoming of the research on study abroad programs is that most existing works restrict their attention to the impact of demographic (observable) characteristics, and rarely include also attitudinal/behavioural traits. This holds especially for studies based on large-scale nationally representative student and graduate surveys that contain information on study abroad programs. Such surveys tend not to collect data on relevant personality characteristics, as they mainly comprise variables that are more easily observable and measurable.

However, not accounting for the impact of unobserved or difficult-to-measure personality traits on study abroad program participation may lead to misspecification or omitted variable bias. This means that the effect of above factors on the probability of studying abroad is picked up by observed individual characteristics that are correlated with them. For example, family background can influence study abroad program participation through known environmental factors (e.g. family income), but also because parents may transmit unobserved traits to their children[3]. Kuhn (2016) argues that students may develop an interest in other cultures from having been exposed to transnational influences in their childhood, which in turn is related to parental socio-economic status. Similarly, Salisbury et al. (2010) provide evidence showing that social and cultural capital accumulated before college matriculation are both positively associated with intent to study abroad while in college.

[3] This is the so-called *nurture versus nature* debate (see, for example, Havari and Savegnago, 2014).

This paper, which uses data from a nationally representative Italian survey, estimates a bivariate probit selection model (Greene, 2012; Rubb, 2014) in an attempt to disentangle the effect that observed variables have on the likelihood of studying abroad from the effect exerted by (at least some) unobservables related to them. The intuition behind such model is to jointly estimate the probability of enrolling at university and that of studying abroad. In the first step, which includes all upper secondary school leavers, the probit determines whether or not the individual attends university. The second step, which estimates the likelihood of participating in study abroad programs, includes only university students. This bivariate specification allows us to estimate the probability of studying abroad while controlling for those unmeasurable variables affecting the two outcomes (university enrolment and study abroad program participation), thereby providing estimates that are less contaminated by misspecification bias compared to a conventional univariate probit model[4]. Not accounting for selection on unobserved variables[5] may lead to bias in the estimates of the effects of explanatory variables on the probability of studying abroad (Holm and Jæger, 2011).

The rationale of the model is that some of students' motivations to study at university may also affect their later decision to study abroad. For example, it is well-known that many individuals choose to enter higher education because they are especially eager to get a job and become financially independent (Houle, 1961). However, this goal orientation may prevent them from studying abroad as they may perceive that this experience may delay their graduation (Walker, 2015) and may make them take longer to find a job (Rodrigues, 2013). As argued by Curtis

[4] In a similar vein, it is important to note that the bivariate probit selection model has been employed to model university drop-out (Di Pietro, 2004; Montmarquette el al., 1996). In this case, it is assumed that unobservables driving university participation are also likely to affect the decision to discontinue studies conditional on university enrolment.

[5] Another approach used to correct for sample selection bias is the Heckman's two-step estimator (Heckman, 1976). In contrast to the bivariate probit selection model, this method is applied when the dependent variable of the outcome equation is continuous. While in the first step a probit regression is employed to determine the sample selection process, in the second step a correction factor – the inverse Mills ratio calculated from the probit model- is included in the Ordinary Least Square (OLS) model.

and Ledgerwood (2017), students are often unable to make a clear connection between study abroad and students' professional benefits. On the other hand, a large number of people enrol at university because they want to meet new people and have new experiences (Bennet, 2004). This explorative attitude may make them more likely to participate in international student mobility schemes.

Attention is focused on Italy for three different sets of reasons. First, looking at the statistics of Erasmus+, Italy is among the biggest sender countries in terms of students going abroad. Second, Italian institutional policies governing access to university education make the use of the bivariate probit selection model appropriate in this context. Italy is in fact characterised by the absence of selective barriers to entry to university- the so called 'open access policy'. The general rule is that all students who have successfully completed five years in upper secondary education gain the automatic right of entry to university. Third, the Italian National Statistical Institute (ISTAT) carries out a survey where upper secondary school leavers are interviewed a few years after the end of their studies. These data are well suited to the purpose of this study given that one of the possible destinations of these individuals is university enrolment and the survey does contain a lot of information on the higher education experience of those upper secondary school leavers who chose to attend university.

The remainder of the paper is as follows. Section 2 describes the bivariate probit selection model used in this study as well as the data employed in the empirical work. Section 3 presents and discusses the results of the analysis. Section 4 concludes.

2. Methodology and Data

Our model comprises two simultaneous equations, one for the probability of attending university and another for the probability of participating in study abroad programs. These can be written as:

$$Y_{1i}^{*} = \alpha_1 x_{1i} + \varepsilon_{1i} \quad (1)$$

$$Y_{2i}^{*} = \alpha_2 x_{2i} + \varepsilon_{2i} \quad (2)$$

where Y_{1i}^{*} denotes the propensity to enrol at university of upper secondary school leaver i; Y_{2i}^{*} denotes the propensity to participate in study abroad programs of university student i; x_{1i} and x_{2i} are vectors of explanatory variables; the $\alpha's$ are associated parameters to be estimated; and ε_{1i} and ε_{2i} represent error terms that are distributed as a bivariate normal with means equal to zero, variances equal to one, and correlation coefficient equal to ρ.

Since Y_{1i}^{*} and Y_{2i}^{*} are not observed, the following binary variables are defined:

$$Y_{1i}\begin{cases} 0\ if\ the\ upper\ secondary\ school\ leaver\ does\ not\ enrol\ at\ university & (Y_{1i}^{*} < 0) \\ 1\ if\ the\ upper\ secondary\ school\ leaver\ does\ enrol\ at\ university & (Y_{1i}^{*} = 0\ or > 0) \end{cases}$$

$$Y_{2i}\begin{cases} 0\ if\ the\ university\ student\ does\ not\ study\ abroad & (Y_{2i}^{*} < 0) \\ 1\ if\ the\ university\ student\ studies\ abroad & (Y_{2i}^{*} = 0\ or > 0) \end{cases}$$

Given that one can observe whether the upper secondary school leaver participates in study abroad programs only if he/she had previously enrolled at university, there is a censoring rule in addition to an observation rule. This gives rise to three different types of observations: a) no university enrolment, b) university enrolment and no participation in study abroad programs and c) university enrolment and participation in study abroad programs. One may also note that these three categories of observations are made with unconditional probabilities:

$$Y_{1i} = 1,\ Y_{21} = 1 : Prob(Y_{1i} = 1, Y_{2i} = 1) = \Phi_2[x_{1i}\alpha_1, x_{2i}\alpha_2, \rho] \quad (3)$$

$$Y_{1i} = 1,\ Y_{21} = 0 : Prob(Y_{1i} = 1, Y_{2i} = 0) = \Phi_2[x_{1i}\alpha_1, -x_{2i}\alpha_2, -\rho] \quad (4)$$

$$Y_{1i} = 0 : Prob(Y_{1i} = 0) = \Phi[-x_{1i}\alpha_1] \quad (5)$$

where Φ and Φ_2 indicate the univariate and bivariate normal cumulative distribution functions, respectively. The corresponding log-likelihood function is:

$$\sum_{Y_{1i}=1,Y_{2i}=1} log\Phi_2\,[x_{1i}\alpha_1, x_{2i}\alpha_2, \rho] + \\ +\sum_{Y_{1i}=1,Y_{2i}=0} log\Phi_2\,[x_{1i}\alpha_1, -x_{2i}\alpha_2, -\rho] + \sum_{Y_{1i}=0} log\Phi[-x_{1i}\alpha_1] \quad (6)$$

Eq. (6) is maximised with respect to the parameters α_1, α_2 and ρ. Note that this formulation is very similar to the log-likelihood function developed by Meng and Schmidt (1985).

The credibility of the results of the above model relies on the credibility of the exclusion restriction, i.e. Eq. (1) should include at least one variable that determines the individual's decision to enrol at university but has no effect on participation in study abroad programs. Following the approach of Oppedisano (2011), our exclusion restriction is the number of degree courses offered by the university(ies) located in the same province of the upper secondary school attended by the individual at the time of the university enrolment decision[6]. The idea is that, everything else being equal, upper secondary school leavers who do not have to move/commute to attend university are more likely to continue studying as they will face a lower cost of education. The higher is the number of locally supplied degree courses, the higher is the probability that the individual finds a course that suits his/her interests and abilities without having to move/commute. On the other hand, there are no reasons to believe that our exclusion restriction has an own independent effect on study abroad program participation especially when university fixed effects are included in Eq. (2). These fixed effects account for time-invariant university characteristics (e.g. location, unique institutional history) that may be correlated with the number of degree courses offered and may also affect the probability of

[6] Data on this variable come from the Italian Ministry of Education and Research (https://offf.miur.it/pubblico.php/ricerca/show_form/p/miur)

studying abroad. For instance, universities located in big cities (e.g. Rome, Milan) may supply more courses, and at the same time may provide their students with a higher chance to study abroad. Similarly, universities with a long tradition of research and teaching excellence are likely to offer students the possibility to study a wide range of subjects, but are also likely to have student exchange agreements with many foreign higher education institutions[7]. In education and labour economics, the use of supply-side constraints as exclusion restrictions is quite widely established (see, Card, 2001).

We employ data from a nationally representative survey conducted by ISTAT in 2011 on the cohort of Italian individuals who successfully completed upper secondary education in 2007 (*Percorsi di studio e di lavoro diplomati — Indagine 2011*)[8]. As argued earlier, the advantage of these data is they allow us to model the choice to attend university, but also contain relevant information on the academic career of a large number of university students, Not only do they identify whether or not a student has participated in study abroad programs (Erasmus and other types of credit mobility programs), but also keep track of many demographic (observable) variables that are expected to influence such a decision. As mentioned earlier, gender is considered to be an important determinant as women tend to show a higher propensity to study abroad (e.g. Netz, 2015). Several studies conclude that age[9] is related to study abroad program participation, though they disagree about the direction of its effect (for a detailed discussion,

[7] On the other hand, in line with the approach of Oppedisano (2011), upper secondary school province fixed effects are included in the university participation equation, i.e. Eq. (1). These fixed effects are meant to capture observed and unobserved time-invariant province characteristics or 'amenities' that may influence university attendance.

[8] One should observe that, although 4 waves of this survey (i.e. 2004, 2007, 2011 and 2015) collect information about study abroad program participation among university students, only the data in the third wave (i.e. the one used here) appear to be appropriate given the purpose of this paper. The 2004 and 2015 waves do not report information on a key variable for the construction of our exclusion restriction, i.e. province of the upper secondary school attended by the individual. While such information is provided in the 2007 wave, the following problem is noted. Given that upper secondary school leavers were interviewed three (and not four) years after completing their studies, the survey permits us to track a cohort of university students in the third year. This cohort is, however, characterised by a relatively low study abroad participation rate since those students who were abroad might have had difficulties in taking part in the survey while others might not have had yet the opportunity to study abroad.

[9] Age is only available in classes/categories.

see Netz et al, 2020). Students' academic ability (often proxied by secondary school performance[10]) is found to be positively correlated with studying abroad as study abroad scholarships/places are increasingly allocated on the basis of academic merit. The type of upper secondary school attended[11] may also be a relevant predictor as vocational upper secondary schools typically provide a curriculum that is less conducive to studying abroad (Büchner, 2004). For instance, they frequently provide less opportunities to learn foreign languages compared to academic upper secondary schools, whereas lack of foreign languages is often considered to be an important barrier to international student mobility (Di Pietro, 2020). Finally, there is a large consensus that students from more advantaged socio-economic backgrounds are more likely to study abroad than their peers from less advantaged backgrounds (see, among others, Van Mol and Timmerman, 2014; Daly, 2011). Theories of cultural reproduction (Bótas and Huisman, 2013) and of rational choice (Lörz et al., 2016) have been advanced to explain the social selectivity of studying abroad. Following the approach of Netz and Finger (2016), our indicator for family background is a dummy variable that takes the value of 1 if the student has at least one of their parents with a university degree, 0 otherwise.

The following two considerations should be taken into account in constructing the final sample. First, as Eq. (1) estimates the decision to attend university immediately after upper secondary school completion, we remove from the sample those individuals who did enrol at university, but did so later. This is to avoid problems of comparability when studying participation in study abroad programs since these students are observed for a shorter period of time relative to their peers who began university right after the end of their studies. However, following this, a relatively small number of observations is excluded from the sample given that the very large

[10] We use both upper and lower secondary school final grades as proxies for academic ability.
[11] In Italy, around the age of 14, students choose one of the upper secondary pathways. These are divided into two tracks: academic and vocational. The latter comprises technical institutes (*istituti tecnici*), professional institutes (*istituti professionali*), teacher training institutes (*istituti magistrali*) and art institutes (*istituti d'arte*).

majority of upper secondary school leavers who decided to attend university did so immediately after completion of their studies (i.e. 89%). Second, while we include in the sample those upper secondary school leavers who enrolled at university right after the end of their studies but dropped out before the survey started (removing them would in fact lead to sample selection bias in Eq. (1)), one should note that these individuals were unfortunately not asked about their study abroad program participation. We have here assumed that they did not study abroad given that an extremely high proportion of them (i.e. 91.5%) dropped out in the first two years and there is consistent evidence indicating that most university students go abroad during the third or fourth year of study (Orr et al., 2008). Additionally, as the survey does not report information on the subject studied at university for dropouts, this variable cannot be included in Eq. (2).

The final sample consists of 22,348 upper secondary school leavers. Of these, 11,756 (52.6%) enrolled at university and 10,592 (47.4%) did not. Of those who enrolled at university, 11,046 (49.4% of the sample and 94% of those who enrolled at university) did not study abroad and 710 (3.2% of the sample and 6% of those who enrolled at university) did study abroad. Descriptive statistics for the final sample are reported in Table 1.

Insert Table 1 here

3. Results

Columns (1) and (2) of Table 2 show the results from the bivariate probit selection model[12]. Findings from the univariate probit model, which are reported for comparison purposes, are presented in column (3) of Table 2. We first note that the estimated correlation coefficient is

[12] Results of F tests (available from the author upon request) show that upper secondary school province fixed effects in Eq. (1) and university fixed effects in Eq. (2) are both highly statistically significant.

statistically significant at the 5% level. This means that the outcome and selection equations of the bivariate probit selection model (i.e. Eqs (1) and (2)) are not independent of each other, thereby suggesting that a selection model is warranted. Additionally, given that ρ has a negative sign, this suggests that there is a negative selection into study abroad, i.e. individual-level motivations driving university enrolment are correlated with unobserved factors having a detrimental effect on the likelihood of participating in study abroad programs. This result is in line with the findings of some previous studies. Varela (2016), using student-level data from a Spanish university, concludes that there is an adverse selection into the Erasmus program. He argues that the grade distribution among students participating in study abroad programs tends to be quite narrow as professors are unlikely to strongly penalise the least performing international mobile students on the one hand, but are also reluctant to give high grades to the best foreign visiting students on the other. This may create an incentive for the less ambitious students to study abroad, and a disincentive for the more determined ones. In a similar vein, Di Pietro (2015) notes that some university students may view the study abroad experience as an opportunity to put less effort into their education since examinations tend to be easier in study abroad programs. Furthermore, there is also evidence that a large number of students choose to study abroad because they seek adventure and excitement. Teichler (2004) shows that 66% of former Erasmus students stated that they decided to study abroad because they wanted "a break from usual surroundings". Stronkhorst (2005) investigates students' expectations before going abroad in two Dutch professional higher education institutions. He finds that the majority of students see this experience as an occasion for fun and adventure. Relyea et al. (2008) argue that universities need to do more to ensure that participation in study abroad programs is perceived as an opportunity to grow personally and professionally rather than as a break from academic studies.

Insert Table 2 here

Looking at column (1) of Table 2, we find that our exclusion restriction turns out to be a good predictor of university attendance. *Ceteribus paribus*, individuals who studied at upper secondary schools located in the same provinces as university(ies) offering more degree courses are found to have a higher probability of continuing studying. Next, our instrument is included as an additional regressor in Eq. (2) in order to check whether it does not have any effect on study abroad program participation. The estimates (available upon request) indicate that the coefficient on our instrument is far from being statistically different from zero (the p-value is 0.82). Although this is not a formal test, it provides some evidence that our exclusion restriction does not affect the probability of studying abroad, at least when controlling for several individual characteristics and university fixed effects.

While estimates from the univariate probit model and those from the outcome equation of the bivariate probit selection model both indicate the women and students from more advantaged backgrounds[13] are more likely to study abroad, a different result is obtained for participation in vocational upper secondary education. More specifically, findings from the univariate probit model suggest that having attended vocational upper secondary schools decreases the likelihood of participating in study abroad programs, whereas such conclusion does not hold when accounting for selectivity bias. Although the relevant marginal effect has a negative sign in both columns (2) and (3), it is statistically significant at conventional levels only in the latter.

The above result would seem to indicate that the choice of the type of upper secondary school is positively correlated with unobserved influences behind the relationship between the

[13] Although, in line with expectations, the size of the marginal effect associated with having at least one parent with a university degree is smaller in the estimates from the outcome equation of the bivariate selection model compared with the estimates of the univariate probit model, such difference is unlikely to be statistically significant at conventional levels.

decision to attend university and that to study abroad. The bivariate probit selection model allows us to isolate the effect of this variable from that of omitted factors associated with it. Not only, as stated at the beginning of this study, may students' desire for personal and professional development predict university enrolment and study abroad program participation, but it is also likely to be linked to the decision about the type of upper secondary school. In contrast to other countries (e.g. Germany), in Italy students can freely choose the upper secondary school track they want to pursue. Several studies (e.g. Protsch and Dieckhoff, 2011) show that personality traits such as aspirations, importance of education, and openness to experience, affect the transition from primary to secondary school, even beyond social background. Therefore, while in the univariate probit model the influence of these unobservables is captured by participation in vocational upper secondary education, this is not the case in the bivariate probit selection model. Estimates from the latter suggest that such unmeasured variables are actually driving the relationship between studying abroad and vocational upper secondary education.

Two sensitivity tests are performed to test the robustness of our results. First, we include youth unemployment rate (people aged 18-29 years) in 2007 by gender and province of the upper secondary school attended by the individual among the independent variables of the selection equation of the bivariate probit selection model[14]. The rationale for including such factor is that local labour market conditions may affect university enrolment. Results on selected coefficients (including vocational upper secondary education), which are reported in the first half of Table 3, are broadly consistent with the corresponding ones depicted in Table 2. The marginal effect on unemployment rate has the expected positive sign (lower employment opportunities decrease the opportunity cost of university education) but is statistically

[14] Data on this variable are from ISTAT.

insignificant at conventional levels. Second, since foreign language competence is likely to affect participation in study abroad programs, we attempt to account for this factor by including in the model a dummy variable taking the value of 1 if the student responded that he/she was 'very satisfied' with the foreign language knowledge and skills acquired at upper secondary school, and 0 otherwise. The advantage of using this indicator is that it captures students' knowledge of a foreign language before they take the decision about whether or not to study abroad. The second half of Table 3 reports the new estimates for both the bivariate probit selection model and the univariate probit model. Again, results are similar to those shown in Table 2. The marginal effect on our measure for foreign language competence is positive and statistically significant in both models.

Insert Table 3 here

4. Conclusions

It is well-established that an individual's decision to spend some time abroad during his/her university studies depends on a set of personal and social factors, some of which are unmeasured or difficult-to-measure. In an attempt to address this omitted variable bias, the intuition behind this paper is to link this decision with the earlier one about university attendance given that unobservables driving both these choices are potentially correlated. Using data from an Italian survey on the destinations of leavers from upper secondary education, a bivariate probit selection model is estimated in order to study the determinants of studying abroad while accounting for the possible unobserved correlation between university and study abroad program participation.

Our results show that the effect of having attended vocational upper secondary schools on participation in international exchange programs during university studies disappears after

accounting for selectivity bias. Bivariate probit selection estimates of the impact of vocational upper secondary education on the likelihood of participating in study abroad programs are smaller than those obtained from single probit equation estimates and are not statistically significant at conventional levels.

Our analysis has two implications for future research. First, it underscores the importance of controlling for sample selection bias when modelling student's choice to study abroad. Second, there is a need to have more quality data that include information about students facing educational transitions rather than focusing on a specific group. The large majority of studies analysing individual's probability of studying abroad are based, in fact, only on surveys addressed to university students.

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Table 1

Descriptive statistics

	All upper secondary school leavers (N=22,348)			Upper secondary school leavers who did enrol at university (N=11,756)		
	Upper secondary school leavers who did not enrol at university (N=10,592)	Upper secondary school leavers who did enrol at university (N=11,756)	Diff (2) – (1) (*t*-test)	Upper secondary school leavers who did participate in study abroad programs (N=710)	Upper secondary school leavers who did not participate in study abroad programs (N= 11,046)	Diff (4) – (5) (*t*-test)
	(1)	(2)	(3)	(4)	(5)	(6)
Male	0.56	0.42	-0.14***	0.31	0.42	-0.11***
	(0.50)	(0.49)	(0.01)	(0.46)	(0.49)	(0.03)
Age at upper secondary school completion (omitted is 20 years or more)	0.37	0.10	-0.27***	0.09	0.10	-0.01
	(0.48)	(0.30)	(0.01)	(0.28)	(0.30)	(0.01)
-18 years or less	0.02	0.06	0.04***	0.06	0.06	-0.00
	(0.15)	(0.25)	(0.00)	(0.24)	(0.25)	(0.01)
-19 years	0.61	0.84	0.23***	0.85	0.83	0.02
	(0.49)	(0.37)	(0.01)	(0.36)	(0.37)	(0.02)
Vocational upper secondary education	0.94	0.47	-0.47***	0.31	0.48	-0.17***
	(0.24)	(0.50)	(0.01)	(0.46)	(0.50)	(0.02)
Lower secondary school final grade (omitted is poor (*sufficiente*)	0.32	0.08	-0.24***	0.05	0.08	-0.03**
	(0.46)	(0.26)	(0.01)	(0.22)	(0.27)	(0.01)
-Good (*buono*)	0.42	0.24	-0.18***	0.18	0.24	-0.07***
	(0.49)	(0.43)	(0.01)	(0.38)	(0.43)	(0.02)
-Very good (*distinto*)	0.20	0.32	0.12***	0.29	0.32	-0.03
	(0.40)	(0.47)	(0.01)	(0.45)	(0.47)	(0.02)
-Excellent (*ottimo*)	0.07	0.37	0.29***	0.48	0.36	0.012***
	(0.26)	(0.48)	(0.01)	(0.50)	(0.48)	(0.03)
At least one parent with university degree	0.06	0.25	0.019***	0.35	0.25	0.10***
	(0.23)	(0.44)	(0.01)	(0.48)	(0.43)	(0.03)
Upper secondary school final grade (omitted is 60-84)	0.49	0.20	-0.29***	0.16	0.20	-0.04**
	(0.50)	(0.40)	(0.01)	(0.37)	(0.40)	(0.02)
-85-94	0.28	0.25	-0.03***	0.22	0.25	-0.03
	(0.45)	(0.43)	(0.01)	(0.41)	(0.43)	(0.02)
-95-99	0.14	0.23	0.09***	0.23	0.23	-0.00
	(0.35)	(0.42)	(0.01)	(0.42)	(0.42)	(0.02)
-100	0.08	0.31	0.23***	0.38	0.31	0.07***
	(0.27)	(0.46)	(0.01)	(0.49)	(0.46)	(0.02)
Number of degree courses offered by the university(ies) located in the same province of the upper secondary school attended by the individual	64.40	69.48	5.08***			
	(81.56)	(89.23)	(1.79)			

Survey weights are used. Standard deviations are in brackets in Columns (1), (2), (4) and (5). Standard errors are in brackets in Columns (3) and (6). *** denotes statistical significance at the 1% level, ** denotes statistical significance at the 5% level, * denotes statistical significance at the 10% level.

Table 2

Univariate and bivariate probit estimates- Marginal effects (Main results)

	Bivariate sample selection probit		Univariate probit
	University enrolment	Participation in study abroad programs	Participation in study abroad programs
	(1)	(2)	(3)
Male	-0.039*** (0.005)	-0.026*** (0.005)	-0.022*** (0.005)
Age at upper secondary school completion (omitted is 20 years or more)			
-18 years or less	0.167*** (0.040)	-0.027 (0.022)	-0.015 (0.013)
-19 years	0.158*** (0.015)	-0.016 (0.013)	-0.006 (0.008)
Vocational upper secondary education	-0.487*** (0.014)	-0.010 (0.010)	-0.022*** (0.005)
Lower secondary school final grade (omitted is poor (*sufficiente*)			
-Good (*buono*)	0.098*** (0.014)	-0.006 (0.013)	0.001 (0.010)
-Very good (*distinto*)	0.174*** (0.017)	-0.008 (0.016)	0.002 (0.010)
-Excellent (*ottimo*)	0.237*** (0.018)	0.003 (0.014)	0.011 (0.010)
At least one parent with university degree	0.208*** (0.017)	0.012** (0.006)	0.013*** (0.005)
Upper secondary school final grade (omitted is 60-84)			
-85-94	0.126*** (0.012)	-0.005 (0.008)	-0.0002 (0.007)
-95-99	0.227*** (0.015)	-0.004 (0.009)	0.003 (0.007)
-100	0.357*** (0.015)	0.001 (0.009)	0.010 (0.007)
Number of degree courses offered by the university(ies) located in the same province of the upper secondary school attended by the individual	0.0014** (0.0007)		
Rho (ρ)	-0.280** (0.117)		
Sample size	22,348	11,756	11,756

Upper secondary school province fixed effects are included in Column (1). University fixed effects are included in Columns (2) and (3). Standard errors, which are always reported in brackets, are clustered at upper secondary school province level in Column (1). Survey weights are used in all the analyses. Marginal effects are computed at the means of the independent variables. *** denotes statistical significance at the 1 level ** denotes statistical significance at the 5% level, * denotes statistical significance at the 10% level.

Table 3

Univariate and bivariate probit estimates- Marginal effects (Robustness checks)

	Bivariate sample selection probit		Bivariate sample selection probit		Univariate probit
	University enrolment	Participation in study abroad programs	University enrolment	Participation in study abroad programs	Participation in study abroad programs
	(1)	(2)	(3)	(4)	(5)
Vocational upper secondary school	-0.487***	-0.010	-0.487***	-0.010	-0.022***
	(0.014)	(0.010)	(0.014)	(0.010)	(0.005)
Number of degree courses offered by the university(ies) located in the same province of the upper secondary school attended by the individual	0.0015**		0.0014**		
	(0.0007)		(0.0007)		
Youth unemployment rate	0.003				
	(0.003)				
Foreign language competence				0.017**	0.014**
				(0.007)	(0.006)
Rho (ρ)	-0.279**		-0.278**		
	(0.116)		(0.115)		
Sample size	22,348	11,756	22,348	11,756	11,756

Upper secondary school province fixed effects are included in Columns (1) and (3). University fixed effects are included in Columns (2), (4) and (5). Standard errors, which are reported in brackets, are clustered at upper secondary school province level in Columns (1) and (3). Survey weights are used in all the analyses. All specifications include gender, age at upper secondary school completion and upper and lower secondary school final grades. Marginal effects are computed at the means of the independent variables. *** denotes statistical significance at the 1% level, ** denotes statistical significance at the 5% level, * denotes statistical significance at the 10% level.