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Evaluation of the higher education grant system for less privileged students in Portugal

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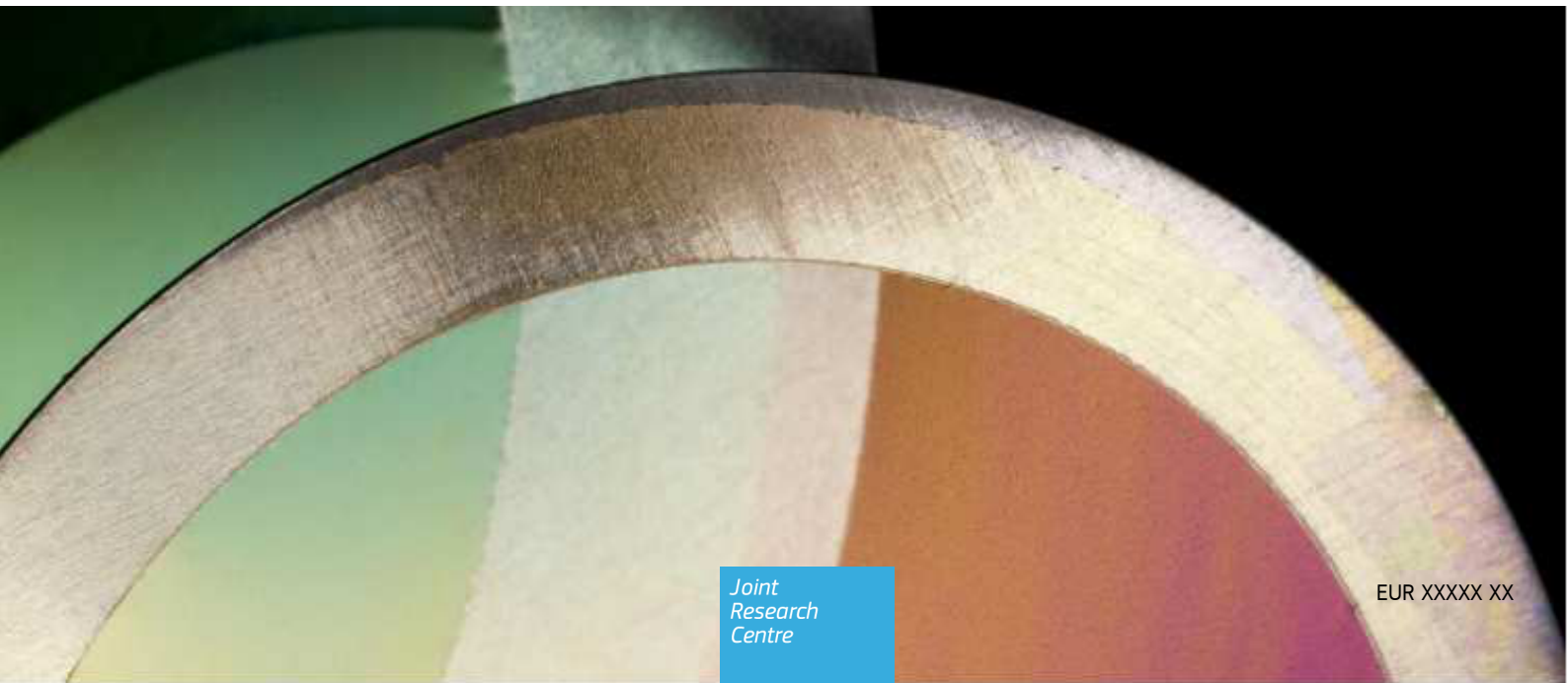

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Foreword

The Portuguese Human Capital Operational Programme (HCOP) has commissioned the Joint Research Centre, Competence Centre on Microeconomic Evaluation (CC-ME CRIE) within the Data Fitness Initiative, support in the evaluation of the higher education grant system for less privileged students in Portugal, partly funded by EU Funds. This evaluation is carried out in collaboration with the Directorate-General of Higher Education in Portugal (DGES), the Directorate-General for Statistics on Education and Science (DGEEC) and the Social Inclusion and Employment Operational Program (SICOP).

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Executive summary

This report focuses on the evaluation of the grant program for students (coming from families) with low income, namely the "Higher education grant system for less privileged students" in Portugal, whose purpose is to respond to the real needs of students, ensuring equity in the allocation of social benefits and, as a consequence, to promote a social action that favors access to higher education and increases the attendance success.

This evaluation is justified by the fact that Portugal 2020 provides a broad set of support in this area, aiming to increase the proportion of the population with higher education to the threshold defined in the Portuguese Reforms Plan - 40% of the population aged 30-40 with a higher education diploma in 2020 (in 2013 the rate of graduates in higher education was 29.2%, around 10 percentage points from that target and below the EU average).

Since 2011 the grant has supported around 70,000 students every year, and is supported by the State and by the European Social Fund (ESF) in the less privileged regions North, Centro, Alentejo. This evaluation is a national evaluation due to the fact that the grant rules are the same all over the country, being 100% supported by the state in the regions not supported by ESF.[1]

The intervention is a yearly grant intended for students in low-income households. Eligibility to the grant is conditioned on two main criteria: (1) having resources (per-capita income) below a threshold and (2) having completed a minimum number of credits the previous year of study, for students in curricular years above the first one. The grant covers tuition fees, and provide additional cash to very poor students.

Thanks to two sources of administrative data, we are able to precisely identify eligible students and adopt a regression discontinuity approach to identify and measure the causal impact of the grant on academic success.

The first part of the report analyses the impact of the grant for students applying for the first time to the grant and enrolled in the first year of a degree. Access to the grant for this sub-sample of students is solely determined by family income. We use regression discontinuity design, which compares students whose per-capita income is just above and just below the threshold, to identify the causal effect of receiving the grant. We measure academic success with several variables: dropout at the beginning and end of the first year, type of course enrolled in, and credits obtained at the end of the first year. Finally, longer-term academic success is also investigated with the probability of graduating, the final mark obtained at graduation, and the probability of graduating in time.

The main results on the sample of first year students are the following:

— The analyses on the full sample of first year students show a negative effect of the grant on the probability of drop out at the beginning of the first year, a positive effect on the probability of reaching at least 36 credits and of reaching all the credits in which the students are enrolled in at the end of the first year, and a positive effect on the probability of graduating in time

— We investigate whether these main results are driven by particular types of students or university programs. The results of this heterogeneity analysis show that the impact of the grant is different by students' characteristics: the effect is higher for males (for dropouts and graduation in time) and for females (for the results on the credits), for students residing in less developed regions (Alentejo, Açores, Centro and Norte), and for students enrolled in a Bachelor degree and attending a public university.

— We investigate the effects of receiving the scholarship for more than one year, and we find that the positive effect on the probability of graduating in time is larger for students who received the scholarship during two, and three years.

— The scholarship also contributes to the progression to the Master for Bachelor students.

The second part of the analysis focuses on second year students, and uses three approaches to identify the causal effect of the scholarship: i) regression discontinuity design on the sample of students who obtained at least 36 credits the previous year; ii) Regression discontinuity design combined with difference-in-difference; iii) difference-in-difference on the full sample of second year students. The main results on the sample of second year students are the following:

— Being eligible for the scholarship at the beginning of the second year has a negative effect on dropout at the beginning of that year, for students enrolled in the Bachelor

— There are differential effects of the scholarship taken in the second year, according to whether the students also received it during the first year: students who were eligible in both years, show lower drop out rates, and higher probabilities of graduating and of reaching the credits they enrolled in.

[1] The available data allow to go back until 2012, so the first year used in the analysis will be the academic year 2012/2013

— The results of this heterogeneity analysis show that the impact of the grant is different by students' characteristics: the effect is higher for females(for the results on the credits), for students residing in less developed regions (dropouts, graduation, and graduation in time) and for students attending a public university.

Overall the grant has a positive and significant impact and is contributing to the aim of the Portuguese government to increase enrollment and higher education graduates.

1 Introduction

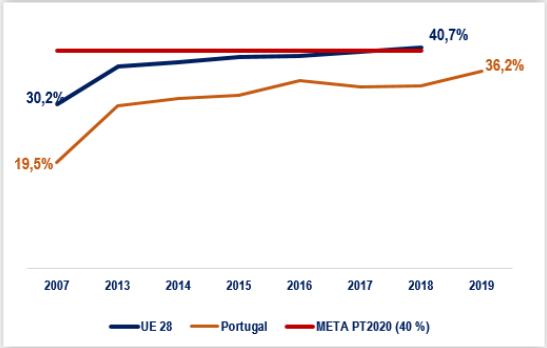
One of the EU "Education and Training" targets for 2020 states that at least 40% of people aged 30-34 should have completed some form of higher education. In the last years, the rate of higher education attainment in Portugal (in groups aged 30-34), increased significantly (36.2% in 2019), but is still below the EU average and the 2020 target - 40% (Figure 1). As a consequence, the Portuguese government has been taking many actions to make higher education more attractive and increase the completion rate, including, among others, bolstering social support mechanisms for students from disadvantaged backgrounds through a significant increase in grants, the creation of specific grants for students with special educational needs corresponding to the amount of the fee effectively paid, a social scheme for paying tuition fees in multiple installments, and the implementation of a redefined +Superior program to promote and support enrollment in less densely populated regions and in regions where the demand is lower.

This report focuses on the evaluation of the grant program for students (coming from families) with low income, namely the "Higher education grant system for less privileged students". The purpose of this grant program is to respond to the real needs of students, ensuring equity in the allocation of social benefits and, as a consequence, to promote a social action that favors access to higher education and increases attendance success.

Since 2011 the grant has supported between 55,000 and 70,000 students every year, and is supported by the State and by the European Social Fund (ESF) in the less privileged regions North, Centro, and Alentejo (Figure 2). Students can apply to receive the grants, but only the ones with income below a predetermined threshold will get the grant. (More details about the selection process are described in Section 1.3).

The purpose of this evaluation is to assess whether the grant contributed to the 2020 European strategy on higher education, using counterfactual evaluation methodologies. These methodologies allow to reply to the following evaluation question: do students receiving the scholarship have better academic outcomes than students who applied but did not receive it?[2]. Therefore, in this report, we focus on the evaluation criteria related to effectiveness only.[3]

Figure 1: Population between 30 and 34 years old with higher education (or equivalent) in the EU and Portugal



Source: HCOP adapted from Eurostat and INE data.

Figure 2: Number of grants submitted, awarded and rejected, since the academic year 2011-2012 (data from 2018-2019 are not final yet)

Academic year	Nr of requested grants	Nr. of grants awarded	Nr of grants rejected
2011-2012	96870	55999	40335
2012-2013	88600	58818	29640
2013-2014	85558	62312	23083
2014-2015	86936	63611	23173
2015-2016	90613	69353	21073
2016-2017	94538	71947	22383
2017-2018	**97003**	**74187**	**22326**
2018-2019	**96001**	**46870**	**10319**

Source: DGES, 2019.

[2] A variety of outcomes is used, details are in Section 4.3.1

[3] Effectiveness analysis, as defined by the EU Better Regulation, considers how successful the EU action has been in achieving or progressing towards its objective. See https://ec.europa.eu/info/sites/info/files/better-regulation-guidelines-evaluation-fitness-checks.pdf

1.1 The Portuguese education system

The Portuguese educational system is regulated by the Basic Law of the Educational System and is developed in three levels: basic (with three cycles), secondary, and higher education. It begins with pre-school education, a cycle for children from three to six years old, followed by basic education, which comprises three sequential cycles: The first cycle of four years (expected attendance ages: from 6 to 10 years old); the second cycle of two years (expected attendance ages: from 10 to 12 years old), corresponding to ISCED1; the third cycle of three years (expected attendance ages: from 12 to 15 years old), corresponding to ISCED 2 (lower secondary education). Upper secondary education is a three-year cycle (expected attendance ages: from 15 to 18 years old) (corresponding to ISCED 3) and includes five types of courses: science-humanities courses, vocational courses, specialized artistic courses, own-school-curriculum courses (science-technology courses), education and training courses. ISCED 4 corresponds to post-secondary non-higher education, while ISCED 5 corresponds to short-cycle higher education programs. The Portuguese education system also includes homeschooling and individual tuition. [4]

Portuguese higher education is organized in a binary system that integrates university education and polytechnic education and is taught in public and private institutions. The private higher education institutions must obtain prior recognition of the Ministry with the authority of the Higher Education. University education includes universities, university institutes, and other university teaching institutions. Polytechnic education comprises polytechnic institutes and other polytechnic teaching institutions. Higher education is structured according to the principles of the Bologna Process (since 2005) and is designed for students who have successfully completed an upper secondary education course or obtained a legally equivalent qualification. [5] ISCED 6 comprises the Licenciatura (or equivalent) programs, and ISCED 7 the Master programs (or equivalent). ISCED 8 corresponds to a doctoral program (or equivalent). In 2014, a non-academic higher education cycle was created, called a professional higher technical course, which corresponds to the short cycle of studies linked to the 1st cycle provided for in the Qualifications Framework of the European Higher Education Area.

The Ministry of Education defines educational policies, coordinates their implementation, and, as its main financer, ensures the running of the educational system. Other ministries, the Autonomous Regions, and municipalities also contribute to funding. The Ministry of Science, Technology and Higher Education is responsible for the higher education policies and funding. The Ministry of Education finances its central and regional departments, as well as public education institutions, from the state budget. It also subsidizes private and cooperative basic and upper secondary education, according to the terms stipulated in the Private and Cooperative Education Statute. The Agency for the Evaluation and Accreditation of Higher Education is the competent authority to evaluate and accredit higher education institutions and their study cycles. The European Commission also funds education in Portugal through the European Regional Development Fund (ERDF) and the European Social Fund (ESF). [6] Human Capital Operational Program aims to increase the proportion of the population with higher education or equivalent degrees, through training with specific general and scientific components, a technical training component, and an on-the-job workplace apprenticeship. This objective is operationalized through the funding of scholarships in Higher Education, Doctorate and Post-Doctoral Scholarships, support to Professional Technical Higher Education (TeSP), and through the financing of a credit line for Higher Education Students.

1.2 The higher education grant system as part of the Human Capital Operational Programme (HCOP) within Portugal 2020

The financial support to the higher education grant system in Portugal is co-funded by the European Social Fund (ESF), in the regions North, Centro, and Alentejo, through the following Operational Programmes:

— In the previous programming period (2007-2013) it was supported by the Human Potential Operational Programme (HPOP):

— In the present programming period (2014-2020) it is supported by the Human Capital Operational Programme (HCOP), from 2014/2015 to 2017/2018) within:

[4] by Ordinance no. 69/2019, 26th February; Ordinance no. 69/2019, 26th February, Decree-Law no. 152/2013, 4th November; Decree Law no. 55/2018, 6th July, Ordinance no. 223-A/2018, 3rd August, Ordinance no. 226-A/2018 7th August.

[5] For further legal information: LAW N.Âž 46/86, DE 14 DE OUTUBRO - LAW DE BASES DO SISTEMA EDUCATIVO; Law nÂž 46/86, de 14 de outubro; LAW N.Âž 62/2007, DE 10 DE SETEMBRO - REGIME JURÃŊDICO DAS INSTITUIÃĞÃ ES DE ENSINO SUPERIOR; Law nÂž 62/2007, de 10 de setembro; DECREE-LAW N.Âž 74/2006, DE 24 DE MARÃĞO - GRAUS E DIPLOMAS DO ENSINO SUPERIOR; Decree-Law nÂž 74/2006, de 24 de marÃĝo; DECREE-LAW N.Âž 42/2005, DE 22 DE FEVEREIRO - PRINCÃŊPIOS REGULADORES DE INSTRUMENTOS PARA A CRIAÃĞÃČO DO ESPAÃĞO EUROPEU DE ENSINO SUPERIOR (ECTS); Decree-Law nÂž 42/2005, de 22 de fevereiro; DECREE-LAW N.Âž 369/2007, DE 5 DE NOVEMBRO - AGÃŁNCIA DE AVALIAÃĞÃČO E ACREDITAÃĞÃČO DO ENSINO SUPERIOR; Decree-Law nÂž 369/2007, de 5 de novembro; LAW N.Âž 38/2007, DE 16 DE AGOSTO - AVALIAÃĞÃČO DO ENSINO SUPERIOR; Law nÂž 38/2007, de 16 de agosto.

[6] Madeira and Azores receive transfers from the Government's budget to finance education in the respective regions, except for higher education.

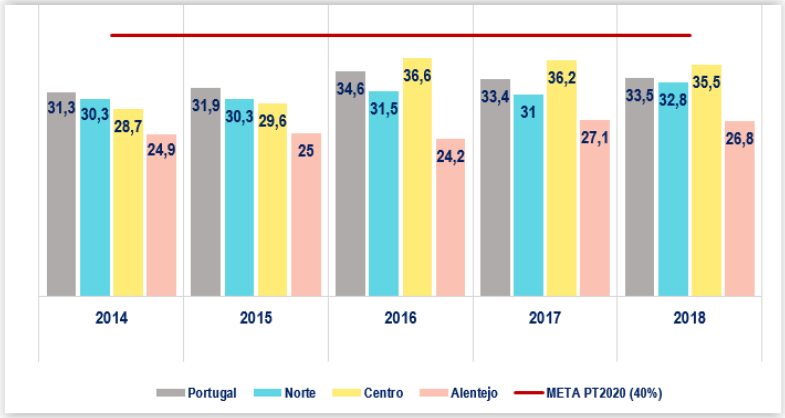
- Priority axis 10.2 - Improvement of quality, efficiency and access to higher and equivalent education, with a view to increasing levels of participation and skills, particularly for disadvantaged people.
- Specific objective 2.2.2 - Increase the number of higher education graduates, improve the quality of offers and strengthen their orientation towards the needs of the labor market.

— Social Inclusion and Employment Operational Programme (since the reprogramming period in 2018/2019), within:

- Priority axis 9.1 - Active inclusion, including with a view to promoting equal opportunities and active participation and improving employability.
- Specific objective 3.1 - Promote the development of socio-professional, personal, social, and basic skills of potentially more vulnerable groups, enhancing their employability and strengthening opportunities for their socio-professional integration.

From January 2014 to September 2019 the HCOP supported 116.526 less privileged students to attend the higher education system in the Portuguese regions of the North, Centro, and Alentejo (Figure 3). 12 operations were approved with a total approved eligible investment of € 427M (€ 363 M ESF). Higher education grants have the highest realization and payment rates within the whole typology of programs. They represent a realization rate of 91% (€ 330M) of the approved fund and 92% was paid to the beneficiaries (€ 334M ESF).

Figure 3: Population between 30 and 34 years old with higher education (or equivalent) in the eligible regions to the ESF in Portugal



Source: HCOP adapted from EUROSTAT data.

1.3 The higher education grant system characteristics and eligibility conditions

The grant is an annual monetary benefit, non-repayable, that allows students to attend a higher education course or to complete a compulsory internship, whenever the student's household financial resources are below a minimum threshold (See Annex 1 Maximum per capita income reference values).

The grant is awarded for a full school year (except in some cases), and the application can be renewed annually. All students attending Professional Higher Technical Courses, Bachelor Degrees, Integrated Master and Master courses in Portuguese higher education institutions (public, private, university, and polytechnic) are eligible.

In addition to having resources (income and movable assets) below a certain threshold, students need, in particular, to have completed successfully the previous academic year, and have completed the course within its normal duration. See Annex 2 for the full list of eligibility conditions. If one of these conditions is not met, the grant is not awarded (Annex 3 Reasons for not awarding a grant). The grant award conditions are common for both public and private higher education (Annex 4 Higher Education Grant system: Process and financing).

The amount of the grant depends on the per capita income of the household. The tuition fee is always covered but can never be higher than the maximum amount fixed annually for the 1st cycle of studies of public higher education. Supplements for accommodation and transport can also be granted (see Annex 5 for the details on the grant amount calculation.)

2 Literature review

Higher education can have a large impact on many dimensions of students' lives, such as earnings and personal development. It has been demonstrated that economic returns related to human capital investments constitute both private and social benefits. For this reason, many countries in recent years have designed interventions aimed at increasing tertiary education. Some examples of interventions are: merit-based and need-based scholarships, loans, tuition subsidies, and also programs to help students earn some money through a part-time occupation. Among these countries, the Portuguese government has been taking many actions to make higher education more attractive and increase the completion rate. In this context, the aim of the grant program for students (coming from families) with low income, is to respond to the real needs of students, ensuring equity in the allocation of social benefits and, as a consequence, to promote a social action that favors access to higher education and increases the attendance success. Since from the second year onward in order to get the scholarship students need to reach at least 36 credits in the academic year before, this intervention can be classified as both need and merit-based.

Evidence from the literature shows that the majority of the programs in place in Europe and the US are based on monetary incentives to low-income students (need-based grants). Such policies are justified by the fact that, in theory, monetary aids should increase enrollment, performance, and effort. In the US, the largest of these grants (both in terms of the total number of awards and total dollars awarded) is the federal Pell Grant, a need-based grant awarded to low- and moderate-income students pursuing a college education at an accredited institution. Concerning enrollment and attendance, the effects of monetary incentives are quite clear: the relationship between costs of college and enrollment is negative, implying that if costs are reduced the enrollment and attendance rates are expected to increase. Dynarski (2003) aims at evaluating the effect of aid on college attendance. The author uses a reform of 1981, which eliminated the Social Security Student Benefit Programme, thank to which students received generous monthly payments while enrolled full-time in college. The elimination of the Programme reduced by half the probability to go to college. Findings suggest that a grant payment of 1,000 dollars increases ultimate educational attainment by about 0.16 years and the probability of attending college by about 4 percentage points. Indeed, the elasticities of attendance and completed years of college with respect to schooling costs are 0.7 to 0.8. David and Dynarski (2009) and Dynarski and Scott-Clayton (2013)review the findings on US financial aid programs and show that there is robust evidence that need-based grant eligibility can have a strong, positive effect on whether students enroll in college, with the average estimated probability of enrollment increasing by between 3 to 4 percentage points for each additional $1,000 in grant aid eligibility.

Mixed evidence is provided by European studies: in Germany, an increase in fee of $1000 dollars, decrease enrollment by between 2.5 and 4 percentage points.((Hübner, 2012)),however, in Catalonia, no effects are found of increasing the tuition fees on enrollment ((Montalvo et al., 2018). Similarly, older studies trying to quantify the effect of tuition fees on enrollment rates using European data have in general found only a very small or insignificant effect (Canton and De Jong (2005) in the Netherlands Fredriksson (1997) in Sweden.).

The effects on performance or other longer terms outcomes are more ambiguous. On one side, by reducing college costs, higher benefits may convince students to spend more time studying rather than working. Furthermore, economic incentives may encourage exerting more effort. Both of these factors should improve performances.

Focusing on Florida students, Castleman and Long (2016) show that Florida Student Access Grant eligibility had a positive impact on short-, medium-, and long-term college outcomes. The additional $1,300 in grant aid eligibility (in 2000 dollars) increased the probability of immediate enrollment at a public 4-year university by 3.2 percentage points, while it also increased the probability of staying continuously enrolled through the spring semester of students' freshman year by 4.3 percentage points; no effect was found in terms of enrollment at a private 4-year college. Finally, an additional $1,300 in aid eligibility increased the probability of earning a bachelor's degree within 6 years by 4.6 percentage points, or 22%.

Finally, the Pell Grant program, one of the largest financial programs in the US, causes a small reduction of the drop-out rates (after the first year) in Ohio University: between 1.4 and 4 p.p. according to specifications, and not always statistically significant from 0. (Bettinger, 2004)

As for Europe, some papers, such as Agasisti and Murtinu (2016) and Sneyers et al. (2016) confirm these assumptions finding good effects on performance. Agasisti and Murtinu (2016) uses a matching technique to estimate the effect of financial aids on some performance indicators in an Italian University (Politecnico di Milano). Findings suggest that obtaining a grant has a positive effect on academic performances: students who receive the financial aid obtain more formative credits and are more likely to graduate on time. Also Sneyers et al. (2016), in evaluating the impact of need-based grants on five Italian Universities, discovers a positive effect in credit accumulation in the first year, fewer dropouts, and more graduations in time.[7] Garibaldi et al.

[7] It should be noted that these two studies use matching techniques on very small samples, and the parameter retrieve is quite different from what one can estimate using regression discontinuity design.

(2012) find that a 1000 euro increase in tuition fee increases the probability of *not* graduating in time by 5.2 percentage points, in a private Italian University. In Italy, (Mealli and Rampichini, 2012) study the effect of grants on dropout during the first year of university, using a regression discontinuity approach applied to 5 universities. In 4 out of the 5, the grant has no effect on drop out during the first year, ans only in the University of Padova the grant contributes to reducing dropout, but this effect is not present for the poorest students. In Denmark, these positive effects are confirmed even if the impact of aids on both dropout rate and time of degree completion is smaller (Arendt, 2013).

In the literature, we find also examples of merit-based scholarships, given to students who achieve some specific merit requirements. Generally, programs that link a scholarship to some merit requirements could work either by reducing the cost of college or by increasing students' effort (Scott-Clayton, 2011). In West Virginia, the PROMISE program is entirely based on academic performances, not financial needs. The PROMISE scholarship covers full tuition and required fees for up to four years. In order to be eligible for the program, freshmen must have a 3.0 high school GPA and obtain a certain score on the ACT or SAT test.[8] Also, after the first-year students need to maintain the 3.0 GPA and to complete 30 credits per year, which correspond to the full number of credits foreseen for 1 year of full-time attendance in college. Those who fail to meet renewal requirements once cannot later regain the scholarship. Findings demonstrate that the program has a positive impact on both GPA and credit accumulation, both at the end of the first year (0.15 higher GPA, and 2 credits more) and overall the college degree (4.6 credits more and 0.099 higher GPA over 4 years). It also has large effects on the share of students meeting key achievement thresholds: PROMISE recipients were nearly 25 percentage points more likely to have earned 30 or more credits, the threshold for PROMISE renewal. Finally, recipient students had between 7 and 9.5 percentage points higher probability of graduating within the 4 years (according to the two different specifications used). [9]Scott-Clayton and Zafar (2019) finds that these positive effects on grant recipients still appear after 10 years: scholarship recipients are more likely to earn a graduate degree, more likely to own a home and live in higher-income neighborhoods, less likely to have adverse credit outcomes, and are more likely to be in better financial health than similar students who did not receive scholarships.

Another large merit-based scholarship is the Georgia's HOPE program (Henry and Rubenstein, 2002) The two programs (PROMISE and HOPE) are of similar monetary value (both cover tuition and fees), and both require students to maintain a 3.0 GPA while in college (although PROMISE allows a 2.75 GPA in the first year). But in Georgia there are no minimum course load requirements for renewal; students need not even attend full-time. Henry and Rubenstein (2002) test the hypothesis that merit-based financial aids increase the quality of education. Their results show that students responded to HOPE. Grades in high schools are improved and both for the percentages of males and females eligible for the scholarship increase. Contrary to the PROMISE program, HOPE does not have strong credits requirements for renewal, as a consequence, Cornwell et al. (2005) find that HOPE recipients at Georgia's flagship university were 9.3 percentage points *less* likely to complete a full-time course load in their freshman year. The difference suggests that students respond strategically to each program's incentives: HOPE's rules encouraged students to reduce course loads in order to raise their GPAs. Nevertheless,while HOPE may have slowed time-to-degree, Dynarski (2008) estimates that it increased the college completion rate by 3 to 5 percentage points, especially among female students.

Leuven et al. (2010) performs a randomized field experiment in Amsterdam. First-year students earn financial rewards if they pass all requirements within one year. Results concerning achievement are ambiguous because for low ability students the grant seems to have negative effects, while for high ability students performances improve.

The same evidence was found by Solis (2017), who wants to show the effects of financial aids on enrollment also in countries in which programs are less expensive and policies could have a greater impact (Chile). He studies the impact of receiving a loan, which is granted to students, whose income is in the lowest quantile, and whose college admission test score is above a given threshold. Using a regression discontinuity design based on the admission test score, he finds that the loan programs lead to a large increase in enrollment rates in college both in the year after high school and in the subsequent years.

Merit-based aid only programs are often criticized, as they provide financial assistance to those individuals who need it the least and who would almost certainly attend college anyway. Therefore, there is growing consent of the importance of packaging financial aid between merit-based, need-based, grants, loans, and work-study. However, findings on the effect of combining a merit requirement, to need-based requirements are controversial. Dynarski and Scott-Clayton (2013)provides an extensive review of the effectiveness of financial aid programs in the US and suggests that merit-based incentives within the grant/aid systems are helpful for stimulating better performance of eligible students. If students do not have the resources or don't know how to convert effort into achievement it is likely to obtain opposite or ambiguous results. For example, Scott-Clayton and Schudde (2016) shows that higher financial incentives, attached to weak requirements for the renewal, can cause moral hazard and convince under-performing students to persist in college. In the US, Scott-Clayton

[8]They must have scored at least a 21 overall on the ACT or 1000 on the SAT.

[9]The authors also study possible gender heterogeneous effects, but they do not find differences between female and male students.

and Schudde (2020) examine the consequences of federal Satisfactory Academic Progress (SAP) requirements, which students receiving Pell Grants, student loans, and other need-based federal aid must meet to maintain eligibility for aid: if they fail to reach the SAP requirements, they risk to lose the financial aid. They find that among Pell recipients, students who fail to reach the SAP requirement at the end of the first year, and thus more at risk to lose their scholarship, have worse outcomes than those who instead reached the minimum SAP requirements. In particular, they find that discouragement effects appear larger, and encouragement effects smaller, for students further below the GPA threshold: that SAP policy is only partly doing its job. It does appear to reduce some unproductive re-enrollments while providing some encouragement for students to perform better. But, for many students, by the time they receive their first warning, it may be too late for them to improve their GPAs sufficiently to maintain their aid eligibility.

However, findings for Europe , seem to point in the other direction. The papers by Agasisti et al. (2021) and Montalbán (2019), study the effect of increasing merit requirements for scholarship targeting low-income students in Italy and Spain respectively. Agasisti et al. (2021) use a reform in an Italian region that increased by 40% (i.e. from 25 to 35 out of a maximum of 60) the number of credits to be earned in the first academic year to maintain aid eligibility. They find that tightening merit requirements had a statistically significant, positive effect on various dimensions of performance of the "average" aid recipient. More specifically, positive effects are found on the probability of graduating within the degree legal duration (three years), which increased by about 8.9 percentage points, and on the probability of graduating in three or four years which went up by 7 p.p. The reform increased the number of credits earned in the first year. No effect on students' GPA, final mark, or in the probability of enrolling in second or third year. However, the positive effects are concentrated among higher and medium-ability students, while lower-ability students receiving financial assistance are discouraged from continuing in their studies. Montalbán (2019) study the effect of a similar reform in Spain, which raised the minimum academic requirement for scholarship renewal. He finds strong positive effects of being eligible for a grant on student performance when combined with demanding academic requirements, while there are no effects on student dropout. Students improve their final exam attendance rate, their average GPA in final exams, and their probability of completing the degree. The results show that being eligible for an average grant of 825 euros (relatively to being eligible for only a fee waiver) under strong academic requirements increases student average GPA and fraction of credits earned by 0.45 points (on a 0 to 10 scale) and 6 percentage points respectively, which corresponds to an increase of approximately 7.3 and 7.6 percent with respect to the baseline mean. These effects correspond to about 25 percent of the standard deviation of the dependent variable.

Few of the studies mentioned above report differential findings according to gender. Angrist et al. (2009) for example find that the effect of a program which offered tuition fee waiver, condition on reaching a given GPA at the end of the first year, is effective exclusively for women, while no effect is found for men.

Concluding, there is a consensus that need-based scholarships have a positive (somehow small) effect on higher education enrollment. Mixed evidence is found on what regards performances. Merit-based scholarships work especially if there are tight requirements on credits or GPA, and combining the two (merit and need) can work in increasing enrollment and also performance. (lower dropout, higher grades, less completion time).

3 Methods

3.1 Counterfactual impact evaluation methods

Our aim is to assess the effectiveness of the intervention. To do so we would like to compare the outcome of a student who receives the grant, to the outcome of the same student had s/he not received the grant. Clearly, the latter outcome is not observable: if a student is treated, i.e. s/he received the grant, we only observe her or his outcome conditional on the fact of having received the grant. Similarly, if a student is not treated, i.e. s/he did not receive the grant, we can only observe his or her outcome conditional on the fact of not having received the grant. This is defined as the "fundamental problem of causal inference" in the economic literature: one cannot observe the status of a treated individual in the scenario where s/he did not receive the treatment (the counterfactual).

One possible way out of this problem is to use the outcome of the students who did not receive the grant as the counterfactual. However, since the students selected to receive the grant, may be different from the ones not selected, we cannot simply retrieve the impact of the intervention by comparing the outcome of the two groups, because the results would suffer from a bias related to the mechanism of selection to the treatment (selection bias). Assuming we would just compare the outcome in the two groups of students: the one receiving the grant and the one not receiving the grant. Based on the eligibility conditions we know that students who do not receive the grant have higher per capita income than the ones receiving the grant, this may be associated with belonging to families with higher socioeconomic backgrounds, which can have a direct effect on the academic performances of students. So, just a simple comparison of the outcome in the two groups of treated and non-treated students will lead to concluding something, which may not be the direct causal effect of receiving the grant. Counterfactual evaluation methodologies aim at identifying the most suitable control

group of students, so as to be sure that any difference in the outcomes between the group of students receiving the grant and the selected group of students not receiving the grant is due to having received the grant.

Among the several econometric techniques that can help us account for the selection bias and perform a valid evaluation, the final choice of the most suitable counterfactual method is strongly related to institutional background and to data availability. In this particular situation, we exploit the fact that assignment to the treatment (i.e. decision of giving or not giving the grant) is based on a clear rule: only students whose per-capita income is below a predefined threshold (also called "cutoff") are treated, the ones whose income is above the threshold are not treated. So the assignment is based on a well identifiable variable, called "running variable" or "score": here the per-capita income. This setting is perfect to apply the Regression Discontinuity Design (RDD) methodology. RDD has emerged to be the most credible non-experimental method for the analysis of causal effects in observational studies. Within an RDD, all units have a score, and treatment is assigned to those units whose value of the score is below a known cutoff and not assigned to units whose value of the score exceeds the cutoff. When all units are perfectly sorted around the cutoff i.e. all units eligible to the treatment receive the treatment, a "Sharp RDD" is applied. When units are not perfectly sorted around the cutoff, a "fuzzy RDD" is applied.

The key feature of the design is that the probability of receiving the treatment changes abruptly at the known threshold. The discontinuous change in this probability can be used to identify the local causal effect of the treatment on an outcome of interest because units with scores barely below the cutoff can be used as counter-factual for units with scores barely above it. Indeed, RDD assumes that students, whose income is just above or just below the pre-defined threshold, are very similar, and thus are comparable. More details are explained in the following section.

We will use RDD methods to study the impact of receiving the scholarship for first-year students, as reported in Section 4 and for a sub-sample of the second-year students. We will complement the analysis of the second-year students using a Difference-in- differences approach, and a combination of RDD and Difference-in- differences.

3.2 Data

The analysis is based on two sources of administrative data. The Directorate-General of Higher Education in Portugal (DGES) provides access to the universe of students applying for the grant from 2012 to 2018. Using a unique student identifier, this information is merged with another dataset containing information about the academic career and progression, provided by the Directorate-General for Statistics on Education and Science (DGEEC).

Data were granted to the JRC with a personal data transfer agreement preceded by the approval of a "Data protection record". [10] In order to comply with the personal data regulation, in the data transfer agreement, a number of data-related conditions were agreed upon between the various parties. The most relevant being:

— Students with extreme values of per-capita income (both very high and very low) would not be included in the shared sample and only students with income between -5,000 and 5,000 around the threshold would be kept. This is the sample needed for the analysis, as the methodologies foreseen is a comparison of students close to the threshold, so students whose per-capita income is further away from the thresholds are not necessary.[11]

— Students with disability and students foreign background would not be included in the shared sample

DGES provided information about all applicant students, and available variables are: socio-demographic characteristics (gender, year of birth, region of residence), information of the university chosen by the student (type of university - public or private-, type of degree - bachelor, master or unique cycle-, the field of study, region, current academic year, current curricular year), the per capita income rounded at the unit digit (which is used to determine whether the student is eligible for the grant), the result of the application, and in case of rejection the reason why the grant was not granted. DGEEC provided information about the academic progression of each applicant student in the academic years from 2012/2013 to 2017/2018. For each academic year, each student could be classified into eight possible categories. (See Annex 7 for the details of the categories).

In all analyses a further restriction to the sample was made: old students (age above 50),and students enrolled in part-time education were excluded from the analysis. And also students who were enrolled in two specific types of course were excluded and we only focus on students enrolled in Bachelors, Master or Integrated

[10] DPR-EC-04126.1

[11] The original per-capita income distribution range from -7,924.87 to + 2,080,000,000 around the threshold. We run the command developed by Calonico et al. (2017) on the original sample to choose the bandwidth. As the optimal bandwidth for all available specifications were below the income range [-2,500; + 2,500], and to have enough observations in each income bin, the parties involved agreed that in the data which would be transferred, extreme values of per-capita income could be excluded, and only the students with income between -5,000 and 5,000 around the threshold would be kept.

master. [12] Finally, we drop students who are enrolled in less than 30 credits, as they are not eligible for the scholarship.

4 Analysis on first year students

In this section of the report, we analyze the effect of the grant on students in the first year of study, applying for the grant for the first time only, not enrolled in the previous academic year (i.e. enrolled in zero credits in the previous academic year). So we do not include in our sample, students who are requesting the grant to enroll in grades higher than the first one.

4.1 Sample selection

Students can apply to the grant at any point of their university career, and apply multiple times (over the years, as they progress to the following course year). In this section of the report, we focus on students who apply for the first time to the grant (as recorded by the system) at the beginning of the first year (independently of whether it is the first year of the Bachelor, master, or of the Integrated master). For this particular subset of students, the assignment variable is solely the per-capita income, as no merit requirement is foreseen for first-year students.

The per-capita income used to assess eligibility is normalized around the cutoff value giving access to the grant, for each academic year.[13](As reported in Annex 1.)

The total sample of students is $94,964$. Based on this sample we checked whether the running variable, the per capita income used to assess eligibility to the grant, was a real predictor of receiving the grant. We built two variables: (1) the "treatment" variable, which is built using information from the current status of the application as registered in the system, after all the eligibility checks have been done (i.e. thus variables reflect the actual number of students who receive the grant). (2) The "intention to treat" variable, which measures students' eligibility to the grant according to their per-capita income, is a binary indicator when the per-capita income is below the pre-defined threshold. [14]

The cross-tabulation of these two variables reveals that there are 21 students who receive the grant even if their income is above the threshold, and $1,545$ students who do not receive the grant even if their income is below the threshold. For the rest of the sample "intention to treat"= "treatment"; $14,818$ students do not receive the grant and have an income above the threshold and $78,580$ receive the grant and have an income below the threshold. This is summarized in Figure 4 which plots the probability of being treated according to the running variable.

4.2 Empirical strategy

As reported in Figure 4, Students are not perfectly sorted around the income threshold. Therefore, we follow a fuzzy regression discontinuity design (RDD) to estimate the effect of receiving the grant on future academic outcomes. We exploit the fact that only students with per-capita income below the pre-defined threshold are eligible to receive the grant, which results in a discontinuity in the probability of receiving the scholarship for students with different per-capita income, along with a smoothly increasing running variable. (As shown in Figure 4). The idea behind this methodology is that students who are very close to the cut-off points are very similar in all aspects, but some have access to the grant, and some do not, so those students whose income is just above or just below the threshold are comparable (Lee and Lemieux, 2010).

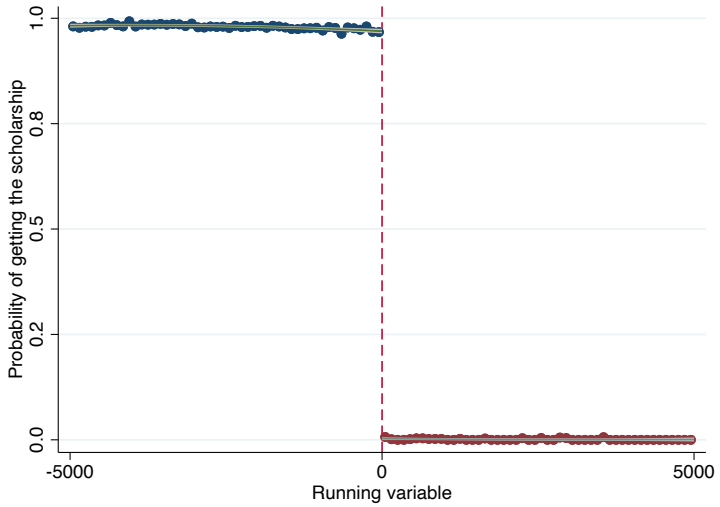
Formally, Y_i is academic success, the outcome variable of interest for each student i and X_i represents the income of the student's household, which determines treatment assignment for each student i. T_i indicates whether a student is eligible to the grant and D_i whether the student receives the grant. In our case $D_i \neq T_i$ i.e. there is imperfect compliance between being eligible for the grant and receiving the grant. $T_i = 1(X_i < c)$, a student is eligible for the grant when the per-capita income X_i is smaller than the eligibility threshold c.

[12]The other two courses were: 1) Curso de Especializacão Tecnológica (CET): a post-secondary technological course which provided students with level 5. Since 2016 CET passed from higher education institutions to professional schools and it now provides a level 4. ItâĂŹs a 1-year course. In this course, in the data there are only 5,700 students, only applying in 2012, 2013, 2014. 2) Curso técnico superior profissional (TESP) âĂŞ this is a post-secondary higher education course, that also provides students with level 5. It gives a pre-university diploma that allows students to continue to higher education. In the data, there are around 9,000 students applying in the academic years 2015, 2016, and 2017. It was decided to not consider these two types of degrees together with the Bachelor, masters or Integrated Masters, as they are substantially different in nature, compared to the other 3. However, given the interest in the effect of the scholarship for TESP students, a separate analysis focusing only on this type of degree is reported in Annex 9.

[13]For each students' per capita income we subtracted the threshold value, and used this new variable as running variable: all students whose value is below 0 are eligible for the grant, and all students whose value is above 0 are not eligible

[14]From this sample we excluded students who were rejected due to not having completed the process of application: those students were requested to provide more information related to their income documentation and they never did, therefore the variable income is not valid for this sample of students and thus are not included in the analysis.

Figure 4: Probability of receiving the grants based on the running variable



Within the potential outcomes framework, D_i can be witten as $D_i = D_i(0) * (1 - T_i) + D_i(1) * T_i$, where $D_i(1)$ is the treatment taken when the student i is assigned to treatment condition (i.e, when T_i = 1) and $D_i(0)$ is the treatment when the student i is assigned to the control condition (i.e, when T_i = 0). Y_i is defined as $Y_i = Y_i(0) * (1 - D_i) + Y_i(1) * D_i$, where $Y_i(1)$ and $Y_i(0)$ are the potential outcomes of interest with and without the grant.

In a fuzzy RDD, the average treatment effect i.e. the average effect of the grant can be written as (Hahn et al. (2001)) :

$$E[Y_i(1) - Y_i(0)|X_i = c] = \frac{\lim_{x \downarrow c} E[Y_i|X_i = x] - \lim_{x \uparrow c} E[Y_i|X_i = x]}{\lim_{x \downarrow c} E[D_i|X_i = x] - \lim_{x \uparrow c} E[D_i|X_i = x]} \quad (1)$$

We estimate regression discontinuities non-parametrically.[15]. Nonparametric local polynomial estimators involve approximating the regression functions above and below the cutoff by means of weighted polynomial regressions, with weights computed with a kernel function on the distance of each observation's score to the cutoff. These kernel-based estimators require a choice of bandwidth for implementation, and several bandwidth selectors are now available in the literature. We apply the one proposed by Calonico et al. (2014) and Calonico et al. (2020) which select the optimal bandwidth based on one common MSE-optimal bandwidth selector and a triangular kernel (see (Cattaneo et al., 2019)). In this baseline model, we include control for the academic year. In addition, we check for the presence of mass points in the running variable and account for them accordingly as in Calonico et al. (2014). We estimate the confidence intervals relying on the bias-corrected RD estimates with a robust variance estimator, which provides valid inference when the MSE-optimal is used. We estimate the model, first without covariates, and then including covariates, as developed in Calonico et al. (2019). The covariates included should not affect the point estimates found, but are included to help improve efficiency.

Following Lee and Lemieux (2010) we perform several tests to validate the underlying RDD assumptions. (1) We first check the absence of manipulation in the running variable around the income eligibility threshold, graphically and by running density tests proposed by Cattaneo et al. (2020b). (2) We verify that there is no discontinuity at the income threshold in the distribution of relevant covariates. We do this both graphically and by estimating Eq. (1) using the covariates as outcomes. (3) We verify the absence of any other discontinuity in the likelihood of receiving the grant at each side of the income eligibility threshold. (4) Finally, we replicate the analysis selecting the bandwidth manually: the first one includes the complete sample, including all observations with running variables in the range (-5000, +5000) of the threshold, then we restrict the range to (-3000, +3000), (-1000, +1000), and (-500, + 500), and, finally we also present the results using different polynomials.

4.3 Data and descriptive statistics

[15]The alternative to non-parametric estimation parametric estimation. Parametric estimations basically use all the observations to find the effect, while non-parametric methods provide estimates based on data closer to the cut-off, reducing bias that may otherwise result from using data further away from the cutoff to estimate local treatment effects. Non-parametric methods are by now the standard framework for RD empirical analysis because they offer a good compromise between flexibility and simplicity

4.3.1 Outcomes

From the information provided by DGEEC, we retrieve the student situation in the academic years from 2012/2013 to 2017/2018. For each academic year, each student could be classified into eight possible categories (See Annex 7 for the details of the categories). When the students graduate - from the same course for which they originally apply- we have information on the final grade of the student at graduation. When the student didn't graduate but is still enrolled in the university course associated with the grant application, we know whether that is the first year of enrollment and the number of credits completed at the end of the first year. The main outcomes of interest can be grouped into five categories: 1) Whether the students actually enroll and start the higher education degree (outcome measured in December of the first year); 2) whether the students are enrolled in any course at the beginning of the second year, (outcome measured in December of the second year) 3) whether the students obtained at least 36 credits at the end of the first year[16] 4) whether the students obtained all the credits they were enrolled in; 5) whether they graduated; 6) whether graduation was on time; 7) which is their final grade. We also estimate the effect on the probability of applying again to the scholarship in the following academic year. From the information reported in the dataset (see Annex 7 for the details of the categories) containing the students' outcome, we define the following outcomes of interest:

1. **Immediate dropout**: a dummy variable equal to 1 when a student is not found in the database in December of the first year.
2. **Immediate dropout, version B**: a dummy variable equal to 1 when an applying student is not found in the database recording students' academic outcomes (DGEEC) in December of the first year, not including students who are never found in the DGEEC database.
3. **Never found**: a dummy variable equal to 1 when an applicant is never found in the DGEEC database. Those students could either be students who apply for the scholarship, but never actually start higher education, and never enroll again, or students who are not found due to matching issues between the two datasets.
4. **Enrolled in the same course of application**: a dummy variable equal to 1 when the student is actually enrolled in the same course of application in December of the first year.
5. **Enrolled in another course**: a dummy variable equals 1 when the student is actually enrolled in a different course, of the same level, of the course of application, in December of the first year.
6. **Dropout end of first year**: a dummy variable equal to 1 when a student is not found in the database in December of the second year, not including students who are never found in the database. This can include also students who were did not enrolled in the year of the application, but enrolled the following year. (We cannot distinguish whether students are in their first or second year).
7. **Reached at least 36 credits**: a dummy variable equal to 1 when the student obtained at least 36 credits (or all the credits if enrolled in less than 36) the end of the first year.
8. **Reached all the credits in which they were enrolled**: a dummy variable equal to 1 if the student obtained all the credits in which he was enrolled, at the end of the first year.
9. **Ever graduated**: a dummy variable equal to 1 when the student graduated from a course of the same ISCED level as the one she originally indicated in the grant application.
10. **Graduated in time**: a dummy variable that equals 1 if the student graduated within 2 years from a master, 3 years from bachelor, and 5 years from Integrated master [17]
11. **Final mark** at graduation. This information is only available when students graduated from the same course they originally apply to.
12. **Apply again**: a dummy variable equal to 1 when the students apply to the scholarship also the following academic year.

The average values of these outcomes are reported in Table 1 for the two groups of students in the working sample. The outcomes of interest are different between students receiving the grant (i.e. the treatment group) and those not receiving it (i.e the control group).

[16] 36 credits is the minimum number of credits students need to have to get the scholarship in the following academic year. See Annex 8 for more details on the strategy used to build this variable, as the information on the number of credits is not there for the whole sample.

[17] 4 years from bachelor in health-related field

Table 1: Descriptive statistics: outcome variables

	Non-treated	Treated	Difference	se
Immediate dropout	0.0392	0.0082	0.0311***	0.002
Immediate dropout- B	0.0221	0.0048	0.0173***	0.001
Never found	0.0175	0.0034	0.0142***	0.001
Enrolled in the same course of application	0.9396	0.9672	-0.0276***	0.002
Enrolled in another course	0.0271	0.0184	0.0086***	0.001
Dropout end of first year	0.0740	0.0527	0.0213***	0.002
Reached at least 36 credits	0.8175	0.8735	-0.0560***	0.004
Reached the enrolled credits	0.5121	0.5132	-0.0011	0.005
Graduated	0.5100	0.5478	-0.0378***	0.006
Graduated in time	0.3770	0.4206	-0.0436***	0.006
Final mark	14.41	14.33	0.09***	0.027
Apply again	0.3268	0.8242	-0.4974***	0.004
Observation	16,363	78,601		

Note: The Table reports the mean values of the outcomes of interest in the non-treated group (column 1), and treatment group (column 2) and their differences and the relative standard error. *** p<0.01, ** p<0.05, * p<0.1.

4.3.2 Students' characteristics

The descriptive statistics of these variables are reported in Table 2.This information is also used to test the validity of the regression discontinuity design in Section 4.4.1.

Table 2 reports the characteristics of students between those receiving the grant and those not receiving it. Students receiving the grant are more often women, little younger, enrolled in Bachelor, in a public university. The most three commonly chosen fields of study are Social Sciences, Business and Law, Health and Social Protection, and Engineering, Transforming Industries and construction, whether the students are receiving the grant or not. The proportion of students in treatment and control groups varies also by region of residence.

Table 2: Descriptive statistics: control variables

	Non-treated	Treated	Difference	se
Running variable	1280.61	-2800.23	4080.84***	12.329
Age	20.55	19.76	0.80***	0.035
Student is a female	0.6121	0.6428	-0.0307***	0.004
Region: A.M.L.	0.1894	0.1506	0.0387***	0.003
Region: Alentejo	0.0839	0.0777	0.0062***	0.002
Region: Algarve	0.0271	0.0217	0.0054***	0.001
Region: Açores	0.0265	0.0212	0.0053***	0.001
Region: Centro	0.2520	0.2517	0.0003	0.004
Region: Maidera	0.0339	0.0359	-0.0020	0.002
Region: Norte	0.3872	0.4411	-0.0539	0.004
Degree: Bachelor	0.7540	0.8183	-0.0643	0.004
Degree: Master	0.1076	0.0754	0.0321	0.003
Degree: Integrated master	0.1385	0.1063	0.0322	0.003
Field: Education	0.0438	0.0466	-0.0029	0.002
Field: Social Sciences, Business and Law	0.1272	0.1380	-0.0107***	0.003
Field: Arts and Humanities	0.3125	0.3328	-0.0202***	0.004
Field: Sciences, Mathematics and Computing	0.0983	0.0869	0.0114***	0.003
Field: Engineering, Transforming Industries and construction	0.1580	0.1347	0.0234***	0.003
Field: Agriculture	0.0159	0.0129	0.0030***	0.001
Field: Health and social protection	0.1704	0.1715	-0.0011	0.003
Field: Services	0.0721	0.0757	-0.0036	0.002
Field: Unknown	0.0017	0.0009	0.0008***	0.000
Public university	0.9000	0.9140	-0.0140***	0.003

Note: The Table reports the mean values of the outcomes of interest in the non-treated group (column 1) and in treated group (column) their differences and the relative standard error. *** p<0.01, ** p<0.05, * p<0.1.

4.4 Results: full sample

4.4.1 Description of students' characteristics around the threshold

One of the main assumptions of the RRD is that, around the cut-off, there are no differences in the distribution of covariates in the two samples. To check if this is true, we first plot the distribution of the covariates around the threshold and then run the model defined in Equation 1 using the covariates as the outcome. Finding zero"effect" means that the pre-determined covariates are truly predetermined. The graphical inspection of the distribution of students' characteristics around the threshold show that students receiving the grant are similar to those not receiving it in terms of age, gender, the field of study, and region of living (see Figures A.1, A.2, and A.3). This graphical inspection is confirmed by the estimates of Eq. (1) using students' characteristics as outcomes. The results are reported in Table 3. The two samples of treated and control students have a similar distribution of covariates around the threshold, and therefore they are comparable. Graphically, students receiving the grant seem more likely to be enrolled in Mestrado. The RDD estimates reveal that this difference is not significant around the optimal bandwidth. This confirms that around the threshold the two groups of students are comparable. We look closer at these differences by estimating the impact of the grant by gender, university sector, type of degree, and region of origin, in the heterogeneity analysis in Section 4.6.

Table 3: Discontinuity in covariates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	**A.M.L**	**Alentejo**	**Algarve**	**Açores**	**Centro**	**Maidera**	**Norte**
Robust	0.010	-0.000	0.001	-0.004	-0.009	-0.003	0.007
	(0.014)	(0.010)	(0.006)	(0.005)	(0.015)	(0.007)	(0.017)
Observations	[79320:14680]	[79320:14680]	[79320:14680]	[79320:14680]	[79320:14680]	[79320:14680]	[79320:14680]
Bandwidth	[1491:1491]	[1632:1632]	[1273:1273]	[1441:1441]	[1635:1635]	[1538:1538]	[1612:1612]
Effect. obs	[16163:7835]	[18104:8375]	[13287:6966]	[15459:7659]	[18152:8380]	[16793:8039]	[17815:8300]
	(8)	(9)	(10)	(11)	(21)	(22)	(12)
VARIABLES	**Female**	**Bachelor**	**Master**	**Mestrado Int.**	**Age**	**Public**	**Education**
Robust	-0.017	-0.001	-0.001	-0.001	0.031	0.009	0.000
	(0.017)	(0.015)	(0.011)	(0.011)	(0.187)	(0.010)	(0.007)
Observations	[80125:14839]	[80125:14839]	[80125:14839]	[80125:14839]	[80125:14839]	[80125:14839]	[80125:14839]
Bandwidth	[1538:1538]	[1429:1429]	[1323:1323]	[1643:1643]	[1064:1064]	[1574:1574]	[1715:1715]
Effect. obs	[16953:8130]	[15440:7695]	[14049:7258]	[18429:8490]	[10858:6181]	[17465:8273]	[19503:8718]
	(13)	(14)	(15)	(16)	(17)	(18)	(19)
VARIABLES	**Social sciences**	**Arts**	**Sciences**	**Engineering**	**Agriculture**	**Health**	**Services**
Robust	0.015	0.000	-0.008	-0.001	0.000	-0.015	0.014
	(0.011)	(0.019)	(0.010)	(0.011)	(0.004)	(0.015)	(0.009)
Observations	[80125:14839]	[80125:14839]	[80125:14839]	[80125:14839]	[80125:14839]	[80125:14839]	[80125:14839]
Bandwidth	[1688:1688]	[1154:1154]	[1637:1637]	[1848:1848]	[1666:1666]	[1219:1219]	[1619:1619]
Effect. obs	[19067:8637]	[11916:6561]	[18356:8474]	[21499:9162]	[18759:8563]	[12740:6814]	[18095:8424]

Note: The table reports RDD estimates of Eq. (1),using as outcome variables the covariates reported in Table2. Eq. (1) is estimated with the optimal bandwidth, triangular kernel, and local linear polynomial. The coefficients reported are bias-corrected and robust standard errors are in parentheses. Each column is a different regression. *** p<0.01, ** p<0.05, * p<0.1.

4.4.2 The impact of the grant: RDD estimates

We first start with a graphical inspection of discontinuities in outcomes at the threshold. Figures 5 and 6 show that students eligible for the grant i.e having an income below the cutoff, seem to have a lower rate of immediate dropout (both definitions), and of never being found. They also have higher enrollment rates when considering the degree for which they applied, but lower rates when considering other degrees of the same ISCED level. Treated students show higher rates for what regards probability of reaching 36 credits, of graduating and graduating in times, and definitely higher rates for what regards the probability of applying again to the scholarship in the following academic year. This graphical analysis gives only a hint of the true effect of receiving the grant, as we only descriptively compare the outcomes between eligible and non-eligible students. The estimates of the causal impact of the treatment are presented in the next two subsections. Eq. (1) presented in Section 4.2 is estimated first without students' characteristics other than income and academic year fixed effect, (without covariates) and including students' characteristics (with co-variates).

Figure 5: Discontinuity in outcomes

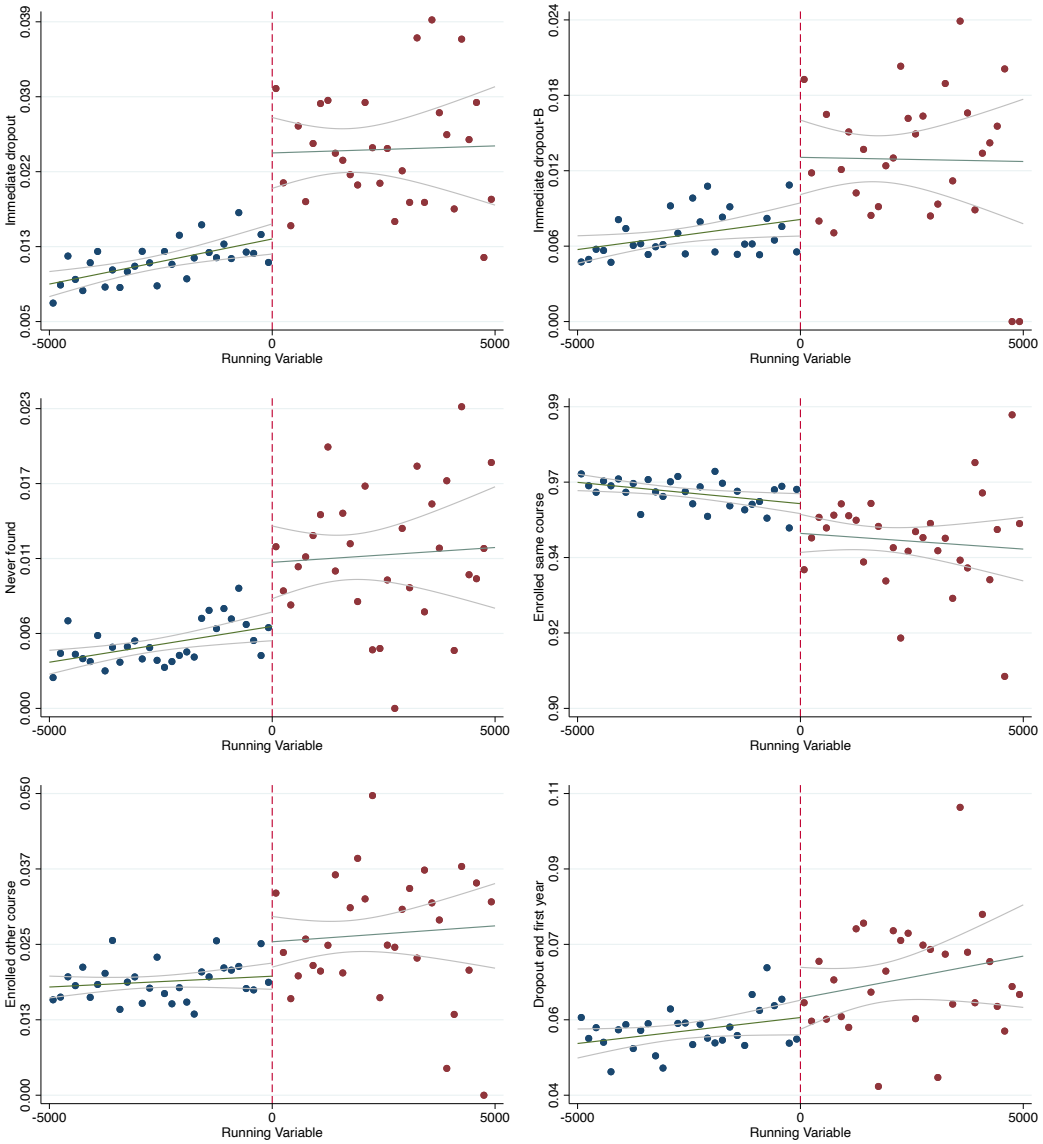
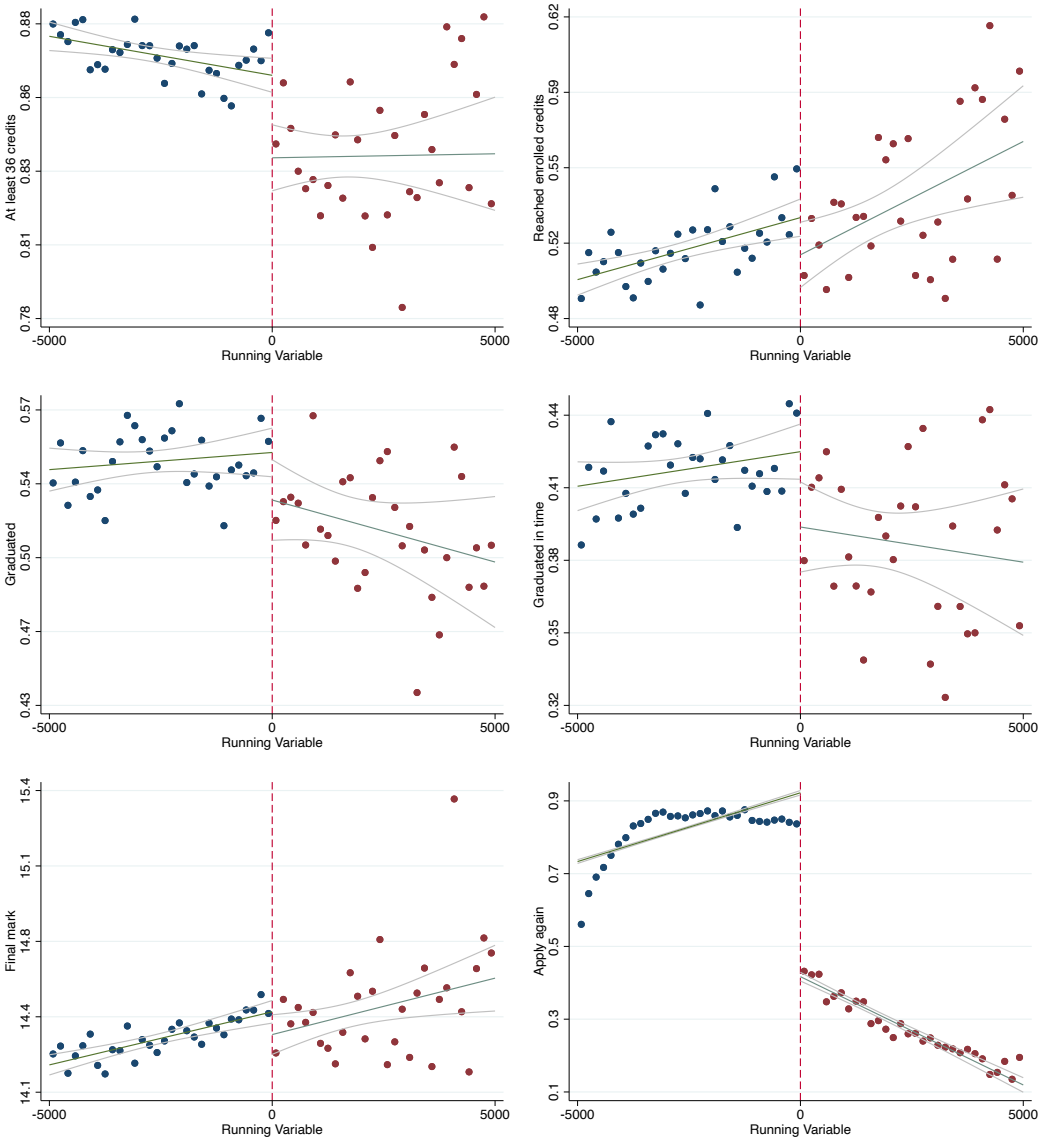


Figure 6: Discontinuity in outcomes



4.4.3 RDD estimates: without co-variates

Main results are reported in Table 4. We estimate the effect of receiving the grant on the outcomes of interest (summarized in Section 4.3.1). As explained in the Method Section, we use optimal bandwidth selected by one common MSE optimal bandwidth bias-corrected RD estimates with a robust variance estimator. The order of the local polynomial used to construct the point estimator is 1 (local linear regression), and the order of the local polynomial used to construct the bias correction is 2. For each of the outcomes, we also report the first stage: the effect of the running variable on the probability of being treated.

The main results point to a negative effect of the grant on the probability of immediate dropout. This is true both if we include the students who are never found in the data (Column (1)) and if we do not include them (Column (2)). Receiving the grant has indeed a direct effect on the probability of not being found in the DGEEC datasets, which could mean that getting the scholarship has an effect on the quality of the matching, or that those students who do not get the scholarship do not enroll that year, and never do (column (3)). We find that receiving the scholarship reduces immediate dropout in a range between 1 and 1.7 percentage points (p.p). We then look at whether the scholarship has any impact on the course the student actually enrolled in and we see interesting differences among the two groups. In particular, receiving the grant increases by around 2.6 percentage points (p.p.) the probability of still being enrolled in the course for which the student applied for the scholarship, but reduces by 1.5 p.p. the probability of being enrolled in another course, of the same ISCED level (columns (4)and (5)). So pupils who get the scholarship are more likely to actually start the course for which they apply to get the scholarship, while those who do not receive the scholarship are more likely to actually enroll in a different course. We then look at results at the end of the first year, we see that getting the scholarship increases the probability of reaching at least 36 credits, by 2.6 p.p and of reaching all the credits the students enrolled by 3.8 p.p. (columns (7) and (8). There is also a negative, but non statistically significant effect on the probability of dropout at the end of the first year. (Column (6)) (This particular estimate excludes the students who are never found, so this variable reflects the probability of dropout, conditional of being observed in the data at least once, so most likely conditional on having at least enrolled in the first year. However, this variable takes a value 0 also for students who are currently enrolled, even if they were not in December of the first year. Those are the students who immediately drop out, as of December of the year of the application, t but that in December of year $t+1$ are enrolled in any course. As a robustness check, we exclude from the sample those students who were not found in the databases in December of year t, but we still do not find a significant effect of receiving the grants.[18]

We also look at longer-run effects estimating the impact on the probability of graduating, of graduating in time, and on the final mark obtained. We do find a positive and significant effect on the probability of graduating in time, with an increase of 5.6 p.p. (column (9)). [19]The sign of the coefficients on the probability of graduating and on the final mark, are positive, but not statistically significant (Columns (10) and (11)). Finally, we also estimate the effect of receiving the grant on the probability of applying again in the following academic year, and we find a large positive effect: 40 p.p.

In total, based on this analysis, we find that receiving the grant has an immediate effect on the probability of actually starting higher education, of reaching the credits needed to receive the scholarship the following year, and of reaching all the credits in which the students enrolled. Receiving the grant leads also to a higher probability of graduating in time.

[18]It is worth mentioning that, in the sample of males, using this definition we find a negative effect of the grant of drop-out, of 3.8 percentage points, similar to what we find using the main definition.

[19]We also use an alternative definition, defining graduating in time all the students who manage to graduate up to 1 year after the normal time: 3 years for the Masters, and 4 years for the bachelor. We find a slightly smaller coefficient but point to the same result. (Beta= 0.050, se=0.027)

Table 4: Main results

	(1)	(2)	(3)	(4)
	Immediate dropout	**Immediate dropout-B**	**Never found**	**Enrolled same course**
First stage	0.966***	0.967***	0.966***	0.966***
	(0.005)	(0.004)	(0.005)	(0.005)
Robust	-0.017***	-0.010**	-0.007**	0.026***
	(0.006)	(0.004)	(0.004)	(0.009)
Observations	[80125:14839]	[79744:14667]	[80125:14839]	[79744:14667]
Bandwidth	[1222:1222]	[1402:1402]	[1177:1177]	[1120:1120]
Effect. observations	[12775:6832]	[14956:7486]	[12194:6639]	[11456:6336]
	(5)	(6)	(7)	(8)
	Enrolled other course	**Dropout end year 1**	**At least 36 credits**	**Reached enrolled credits**
First stage	0.966***	0.964***	0.971***	0.971***
	(0.005)	(0.005)	(0.003)	(0.003)
Robust	-0.015**	-0.011	0.026**	0.038**
	(0.007)	(0.009)	(0.012)	(0.017)
Observations	[79744:14667]	[65371:12020]	[69950:10915]	[68914:10819]
Bandwidth	[1147:1147]	[1434:1434]	[1976:1976]	[2077:2077]
Effect. observations	[11768:6458]	[12717:6176]	[20597:7136]	[21620:7263]
	(9)	(10)	(11)	(12)
	Graduated in time	**Graduated**	**Final mark**	**Apply again**
First stage	0.960***	0.960***	0.956***	0.967***
	(0.007)	(0.007)	(0.009)	(0.004)
Robust	0.056**	0.042	0.177	0.404***
	(0.027)	(0.027)	(0.110)	(0.017)
Observations	[36857:7007]	[36857:7007]	[19746:3328]	[80125:14839]
Bandwidth	[1364:1364]	[1329:1329]	[1377:1377]	[1253:1253]
Effect. observations	[7242:3421]	[7028:3348]	[3926:1660]	[13152:6970]

Note: The table reports RDD estimates of Eq. (1). Eq. (1) is estimated with the optimal bandwidth, triangular kernel, and local linear polynomial. The coefficients reported are bias-corrected and robust standard errors are in parentheses. Each column is a different regression. *** p<0.01, ** p<0.05, * p<0.1.

4.4.4 RDD estimates: with co-variates

In Table 5, we report the same results, with the inclusion of control variables i.e students' characteristics, following the methodology proposed by Calonico et al. (2019). The covariates included are: age, gender, region, type of degree (Bachelor, Master, or Integrated master), and whether the university is public or private. Calonico et al. (2019) suggest that the inclusion of covariates if those are truly predetermined, should not change the point estimates obtained in the specification without covariates, but should increase efficiency by reducing standard errors.

The inclusion of controls confirms all the previously found results: we see that the magnitude of the coefficient is similar to the estimates obtained in the model without covariates, but the standard error are smaller, as expected.

Table 5: Results- including control variables

	(1)	(2)	(3)	(4)
	Immediate dropout	**Immediate dropout-B**	**Never found**	**Enrolled same course**
Robust	-0.016***	-0.009**	-0.008**	0.024***
	(0.005)	(0.004)	(0.004)	(0.008)
Observations	[79320:14680]	[78945:14510]	[79320:14680]	[78945:14510]
Bandwidth	[1340:1340]	[1396:1396]	[1167:1167]	[1197:1197]
Effect. observations	[14132:7235]	[14735:7377]	[11944:6532]	[12284:6579]
	(5)	(6)	(7)	(8)
	Enrolled other course	**Dropout end year 1**	**At least 36 credits**	**Reached enrolled credits**
Robust	-0.013**	-0.011	0.027**	0.044**
	(0.006)	(0.008)	(0.012)	(0.018)
Observations	[78945:14510]	[64679:11885]	[69279:10803]	[68252:10705]
Bandwidth	[1224:1224]	[1732:1732]	[1817:1817]	[1709:1709]
Effect. observations	[12596:6685]	[16083:6955]	[18294:6717]	[16596:6374]
	(9)	(10)	(11)	(12)
	Graduated in time	**Graduated**	**Final mark**	**Apply again**
Robust	0.057**	0.043	0.152	0.405***
	(0.026)	(0.026)	(0.100)	(0.017)
Observations	[36388:6910]	[36388:6910]	[19534:3286]	[79320:14680]
Bandwidth	[1384:1384]	[1356:1356]	[1397:1397]	[1235:1235]
Effect. observations	[7275:3409]	[7116:3356]	[3932:1655]	[12813:6813]

Note: The table reports RDD estimates of Eq. (1). Eq. (1) is estimated with the optimal bandwidth, triangular kernel, and local linear polynomial. The coefficients reported are bias-corrected and robust standard errors are in parentheses. Each column is a different regression. The following controls are included: age, gender, region, type of degree, and public university. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

4.5 Robustness checks

To test the validity of the assumptions underlying RDD, we perform the following checks. We verify the absence of manipulation of the running variable, and the absence of discontinuity in the running variable below and above the income eligibility threshold, finally we run the estimates for manually selected bandwidth, for the following intervals: the first one includes the complete sample, including all observations with running variables in the range (-5000, +5000) of the threshold, then we restrict the range to (-3000, +3000), (-1000, +1000), and (-500, + 500).

4.5.1 Manipulation of the running variable

We first investigate whether there is no indication of potential manipulation of the running variable around the threshold. Some students, with an income just above the threshold, might declare less income, or in their family, someone could choose to work fewer hours in order to become eligible for the grant. We do not think that the former is plausible, as the resources used to assess eligibility are the income declared for tax purposes, and those are verified by the Portuguese administration. The latter might be possible only if the student exactly knows one year before what will be the eligibility threshold for the next academic year, and for the working ones in the family, having the flexibility to adjust the number of hours worked, which is quite unlikely. For these reasons, we do not think that a substantial number of students are able to manipulate their income to become or remain eligible for the grant. However, the main issue in this setting, is that we have access only to applicant students, and not to the whole population of Portuguese students. This might be an issue if "richer" students do not even apply to the scholarship knowing that being rich they will probably not get the scholarship. If all the non-eligible students do not even apply, we would not have the necessary information to carry out the regression discontinuity analysis.

We test this assumption empirically, first by plotting the distribution of income around the eligibility threshold and checking whether there is an accumulation of observations just below the threshold. Graph (a) of Figure A.4 displays no jump at the threshold. In addition, the presence of a discontinuity in the density function at the cut-off point is tested and rejected using tests proposed by Cattaneo et al. (2020b). Graph (b) of Figure A.4 reports the estimate of the local polynomial density estimation test (unrestricted model) by Cattaneo et al. (2020b). We can see that there is no significant discontinuity in the distribution of the income i.e. the running variable around the eligibility threshold. The corresponding coefficients are the following: the robust estimate equals 1.5241 with p-value 0.1275, (optimal bandwidth selection, default settings: $(p) = 2$ and $(q) = 3$). Therefore we conclude that around the threshold there is no sign of manipulation (including both real manipulation and differential application pattern above or below the threshold). This is probably true for two main reasons: while it is true that the thresholds are known, the calculation of the "per-capita" income is not so straightforward, and it could be that some students who are around the threshold will apply anyway hoping to be eligible; this is especially true in our working sample of students: students who apply for the first time, so they do not know (yet) if their income will be considered as eligible or not, meaning that they have no prior experience since this is the first application. We can expect different patterns from the second application onward, when students who were rejected the first time, may be less inclined to apply again if their income was considered to be too high in the first application.

4.5.2 Absence of discontinuity in the running variable below and above the eligibility threshold

To test the robustness of our results, we finally run the RDD estimates using placebo thresholds, to the right and to the left of the income eligibility threshold. Finding no effect at these placebo thresholds will ensure that our results are truly driven by the treatment, i.e. the impact of the grant. Table A.1 reports the RDD estimates of Eq. (1) using the following placebo thresholds to the right and to the left of the income eligibility cut-off value: income cut-off -1,000, -2,000, -3000, and -4000 on the left, and income cut-off +1,000, + 2,000,+3,000, and + 4,000 on the right. For each of these placebo thresholds, Eq. (1) is estimated to the right and to the left, on the full sample, with one common MSE-optimal bandwidth, (Calonico et al., 2017)). We do no not find robust evidence of discontinuity to the left and to the right of the variables of interest, in particular for those we find a significant impact of the grant (see Section 4.4.2).

4.5.3 Manually selected bandwidth

The approach we follow to optimally select the bandwidth is the best in terms of picking the right sample so that all the assumptions needed to run the RDD are respected. However, we also try to manually select the bandwidth around the threshold and test how results would change, according to the selection of different intervals. The results are reported in FigureA.5 and A.6. For each of the outcomes we report estimates based on

ten different samples, manually selecting the bandwidth, including all observations with running variable in the range between (-500,500), (-1000, 1000), (-1500,1500) and so on until (-5000, +5000). The main conclusion we obtain is that our main findings are robust to the manually selected bandwidth, in most of the cases: we only do not find significant results for what regards the variable "never found". Variable "reaching at least 36 credits " is significant in the larger bandwidths (between 2500 and 4000), and the variable "graduated in time is significant in the shorter bandwidths (between 1000 and 2000).

4.5.4 Different polynomial choice

Table A.2 reports the RDD estimates for different polynomial specifications and confirms that our results are robust to different specifications of the running variable (quadratic and cubic).

4.6 Results: heterogeneity analysis

In this section, we investigate whether the results that we found in the full sample are driven by particular types of students or university programs. We divide the sample into groups according to the following characteristics: gender, higher education institution type("Public" and "Private" institutions) type of degree ("Bachelor", which correspond to the bachelor degree; "Master"; and "Integrated master", which is a 5 years degree, including both bachelor and master) and type of regions ("Less developed regions" : Norte, Centro, Alentejo and Açores; "In transition regions": Algarve and Madeira; and "Developed regions": A.M.L). Results are reported in tables from A.3 to A.4.

4.6.1 Results: RDD estimates on dropout

As seen in the main analysis section, the scholarship decreases significantly the probability of immediate dropout. This result is mainly driven by public universities and bachelor degrees (see table A.3, RDD estimates for both immediate dropout variables, columns 5, 16, and 27 and 6 and 16, respectively). Male students have also a reduced probability of dropout in December of the first year. (Columns 3 and 14) Indeed, the decreasing effect on immediate dropout among females who received the scholarship is explained by their lower probability of never being found. (Column 24) As for regional differences, the effects are found in the less developed regions only (Columns 9, 20, and 31). An effect is found in the developed regions (A.M.L) only on the variable immediate dropout, excluding the students who are never found. (column 22) The effect of the scholarship on dropout at the end of the first year (measured in December of the second year) is not significant in the full sample but is negative and significant for male students, (see table A.3, column 58).

4.6.2 Results: RDD estimates on enrollment

The main results show that the impact of the scholarship is positive on the probability of being enrolled in the degree indicated in the application but negative on the probability of being enrolled in a different degree, at the beginning of the first year (measured in December of the first year). The heterogeneity analysis reveals interesting patterns.

On the probability of being enrolled in the same degree, we see that the effect for males is 2 percentage points higher than for females (see table A.3,Column 36). Regarding types of degrees, the positive effect of the scholarship on enrollment in the same degree is stronger for Master students than for Bachelor students (Columns 39 and 40). In addition, this positive effect is mainly driven by students in public universities (Column 38), and for students coming from less developed regions(Columns 42). On the probability of being enrolled in another degree, the picture differs. The negative effect of the scholarship in the full sample is only driven by male students, public universities, Master's students, and less developed regions (see table A.3, columns 47, 49, 51, and 53).

4.6.3 Results: RDD estimates on credits

The positive effect of the scholarship on having achieved the minimum number of credits required at the end of the first year is explained by females(see table A.4, column 68), and master students (Column 73). Similarly, the increased probability of completing the total number of credits enrolled with the scholarship is driven by females, (Column 79) and students enrolled in master programs (Column 84). However, we see that the positive effect of the scholarship on reaching the number of credits enrolled is higher for students in private universities than for those in public universities (Column 81 and 82). The effect on reaching the number of credits enrolled seems also to be driven by students coming from the regions in transitions (Column 87).

4.6.4 Results: RDD estimates on graduation, final mark, and applying next year

Similar to the analysis on the full sample, we do not find significant effects of the scholarship on the probability of graduating by sub-characteristics. However, the positive effect of the scholarship on graduating in time is mainly driven by females, bachelor students, and private universities (see table A.4, columns 90, 94, and 92). Interestingly, in the heterogeneity analysis, we find that amongst students in public universities, students in less developed regions, and students in Integrated master, the scholarship has a positive and significant effect on the final mark (Columns 115, 118, 119).[20] Finally, the strong effect we found in the full sample analysis, of applying again when being already a recipient of the scholarship the year before, is found as well, and with comparable magnitude, in all sub-characteristics(see table A.4, columns 122 to 132).

4.6.5 Results: differences between displaced and non displaced students

In the previous paragraphs we investigate heterogeneity based on somehow pre-determined covariates. Covariates that we saw were continuous at the thresholds (see section 4.4.1). In this paragraph we explore a final heterogeneity based on an indicator of whether the students is displaced or not, that is whether the students is studying in region which is different from the region of origin. This variable is affected itself by the fact that a students receive the scholarship. Indeed when we run the same tests as in Section 4.4.1 we find evidence of the fact that this variable is not continuous at the threshold: students who are eligible for the scholarship are more likely to be displaced (3 percentage point higher). This variable is therefore affected by the scholarship. We still run the heterogeneity analysis in the two sub-samples of students, just to have some information of other potential channels for the scholarships' effect. Results are reported in table A.5. Results on the credits, on the graduation time are totally driven by students who are not displaced: no effect are found among the sub-sample of displaced students. And displaced students who get the scholarship have a lower probability of reaching 36 credits than those who don't get the scholarship. This controversial effect could be due to the fact that displaced students are on average more motivated than non-displaced. So, students who are displaced, without the scholarship may be composed by a group of highly motivated students, and that's why having the scholarship is not so effective.

Effect on drop outs, are mixed: with displaced students having significant effect in the second definition of drop-outs and non-displaced students having higher effects on the probability of drop-out (including the never found) and on the never found students.

4.7 Extended analysis on the first year students

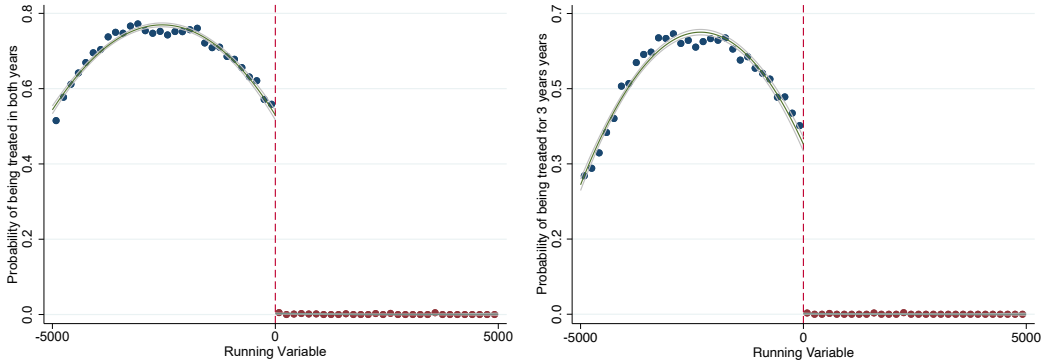
So far we have documented the effect of getting the scholarship during the first year on subsequent outcomes. We also wanted to assess what is the effect of receiving the scholarship while being enrolled in the following years and the effect of being a grant recipient for more than one year. The identification strategy to analyze these aspects is more complicated because from the second year onward the second eligibility condition to receive the scholarship applies: completing at least 36 credits in the previous academic year. And we saw in the main results that the number of credits completed is also affected by receiving the scholarship, as shown in Table 4.

4.7.1 The effect of receiving the scholarship for more than one year

To solve this issue, we adopt here a different strategy: we focus on the sample used in the analysis so far, (first year, first applicant) and we estimate the impact of receiving the scholarship for two years, and for three years (only for students enrolled in Bachelor or Integrated master) on short and long term outcomes: Immediate dropout at the beginning of the second year (third year), enrolled in the same or other courses, and drop out at the end of the second year, (third year) graduation, graduation time and final mark. We use per-capita income measured in the first year as running variable in a fuzzy design. Per-capita income in the first year definitely affects the probability of getting the scholarship in the first year, and very likely affects the probability of getting the scholarship also in the following years, as we expect that per-capita income would not change that much between one year to the other. This is shown in figure 7, which plots on the left side the probability of receiving the scholarship two years in a row, and on the right side the probability of receiving the scholarship three years in a row. While there is no more perfect compliance, as it was for the first year (See figure 4), per-capita income measured in the first year of application is a good predictor of the probability of receiving the scholarship in the subsequent years as well. This is also confirmed by the first stage estimation presented in Table 6. Being the treatment "Receiving the scholarship for two (three) years", implies that students used as control, are both those who are never treated, and also by those who receive the scholarship only in the first (two)years. Results

[20] The estimate for the effect of the scholarship on the final mark on the sub-sample of the "transition" regions could not be run, due to not enough variability.

Figure 7: Probability of receiving the scholarship for two or three years



Note: The figure plots on the y-axis the probability of being treated for two years (left panel) and three years (right panel)„ and on the x-axis the first year per-capita income .

in the first panel, (receiving the scholarship i.e. being treated for 2 years) refer to all three types of degree (Bachelor, Integrated master, and Master), while results in the second panel (treated for 3 years) refers only to students enrolled in the Bachelor (Bachelor) and Integrated master. The results suggest that receiving the scholarship for two years in a row increases the probability of graduating in time by 7.4 p.p., and also has a small positive effect on the final mark obtained. Receiving the scholarship for three years in a row increases the probability of graduating in time by 11.5 p.p and increases the final mark at graduation.[21] We further investigate whether there are differences by type of degree and other student's characteristics. Results are reported in Table A.6 and A.7 for the effect of receiving the scholarship in both first and second year, and in Table A.8 for the effect of receiving the scholarship for three years. While in the full sample, receiving the scholarship for two years has no impact on the probability of immediate dropout, there is a negative effect of the scholarship on immediate dropout for male students, in public universities and for students coming from a less developed region: receiving the scholarship twice prevents these sub-samples of students from not even starting their second year (Columns 3, 4, and 6,) The scholarship also prevent dropout at the end of the second year in less developed regions (Columns 39). The positive effect on graduating in time, instead, is driven by female students, by students coming from the region of A.M.L, bachelor type of degree, and private universities. (columns 57, 60, 63, and 64) The effect of receiving the scholarship for 2 years has a positive effect on final marks in public universities, in less developed regions, and in particular among the students enrolled in an Integrated master [22]. (Columns 70, 72, and 77).

The heterogeneity analysis on the effect of receiving the scholarship for three consecutive years, reveals that being treated for 3 years increases the probability of graduating in time, and this effect is driven by male students, bachelor degree and private universities, and students coming from the region of A.M.L. (Table A.8 columns 33, 35,38, and 39). Receiving the scholarship for three years has also a positive effect on the final mark, this effect is particularly large for students in Integrated master, female students, and public universities.(Table A.8, columns 42, 44, and 50)

[21] Results are robust to the inclusion of covariates

[22] Although this last estimate is based on a very small sample

Table 6: Effect of receiving the scholarship 2 or 3 years

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Treated 2 years	**Dropout start year 2**	**Enrolled same course, start year 2**	**Enrolled other course, start year 2**	**Dropout end year 2**	**Graduated in time**	**Graduated**	**Final mark**
First stage	0.531***	0.533***	0.524***	0.548***	0.565***	0.566***	0.640***
	(0.014)	(0.013)	(0.016)	(0.012)	(0.014)	(0.015)	(0.024)
Robust	-0.027	0.101***	-0.077***	-0.028	0.059	0.075*	0.335*
	(0.018)	(0.029)	(0.029)	(0.023)	(0.039)	(0.042)	(0.186)
Observations	[65371:12020]	[65371:12020]	[65371:12020]	[50648:9428]	[36857:7007]	[36857:7007]	[19746:3328]
Bandwidth	[1158:1158]	[1242:1242]	[919:919]	[1745:1745]	[1807:1807]	[1611:1611]	[1013:1013]
Effect. observations	[9829:5272]	[10716:5563]	[7526:4417]	[12959:5550]	[10304:4162]	[8897:3872]	[2763:1330]

	(8)	(9)	(10)	(11)	(12)
Treated 3 years	**Dropout start year 3**	**Dropout end year 3**	**Graduated**	**Graduated in time**	**Final mark**
First stage	0.414***	0.337***	0.438***	0.439***	0.548***
	(0.015)	(0.013)	(0.018)	(0.018)	(0.019)
Robust	-0.038	-0.020	0.074	0.115*	0.268*
	(0.029)	(0.036)	(0.066)	(0.065)	(0.162)
Observations	[46992:8472]	[22847:4433]	[31702:5720]	[31702:5720]	[17361:2810]
Bandwidth	[1250:1250]	[5000:5000]	[1242:1242]	[1282:1282]	[1782:1782]
Effect. observations	[7744:3959]	[22846:4433]	[5406:2641]	[5625:2705]	[4724:1705]

Note: The table reports RDD estimates of Eq. (1)., for the two treatment definitions: in columns (1) to (7) the treatment is receiving the scholarship for two years, while in columns (8) to (12), the treatment is receiving the scholarship for three years. The sample used to estimate the effect of receiving the scholarship for three years is composed by Bachelor and Integrated master students only, as Master only last for two years. Eq. (1) is estimated with the optimal bandwidth, triangular kernel, and local linear polynomial. The coefficients reported are bias-corrected and robust standard errors are in parentheses. Each column is a different regression. *** p<0.01, ** p<0.05, * p<0.1.

4.7.2 Progression to higher degree

For a limited sample of students (i.e. students starting their Bachelor's course in 2012 and 2013), we study the effect of the scholarship on enrollment in a Master's degree after graduating from a Bachelor's degree. This information is not easy to recover because of the structure of the dataset: For non-applicants, we do not know in which type of course they are enrolled in, we only know if and when they graduated, and if after graduation they are still enrolled in another degree of the same or higher level than the one they originally applied to during the first year of the Bachelor. We build a new variable, which takes value 1 if the student:

— is in status "Graduated from the course (either the one the applied to or another one of the same level" at the end of the third (fourth) year, since first application year,

— is in status " Enrolled in any course of the same level or higher" at the end of the fourth (fifth) year since the first application.

We, therefore, assume that when the student graduated from a Bachelor in year t and is enrolled in a course after graduation, it means that the student has progressed with his/her studies and is now enrolled in a Master. This unfortunately can be tested only for the students observed at least for 5 years, and so the analysis is limited to the sample of students who started a Bachelor in the academic year 2012 or 2013. The results are reported in Table 7, for students receiving the scholarship in the first year, in the first and second year, and in all three years.

We find that receiving the scholarship increases the probability of progressing to the Master, and the effect increases if the scholarship is received for more than one year. (7% first year, 13% first and second, 18% first, second and third year).

Table 7: Effect on progression to the Master degree

	(1)	(2)	(3)
	Treated year 1	**Treated year 1 and 2**	**Treated year 1,2 and 3**
First stage	0.951***	0.524***	0.376***
	(0.0107)	(0.0223)	(0.0218)
Robust	0.071*	0.133**	0.186**
	(0.038)	(0.061)	(0.084)
Observations	[16873:2903]	[16873:2903]	[16873:2903]
Bandwidth	[1351:1351]	[1594:1594]	[1594:1594]
Effect. observations	[3199:1404]	[3948:1593]	[3948:1593]

Note: The table reports RDD estimates of Eq. (1)., for the three treatment definitions: in columns (1) the treatment is receiving the scholarship in the first year, in column (2) the treatment is receiving the scholarship for two years, while in column (3) the treatment is receiving the scholarship for three years. The sample used are students who started a Bachelor in academic year 2012 and 2013. Eq. (1) is estimated with the optimal bandwidth, triangular kernel, and local linear polynomial. The coefficients reported are bias-corrected and robust standard errors are in parentheses. Each column is a different regression. *** p<0.01, ** p<0.05, * p<0.1.

4.8 Discussion on the first year students

The analyses on the sample of first-year students, first applicants, use the eligibility condition related to having resources below a threshold to access the scholarship, and employ a regression discontinuity design approach to identify the causal effect of the scholarship on various academic outcomes; immediate dropout, still being enrolled at the end of the academic year, the number of credits completed, and longer-term outcomes, including graduation, graduation in time, and final mark. The first set of analyses focused on measuring the effect of receiving the scholarship in the first year on these outcomes. The second set of analyses extended the first set of results by investigating the effect of receiving the scholarship more than one time (i.e 2 times) on the sub-sample of students enrolled in a Bachelor, in an Integrated master, or in a Master, and the effect of receiving the scholarship 3 times on the sub-sample of students enrolled in a Bachelor or in an Integrated master only.

The main results of these analyses are the following:

— The analyses on the full sample of first-year students show that receiving the grant has an immediate effect on the probability of actually starting higher education, on the likelihood of reaching the credits needed to receive the scholarship the following year, and on the probability of completing the total number of credits in which the students are enrolled. Receiving the student grant also leads to a higher probability of graduating in time.

— The extended analysis on the first-year students shows that receiving the scholarship for two years in a row increases the probability of graduating in time by 7.5% p.p., and also has a small positive effect on

the final mark obtained. Receiving the scholarship for three years in a row increases the probability of graduating in time by 11% p.p and increases the final mark at graduation. So we see that the effect on graduating in time is increasing with the number of times the students receive the scholarship (the effect of receiving the scholarship in the first year on graduating in time is 5.6% p.p).

— The scholarship also contributes to the progression to the Master for Bachelor students.

— The results of the heterogeneity analysis show that the impact of the grant is different by students' characteristics:

  - The scholarship significantly reduces immediate dropout in Bachelor students. The scholarship thus seems to have a locking effect in particular for those at the beginning of their studies, when the decision to start studying or not is indefinite. In the absence of the scholarship these students would make another choice and probably look for a job instead of studying. On the contrary, this effect is less relevant for Master students, i.e. more experienced students with clearer objectives and a lower timescale until graduation.
  - The locking effect of the scholarship is most relevant for male students, and students coming from the less developed regions. We find that the probability of dropout at the end of the year is decreasing with the number of years with the scholarship for these students. This result could be explained by alternative opportunities or in particular by the effect of the environment or the social network of these students. Indeed, the proportion of individuals enrolled in higher education is higher in less developed regions compared to more developed ones. Individuals in more developed regions are more likely to study with or without the scholarship influenced by their peers or the encouraging environment, while the scholarship has a positive effect on enrollment and maintaining individuals in higher education in the less developed regions. The incentive created by the scholarship seems to be particularly effective for male students. This result is also reflected in the probability of staying enrolled in the same course indicated when applying for the scholarship. Male students and students coming from less developed regions are less likely to change course when receiving the scholarship.
  - The scholarship has a significant and positive effect on the probability to graduate in time. This effect is found among females, bachelor students, and students in more developed regions.
  - The scholarship has also a positive effect on performance, in particular for students coming from less developed regions, and students enrolled in Integrated master. For these students, we find that the effect on the final mark increases with the scholarship, and the magnitude of this effect increases with the number of years with the scholarship.

We try to relate the magnitude of our findings to what the literature previously found. For students close to the threshold - so, for students who most likely contribute to the regression discontinuity estimates- the grant is only providing a tuition fee waive (up to the maximum tuition fee foreseen in public university). [23] The tuition fee in these universities - and observed in the data- is around 1000 euro, as the maximum is set to 1060 euro in the years considered. So we can claim that for most of the students, in public universities, which are close to the threshold, the grant corresponds to the tuition fee amount, which is 1000 euros. Apparently, we find smaller results on enrollment (which we measure by "immediate drop-out"): while on average a $1000 increase in the financial support, increased enrollment by around 3-4 percentage points, in our case a $1000 financial support leads to an increase in enrollment of between 1 and 2 percentage points (according to different sub-sample considered). However, we shall say that the reference population in our case is not the full population of secondary education graduates, as in most of the studies, but of the already selected sample that decides to at least apply for the scholarship, so already somehow motivated to pursue higher education. This represents a much smaller sample than the true population used in the previous studies.

Finally, as documented by Hübner (2012), for Germany effects in Europe tends to be smaller, or even null (Montalvo et al. (2018) in Spain, Canton and De Jong (2005) in the Netherlands Fredriksson (1997) in Sweden.)

The effects on drop-outs are not so conclusive in the literature as the effect on enrollment, so it is hard to compare our findings with others. If we look at performances, measured with credits reached, probability of graduating and graduating in time, we also find some common patterns with previous studies: both European and American studies looking at graduation time find effects which are similar to ours: Garibaldi et al. (2012) find that an increase in tuition of 1000 euro increase by 5.2 percentage point the probability of not graduating in time, which is symmetric to our finding: a 1000 euro decrease in fee, increase the probability of graduating in time by 5.6 percentage points. PROMISE recipients in the US had between 7 and 9 percentage points higher probability of graduating in time (Scott-Clayton, 2011).

We cannot estimate the effect of the grant on actual credits obtained at the end of the first year, but only on the probability of reaching the required credits to get the scholarship also the following year. The only other

[23] See Annex 2.

paper that does that is Scott-Clayton (2011), and they find effects that are about 10 times larger than what we find. However, the requirements in the two programs are quite different: for them, it represents almost 100% of the credits in which students are enrolled, while in our case it represents on average the 60 %, so it is more likely that students - despite the scholarship- reach this. In addition, the PROMISE scholarship cannot be renewed ever again, if a student misses reaching the requirement for one year, while the grant we study, can be renewed in the following year if the requirements (income and credits) are reached later on. So the PROMISE scholarship requirements are much stricter than ours, which probably works as better motivation for students.

As for the differential gender effects, we find that usually, males are the ones benefit most in terms of drop-outs, and females are the ones benefiting the most of the scholarship in terms of performances (higher credits, higher probability of graduating in time), at least when we look to the analysis focusing on receiving the scholarship during the first year, and first and second year. We find the opposite for the effect of receiving the scholarship for three consecutive years, where results on time of graduation are driven by males. Very few studies can be used as a comparison: most of the papers do not distinguish between males and females, however, the few that do finds that the promise of financial rewards works better for the female students, as we do find: females are the ones benefiting the most in terms of performances (higher credits, higher probability of graduating in time). Other instead finds controversial results, like Agasisti et al. (2021) which finds: "*the reform increased the probability of graduating on-time by 11 pp (significant at 10%) for women and 7.1 pp for men (statistically nonsignificant). However, the results are reversed when we consider the probability of graduating in 3 or 4 years, for which we observe an about 11 pp increase for men but a nil effect for women.*"[24] So, like others in the literature, we do not find a clear pattern for females and males, they both seem to benefits in some dimensions from the grant.

[24]Page 17, footnote 15.

5 Analysis on the students who apply for the scholarship at the beginning of their second curricular year

Section 4.7 already provided some hints on the effect of receiving the scholarship for more than one year, but it is limited to the sample of students who receive the scholarship during the first year, and are first-time applicants. In this particular sample, we could apply regression discontinuity design, using the per-capita income as the sole running variable.

The focus of this section is on students who apply for the scholarship at the beginning of their second curricular year. So, those are students who already (successfully) completed their first year.

To extend the analysis to years above the first one, there are a few main issues to deal with: i) Assignment to the scholarship is based on two assignment rules (Per-capita income and credits obtained in the previous academic year), so a standard RDD similar as in the sample of first-year students, first applicants cannot be applied as one should take into account both selection rules; ii) the credits variable, is also an outcome of interest, so the second eligibility rule based on the minimum credits that students need to complete to be eligible for the scholarship is endogenous and cannot be used as running variable to identify the causal effect of the scholarship.

In addition, we cannot apply the method foreseen using the two running variables as described in the Annex 6 as, after several checks, the variable "credits obtained in the previous academic year" is not continuous at the threshold, one of the main assumptions required to apply this method.

Therefore, in order to assess the effect for students who get the scholarship in their second year, we rely on the paper by Scott-Clayton and Schudde (2020), which suggest three approaches:

— RD design on the per-capita income, conditional on having obtained enough credit on the previous academic year

— RD-DID design approach, which compares discontinuities at the income threshold for students whose credits are above or below the 36 thresholds.

— DID approach, which compares students above and below the income and credits thresholds.

Our setting has one main limitation with respect to the data used by Scott-Clayton and Schudde (2020): Our sample does not include the universe of Portuguese students but includes applicants only. Therefore we expect the sample of students whose credits are below the thresholds, or per-capita income is above the threshold not to be fully represented in our sample. Still, even keeping this caveat in mind, it is possible to retrieve some information on the scholarship's effect on students beyond the first year.

The next sections describe the approaches in detail and provide the respective results.

5.1 RD design on the per-capita income, conditional on having obtained enough credits in the previous academic year

This approach is the same as in the previous section, with the only difference that we restrict our sample to second-year students, who obtained in the previous academic year at least 36 credits. Conditioning on success in the previous academic year implies that the only running variable which matters for eligibility is per-capita income. Therefore, we apply the exact same methodology as explained in Section 4.2, that is, we use a regression discontinuity approach, and compare students whose income is just above or just below the eligibility threshold. The two main assumptions needed to apply the method in this sample are the same as before: 1) absence of manipulation in the running variables around the income eligibility threshold; 2) no discontinuity at the income threshold in the distribution of relevant covariates.

Therefore, as a first step, we tested whether these two assumptions are met. When we focus on this sample of second-year students, who successfully complete the first year, and we test for the continuity of the running variable, we notice that per-capita income does not pass the test which we described in section 4.5.2.[25] We, therefore, restrict the sample to second-year students, whose credits are above 36 and who apply for the first time. So those are students who in their first year, for any reason, did not apply for the scholarship. If we restrict the sample to these students the income distribution is continuous at the threshold[26]. However, when we check for the continuity of pre-determined covariates at the threshold (as in Section 4.4.1), we find that the variables "type degree" equal to "Master" or "Integrated master" are not equally distributed on both sides of the income threshold. We then focus only on students enrolled in the Bachelor, who are in their second curricular year, who apply for the first time to the scholarship, and whose credits obtained in the previous academic years are above

[25] T=2.49 with p-value=0.013. This implies that there is evidence of "manipulation" in the density of the running variable at the threshold. As explained in Section 4.5.1, we do not believe that students are able to manipulate their per-capita income, but this absence of continuity is probably coming from the fact that students above the threshold are less likely to apply for the scholarship, and this, even more, when their application was previously rejected.

[26] T=1.551 with p-value=0.121

Table 8: Actual treatment and per-capita income

	Income below the threshold		
Treated student	0	1	Total
0	4,191	1,037	5,228
1	5	17,822	17,827
Total	4,196	18,859	23,055

the 36 credits threshold. Applying these restrictions, our working sample includes now 23,055 students, and in this is particular sub-sample the RDD assumptions are valid.[27] As it was for the first-year students, not all students who should have been treated according to their per-capita income actually receive the scholarship. In particular, the 23,055 students are divided as reported in Table 8.

As assigned to the treatment is not fully compliant with the per-capita income below the threshold (1,037 eligible students do not get the scholarship, and 5 non-eligible get it) we again rely on a fuzzy design, and we replicate the analysis done in the previous section.

We focus on the same outcomes explained in the previous section, but referred to the second year, for what regards immediate dropout, dropout, and credits obtained at the end of the second year. However, we do not consider the definition of immediate dropout which includes students who are never found in the dataset: being in their second year, they must have appeared before: if they are not found in the dataset, it means that the matching was not working between the two different data sources. [28].

The results are provided in Table 9. As we can see, we do not observe any effect of the scholarship in this sample, with the exception of a higher probability of reaching 36 credits at the end of the second year, needed to have the scholarship also in the following year. And, of course, a positive effect on the probability of applying again. The lack of any other effect, especially on the enrollment and dropout, should not surprise: we are dealing with a particular sample of students who managed to reach year 2 of higher education, and that in the previous academic year completed already 36 credits. Dropping out at this stage is more costly than at the beginning of the first academic year, as these pupils already made it in the previous year without the scholarship, which means that this sub-sample is composed of motivated students who already passed one year of their bachelor: having or not the scholarship is "less important" in their decision to continue studying. These results are stable to the inclusion of the usual covariates. [29]

We investigated the heterogeneity of the results according to student gender, private or public university, and regions. The results are reported in Table A.9. We reported only the outcomes for which we find some interesting results (outcomes for which the effect of the scholarship is not significant are not reported). The results show that for female, receiving the scholarship at the beginning of the second year decrease the probability of dropout at the end of that year (column 18). We also see that the result on achieving at least 36 credits is driven by the male sample, by students in a private university, and by students coming from less developed regions (Columns 35, 36, and 38). Treated students in this last group (less developed regions) also show a higher probability of reaching all the credits, they were enrolled in (Column 46). However, we also find a negative probability of graduating. (Column 62). As for the probability of applying again the following academic year, the positive effect is valid for all the sub-samples, and coefficients are very similar in magnitude. So, for the second-year bachelor students, who apply for the scholarship for the first time, and who obtained at least 36 credits in the previous academic year, the scholarship seems to be less effective compared to what we found in the analysis of the first-year students. However, for some sub-samples, we still see some interesting effects.

[27] T=0.517 with p-value=0.605 and all covariates are not different on the two sides of the threshold.

[28] To test whether the probability of not being found differs between the treated and control groups, we run Equation 1 on the variable "Never found", and we do not find significant differences (Coefficient -0.004, with standard error 0.005)

[29] Tables not reported

Table 9: Main results, second year - RDD

	(1)	(2)	(3)	(4)	(5)
	Immediate dropout -B beginning of year 2	**Enrolled same course beginning of year 2**	**Enrolled other course beginning of year 2**	**Dropout end year 2**	**At least 36 credits end of year 2**
First stage	0.936***	0.936***	0.936***	0.936***	0.931***
	(0.010)	(0.010)	(0.009)	(0.011)	(0.011)
Robust	0.008	-0.007	-0.003	-0.023	0.054**
	(0.007)	(0.012)	(0.010)	(0.014)	(0.027)
Observations	[18817:4179]	[18817:4179]	[18817:4179]	[17200:3710]	[14812:3255]
Bandwidth	[1441:1441]	[1671:1671]	[1691:1691]	[1375:1375]	[1494:1494]
Effct. Observations	[3993:2047]	[4806:2283]	[4859:2300]	[3560:1775]	[3320:1626]
	(6)	(7)	(8)	(9)	(10)
	Reached enrolled credit end of year 2	**Graduated in time**	**Graduated**	**FInal mark**	**Apply next year**
First stage	0.931***	0.937***	0.937***	0.935***	0.937***
	(0.010)	(0.013)	(0.012)	(0.013)	(0.010)
Robust	0.040	-0.058	-0.037	0.087	0.446***
	(0.035)	(0.041)	(0.030)	(0.152)	(0.032)
Observations	[15331:3269]	[15675:3269]	[15675:3269]	[12411:2348]	[18859:4196]
Bandwidth	[1869:1869]	[1195:1195]	[1355:1355]	[1381:1381]	[1452:1452]
Effct. Observations	[4513:1918]	[2821:1442]	[3301:1579]	[2669:1185]	[4045:2069]

Note: The table reports RDD estimates of Eq. (1) on the sample of students who apply for the scholarship for the first time at the beginning of their second curricular year, and have obtained at least 36 credits at the end of the previous academic year, enrolled in a "Bachelor", which is equivalent to a bachelor degree. Eq. (1) is estimated with the optimal bandwidth, triangular kernel, and local linear polynomial. The coefficients reported are bias-corrected and robust standard errors are in parentheses. Each column is a different regression. *** p<0.01, ** p<0.05, * p<0.1.

5.2 RD-DID design approach

The second strategy combines regression discontinuity design on the per-capita income, taking into account that some students reached 36 credits, at the end of the first academic year, while others did not. This approach is also called "difference-in-discontinuities", as it combines features of regression discontinuity (RD) and difference-in-differences designs. The intuition is to compare discontinuities at the per-capita income threshold for students whose credits at the end of the first year are above or below 36. In simple words this accounts for running one regression discontinuity using per-capita income as running variable on the sample of students who in the previous year reached 36 credits, then another RDD using per-capita income as running variable on the sample of students who did not reach 36 credits in the previous year (despite nobody is actually treated in this sample) and then take the differences of these two estimates. The second regression discontinuity captures the effect of having an income above or below the threshold on the outcomes, in the sample of students whose number credits the previous year was too low. The assumption underneath this method is that the effect of per-capita income at the threshold is the same in the sample of students who reached and did not reach the 36credits in the previous year. In our setting, in order for the method to be valid, we also need to assume that the effect of the per-capita income at the threshold in the sample of students whose credits the previous year were too low, but still apply for the scholarship, is the same as it would be in the full sample (including students who do not apply).

Under this approach, we still need to assess that the running variable is continuous at the threshold, therefore, as in section 5.1 we rely on the sample of students who are the first applicants and who are enrolled in a Bachelor.[30] Different from the previous section, this sample includes also students who did not obtain 36 credits in the previous academic year, for a total of 26,346 students, divided as shown in Table 10 in the 4 groups. From the table, it is clear that the sample of students who apply, despite not being eligible due to high income and low credits, is definitely not representative of the true population. Therefore, when reading the results, we should keep in mind the characteristics of this selective sample. This is a problem that cannot be solved with the data we have, as to have a proper control group one would need to access data about all students, and not only applicants.

Table 10: Distribution of the RD-DID sample

	Credits below	Credits above	Total
Income above	616	4,196	4,812
Income below	2,503	18,859	21,362
Total	3,119	23,055	26,282

In this setting, the RDD is run parametrically. As we cannot used the methodology proposed by Calonico

[30]The assumptions of continuity in the income distribution at the eligibility threshold are validated by the density tests on this overall sub-sample, as well as in the sub-samples with credit above and below 36

et al. (2014) and Calonico et al. (2020) to identify the optimal bandwidth, we estimate the following equation using a series of different bandwidths. In more details, we estimate the following model:

$$\begin{aligned} Y_i =& \gamma_0 + \gamma_1(I\_below_i * C\_above_i) + \gamma_2(I\_below_i) + \gamma_3(C\_above_i) \\ &+ \gamma_4(I\_dist_i * I\_below_i * C\_above_i) + \gamma_5(I\_dist_i * I\_above_i * C\_above_i) \\ &+ \gamma_6(I\_dist_i * I\_below_i * C\_below_i) + \gamma_7(I\_dist_i * I\_above_i * C\_below_i) \\ &+ academic\_yearFE + \gamma_n X_i + \epsilon_i \end{aligned} \tag{2}$$

Where I_below_i (I_above_i)is a dummy variable taking value 1 if the per-capita income is below (above) the threshold; C_above_i (C_below_i) is a dummy variable taking value 1 if the credits obtained at the end of the first year are above (below) 36; I_dist_i is the absolute value of the distance of the student's per-capita income from the income threshold. In the analysis, we include academic year fixed effects, and the usual set of control variables (age, gender,region, and public or private university). The γ_1 in this regression measures the difference in the two RD estimates. As in the standard RDD, the effect found is local to students whose income is near the cutoff.

Equation 2 is estimated on 3 different bandwidths: the main one: (-1500;+1500), which is similar to the optimal bandwidth identified in the set of analyses on the first-year students, its half (-750;+750) and its double (-3000;+3000). Table 11 reports the three main coefficients of interest: γ_1, which identifies the effect of receiving the scholarship, γ_2 which captures the effect of having an income below the threshold, and γ_3 which captures the effect of having reached 36 credits in the previous academic year. In the regression we control for academic year fixed effect and the usual controls: age, gender, public or private university, region, and field of study.

Overall, there is no effect of getting the scholarship on any of the outcomes. Besides on the probability of applying again in the following year. However, we do see a negative impact of the scholarship on the probability of reaching 36 credits, which is valid only in the main bandwidth, and a negative effect on the probability of graduating in time, again valid only in the main bandwidth. (Table 11, column (14)).

Combining this result with the one found in the previous section (receiving the scholarship, in the sample of students who reached 36 credits in the previous year), showing a positive effect on the probability of reaching 36 credits at the end of the second year (Table 9, column (5)), we find that students who did not reach 36 credits at the end of the first year, but have a low income, have a higher incentive to reach 36 credits at the end of the second year, possibly to apply again and hopefully receiving the scholarship in the following year. This suggests that the merit base criteria, pushes all students whose income is below the threshold to reach 36 credits, but students who did not manage to receive the scholarship in the current year, due to few credits obtained in the previous year, and could be eligible the following year based on their low income, are even more motivated to reach the credits needed to obtain the scholarship in the following academic year. In other words, students whose per-capita is below the income threshold are always more likely to reach 36 credits, than students whose income is barely above, in both samples (the first one being composed by students who the previous year reached 36 credits, and the second one being composed by students who the previous year did not reach 36 credits); but this difference is higher among the students who in the previous year did not reach 36 credits, and so are not currently eligible for the scholarship.

The results on graduation time are in line with many other studies in the field. It can happen that students who have income support, tend to delay more the graduation, as they are covered by a scholarship, and can "afford" to spend more time at university compared to students who have to pay for themselves. However, these two results are barely significant and not robust to the different bandwidth choices.

Table 11: RD-DID results

	750	1500	3000	750	1500	3000
	(1)	(2)	(3)	(4)	(5)	(6)
	Immediate dropout start year 2			**Enrolled same course start year 2**		
Income below * credits above 36	0.040*	0.013	-0.002	-0.15	0.003	0.024
	(0.020)	(0.015)	(0.011)	(0.040)	(0.028)	(0.020)
Income below	-0.030	-0.006	0.005	-0.007	-0.004	-0.020
	(0.016)	(0.014)	(0.011)	(0.028)	(0.026)	(0.019)
Credits above 36	-0.004	-0.019	-0.002	0.043	0.046**	0.007
	(0.007)	(0.012)	(0.009)	(0.030)	(0.022)	(0.016)
Observations	3,547	7,086	14,806	3,547	7,086	14,806
	(7)	(8)	(9)	(10)	(11)	(12)
	Enrolled other course start year 2			**Dropout end year 2**		
Income below * credits above 36	-0.025	-0.016	-0.021	0.029	0.045	0.012
	(0.034)	(0.024)	(0.017)	(0.042)	(0.031)	(0.022)
Income below	0.018	0.010	0.015	-0.046	-0.055*	-0.021
	(0.032)	(0.022)	(0.016)	(0.039)	(0.029)	(0.021)
Credits above 36	-0.013	-0.027	-0.006	-0.172***	-0.138***	-0.132***
	(0.026)	(0.018)	(0.014)	(0.032)	(0.024)	(0.018)
Observations	3,547	7,086	14,806	3,265	6,560	13,759
	(13)	(14)	(15)	(16)	(17)	(18)
	At least 36 credits			**Reached enrolled credits**		
Income below * credits above 36	-0.081	-0.106*	-0.059	0.040	-0.003	-0.000
	(0.089)	(0.064)	(0.045)	(0.112)	(0.080)	(0.058)
Income below	0.123	0.164***	0.133***	0.013	0.028	0.034
	(0.084)	(0.060)	(0.043)	(0.106)	(0.076)	(0.054)
Credits above 36	0.343***	0.393***	0.394***	0.272***	0.265***	0.265***
	(0.068)	(0.050)	(0.037)	(0.085)	(0.062)	(0.047)
Observations	2,739	5,495	11,479	2,803	5,647	11,868
	(19)	(20)	(21)	(22)	(23)	(24)
	Graduated in time			**Graduated**		
Income below * credits above 36	-0.102	-0.127*	-0.046	-0.071	-0.096	-0.037
	(0.074)	(0.074)	(0.054)	(0.084)	(0.061)	(0.044)
Income below	0.058	0.089	0.020	-0.059	0.075	0.020
	(0.096)	(0.069)	(0.050)	(0.079)	(0.057)	(0.041)
Credits above 36	0.528***	0.512***	0.487***	0.450***	0.441***	0.393***
	(0.078)	(0.058)	(0.043)	(0.064)	(0.048)	(0.036)
Observations	3,014	6,090	12,780	3,014	6,090	12,780
	(25)	(26)	(27)	(28)	(29)	(30)
		Final mark			**Apply next year**	
Income below * credits above 36	-0.361	0.113	0.203	0.465***	0.338***	0.394***
	(0.508)	(0.365)	(0.263)	(0.086)	(0.060)	(0.042)
Income below	0.423	-0.049	-0.129	-0.040	0.080	0.047
	(0.490)	(0.352)	(0.253)	(0.080)	(0.056)	(0.039)
Credits above 36	1.387***	1.246***	1.192***	0.014	0.113**	0.090***
	(0.384)	(0.286)	(0.213)	(0.065)	(0.046)	(0.034)
Observations	2,221	4,461	9,421	3,562	7,112	14,859

Note: The table reports RD-DiD estimates of Eq. (2) on the sample of students who apply for the scholarship for the first time at the beginning of their second curricular year, enrolled in a "Bachelor", which is equivalent to a bachelor degree. Each column is a different regression, on the 10 outcomes, using 3 different bandwidths (750, 1500, 3000).Controls variable included in the regressions are: academic year FE, region, age, gender, public university and field of study. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

5.3 Difference in difference approach

Difference-in-differences in this setting will be used to compare students whose per-income is above or below the thresholds, and whose credits obtained in the previous academic year are above or below 36. Using this approach does not require continuity of the running variable at the threshold, therefore we can extend the analysis to the whole sample of students who apply to the scholarship at the beginning of their second curricular year. However, in order to have a meaningful comparison with Sections 5.1 and 5.2, we will first estimate the model on the same sample as in the previous two sections: second-year bachelor students, who apply for the scholarship the first time. Following Scott-Clayton and Schudde (2020), we allow for a very flexible relationship between per-capita income and outcomes, by including a set of per-capita income bins (with a width of 200 euro). The coefficient α_1 is the DiD estimate. As before, we estimate the model for different bandwidths of the running variable: while this is not necessary for a DiD model, we will do so to have a better comparison with the models in Sections 5.1 and 5.2 and to see what happens when one enlarge or restrict the sample used. We use the same bandwidths used previously.

$$\begin{aligned} Y_i =& \alpha_0 + \alpha_1(I\_below_i * C\_above_i) + \alpha_2(IncomeBin_i) + \alpha_3(C\_above_i) \\ &+ academic\_yearFE + \alpha_n X_i + \epsilon_i \end{aligned} \tag{3}$$

Notice that the estimated effect is similar to an "'intention-to-treat"', as there is non-compliance with the eligibility assignment, so there are treated students among the non-eligible and vice-versa.

This approach can be extended to the full sample of second-year students, including also pupils who are not first applicants and who are enrolled in a Master or Integrated master. Therefore, we can replicate the analysis in the full sample of second-year students, by type of degree. This sample includes 123,497 students, of which 99,254 are treated.

The DID requires stronger assumptions about the relationship between first-year income and subsequent outcomes, namely by assuming that whatever differences in potential outcomes exist between students whose credits in the first year are below 36, and those whose credits are above 36, these differences are fixed as we move across the range of per-capita income (after controlling for any differences in observable characteristics). We cannot use the usual common trend assumption, as we do not have pre-treatment outcomes, so we provide a covariates balance check, which tests if the treatment variable has any significant impact on background characteristics. (Pei et al., 2019))This test is reported in Table A.10 for the two samples used: the second-year Bachelor students applying for the scholarship for the first time (column 1), and the full sample. (column 2) [31]. While we see that in the first sample all covariates are balanced, in the full sample, there are some differences, mainly between types of degree. Therefore, we decided to run the covariate checks by type of degree, and indeed the picture looks better (Columns 3,4, and 5). Therefore we will run the model divided by type of degree, and not on the full sample.

Table 12, reports the result in the sample of Bachelor students who are the first applicants. In this particular sample, we see no effect of being eligible for scholarship on any outcomes, besides on the probability of applying again for the scholarship in the following year. Tables 13, 14, and 15 refer respectively to the full sample of Bachelor, Master and Integrated master students, including also non-first time applicants.

Interestingly, we see that in the full sample of Bachelor students (Table 13), being eligible for the scholarship has a negative effect on dropout at the beginning of the second year, which is valid only in the main bandwidth. Similarly, we also see a negative effect on dropout at the end of the second year, robust to all bandwidth choices. There is also an effect on the probability of being enrolled in the same course of application, as it was found in the first-year student analysis. As usual, being eligible for the scholarship also influences the likelihood of applying again. In the sample of Master or Integrated master students, we do not see any effect.[32] We do see a negative effect for the students in Integrated master on the probability of reaching 36 credits.

We run a heterogeneity analysis, focusing only on the sample of Bachelor students, where we do see some similar effects as in the full sample. Table A.11 reports the results. The effect on the immediate dropout is driven by females, public universities, and students in less developed regions. While the effect for dropout at the end of the second year is driven by males, and by students in less developed regions, the students from these regions who are eligible for the scholarship are also more likely to graduate. For students coming from regions in transition, we see a positive effect of the scholarship on the probability of reaching 36 credits, but also a positive effect on the probability of dropping out at the end of the second year. We also estimate differential effects for displaced and non-displaced students. As we found for the first year students, the effects are most evident for non-displaced students.

[31] In these estimations, we only use the 1,500 income bandwidth

[32] Some outcomes are not estimated for the Master students, as at the end of the second year they should finish their degree, so for example we do not have information about the credits obtained, and it doesn't make sense to estimate the probability of applying again for the scholarship in the following academic year.

As a further heterogeneity analysis, we included in the regression an interaction for the students who received the scholarship during the first academic year. This interaction is useful to understand whether there are differential effects for students taking the scholarship also in the first year. Equation 3 becomes:

$$\begin{aligned} Y_i =& \alpha_0 + \alpha_1(I\_below_i * C\_above_i) + \alpha_2(IncomeBin_i) + \alpha_3(C\_above_i) \\ & \alpha_4(I\_below_i * C\_above_i * T1_i) + \alpha_5 T1_i + academic\_yearFE + \alpha_n X_i + \epsilon_i \end{aligned} \tag{4}$$

Where $T1_i$ is dummy taking value 1 if the students were treated also in the previous year. So, α_1 captures the effect of being eligible to the scholarship in year 2, for those who did no get it in the previous year, while $\alpha_1 + \alpha_4$ captures the effect of being eligible in year 2 for those who also got the scholarship during the previous year. α_5 captures the effect of having received the scholarship in the first year, but not being eligible in the second year. (The reference group being those who never got the scholarship, nor in year 1 or in year 2) The results are reported in Table 16. [33] We see that being eligible for the scholarship at the beginning of the second year has a differential effect for students according to whether they received the scholarship the year before or not.

In the table, in the first row, we report the effect of being eligible for the scholarship in the second year, for students who received the scholarship also the year before, $(\alpha_1 + \alpha_4)$ and in the second row the effect for those who did not receive the scholarship the previous year (α_1). We see that the negative effect on immediate dropouts is driven by those students who had the scholarship also the year before. While the effect is 0 for students who received the scholarship for the first time in their second academic year. This result suggests that for the set of students who received the scholarship in their first year, it is really important to receive it also in the subsequent one, just to continue studying: losing the scholarship implies dropping out immediately, as it is shown by the coefficient associated with the variable $T1_i only$, receiving the scholarship in the first year only. Compared to the students who never got the grant,students who received the grant during the first year, but are not eligible any longer in the second year are more likely to drop out immediately.

On the other side, the negative effect on dropout at the end of the second year is negative for both sets of students and somehow larger for the ones who got the scholarship for the first time during their second year.

Another interesting result is the effect on credits: being eligible for the scholarship the second year increases the probability of reaching 36 credits for students who did not have it the previous year, and increases the probability of reaching all the enrolled credits for students who also had it the previous year. Finally, being eligible for the scholarship in the second year increases the probability of graduating only for students who had the scholarship also the year before. The effect on the probability of applying again is positive in both groups.

In table A.12 we report the usual heterogeneity analysis. Overall students coming from less developed regions show the higher benefits: lower dropout probabilities, and higher probabilities of graduating.

5.4 Discussion on the second year students

The analysis of the students beyond the first curricular year is more complicated as there are two eligibility conditions, but one of the conditions (having reached 36 credits) is also an outcome of the first-year scholarship. In this section, we used 3 main identification strategies, based on different assumptions and different samples.

The most interesting results come from the third method used, the difference-in-differences, which allow us to use the full sample and not only the one who applies for the first time at their second year (RDD and RD-DID methods, Sections 5.1 and 5.2) and who got at least 36 credits the year before (RDD method, section 5.1).[34] However, we must stress the fact that the sample used in the DiD section is most likely not representative of the real population of students, as it is composed by those who, despite not being eligible (both for income and credits), apply anyway.

In particular, we find that being eligible for the scholarship at the beginning of the second year has negative effects on dropouts probabilities for Bachelor students. No effects are found for Master or Integrated master students. The magnitude of the estimates is quite small, for what regard immediate dropout (1p.p, while for example Scott-Clayton and Schudde (2020) finds a 6 p.p effect on probability of enrolling in the second year for students of eligible for the Pell grant who passed the merit threshold. However, the effect they find is null for students whose GPA is very low.) They also find a small effect on probability of completing the degree (2 p.p.) which in magnitude is similar to our point estimate, which is however not statistically significant, and smaller than what we find in the sample of students who are eligible for the scholarship for both first and second year (4.8 p.p)

If we take into account differential effects for those who received the scholarship also the previous academic year, we find that being eligible for the second year scholarship for those who had the scholarship the year before

[33] We report the results only for the sample of Bachelor students, as no effects are identified in the other two types of degree.

[34] In these two very selected samples we basically finds an effect only on the probability or reaching 36 credits, which is the minimum necessary to renew the scholarship in the following year.

Table 12: DID estimates- sample of bachelor students, second year first applicants

	750	1500	3000	750	1500	3000
	(1)	(2)	(3)	(4)	(5)	(6)
	Immediate dropout start of year 2			**Enrolled same course start of year 2**		
Income below* credits above 36	0.003	-0.001	0.003	0.021	0.021	0.010
	(0.010)	(0.008)	(0.006)	(0.020)	(0.014)	(0.011)
Credits above 36	-0.010	-0.003	-0.009*	0.025	0.002	0.006
	(0.008)	(0.006)	(0.005)	(0.015)	(0.012)	(0.009)
Observations	3,547	7,086	14,806	3,547	7,086	14,806
	(7)	(8)	(9)	(10)	(11)	(12)
	Enrolled other course start of year 2			**Dropout end of year 2**		
Income below* credits above 36	-0.024	-0.019	-0.012	0.021	-0.001	-0.004
	(0.017)	(0.012)	(0.009)	(0.021)	(0.016)	(0.012)
Credits above 36	-0.015	0.001	0.002	-0.132***	-0.125***	-0.115***
	(0.013)	(0.010)	(0.008)	(0.016)	(0.013)	(0.010)
Observations	3,547	7,086	14,806	3,265	6,560	13,759
	(13)	(14)	(15)	(16)	(17)	(18)
	At least 36 credits end of year 2			**Reached enrolled credits end of year**		
Income below* credits above 36	-0.049	0.023	0.039	0.006	0.011	0.015
	(0.043)	(0.032)	(0.024)	(0.056)	(0.040)	(0.030)
Credits above 36	0.377***	0.352***	0.333***	0.261***	0.254***	0.240***
	(0.034)	(0.026)	(0.021)	(0.044)	(0.033)	(0.026)
Observations	2,739	5,495	11,479	2,803	5,647	11,868
	(19)	(20)	(21)	(22)	(23)	(24)
		Graduated in time			**Graduated**	
Income below* credits above 36	-0.044	-0.003	0.007	-0.048	0.012	0.022
	(0.051)	(0.038)	(0.028)	(0.042)	(0.031)	(0.024)
Credits above 36	0.474***	0.442***	0.411***	0.405***	0.366***	0.342***
	(0.040)	(0.031)	(0.025)	(0.033)	(0.025)	(0.021)
Observations	3,014	6,090	12,780	3,014	6,090	12,780
	(25)	(26)	(27)	(28)	(29)	(30)
		Final mark			**Apply next year**	
Income below* credits above 36	0.207	0.060	-0.008	0.345***	0.415***	0.401***
	(0.250)	(0.182)	(0.139)	(0.043)	(0.030)	(0.022)
Credits above 36	1.211***	1.245***	1.286***	0.109***	0.062**	0.040**
	(0.198)	(0.148)	(0.121)	(0.033)	(0.025)	(0.019)
Observations	2,221	4,461	9,421	3,562	7,112	14,859

Note: The table reports DiD estimates of Eq. (3) on the sample of students who apply for the scholarship for the first time at the beginning of their second curricular year, enrolled in a "Bachelor", which is equivalent to a bachelor degree. Each column is a different regression, on the 10 outcomes, using 3 different bandwidths (750, 1500, 3000). Control variables included in the regressions are: academic year FE,region, age, gender, public university and field of study and income bins. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 13: DID estimates- sample of bachelor students, second year

	750	1500	3000	750	1500	3000
	(1)	(2)	(3)	(4)	(5)	(6)
	Immediate dropout start of year 2			**Enrolled same course start of year 2**		
Income below* credits above 36	-0.000	-0.010**	-0.005	0.004	0.020**	0.012*
	(0.006)	(0.004)	(0.003)	(0.012)	(0.009)	(0.007)
Credits above 36	-0.002	0.001	-0.004	0.010	-0.003	0.002
	(0.004)	(0.004)	(0.003)	(0.010)	(0.008)	(0.006)
Observations	9,618	20,297	46,898	9,618	20,297	46,898
	(7)	(8)	(9)	(10)	(11)	(12)
	Enrolled other course start of year 2			**Dropout end of year 2**		
Income below* credits above 36	-0.004	-0.010	-0.007	-0.043***	-0.020**	-0.031***
	(0.011)	(0.008)	(0.006)	(0.014)	(0.010)	(0.008)
Credits above 36	-0.008	0.002	0.001	-0.083***	-0.104***	-0.091***
	(0.009)	(0.007)	(0.005)	(0.011)	(0.009)	(0.007)
Observations	9,618	20,297	46,898	7,974	16,882	39,049
	(13)	(14)	(15)	(16)	(17)	(18)
	At least 36 credits end of year 2			**Reached enrolled credits end of year**		
Income below* credits above 36	0.005	0.024	0.017	0.008	0.025	0.028
	(0.024)	(0.018)	(0.014)	(0.038)	(0.028)	(0.022)
Credits above 36	0.341***	0.338***	0.343***	0.296***	0.291***	0.287***
	(0.020)	(0.016)	(0.013)	(0.030)	(0.024)	(0.020)
Observations	8,098	17,185	40,080	7,926	16,822	39,151
	(19)	(20)	(21)	(22)	(23)	(24)
	Graduated in time			**Graduated**		
Income below* credits above 36	-0.027	0.001	0.006	-0.008	0.023	0.025
	(0.038)	(0.028)	(0.022)	(0.032)	(0.024)	(0.019)
Credits above 36	0.452***	0.433***	0.425***	0.396***	0.382***	0.376***
	(0.031)	(0.024)	(0.020)	(0.026)	(0.021)	(0.017)
Observations	6,470	13,691	31,707	6,470	13,691	31,707
	(25)	(26)	(27)	(28)	(29)	(30)
	Final mark			**Apply next year**		
Income below* credits above 36	0.151	0.023	-0.008	0.310***	0.322***	0.334***
	(0.183)	(0.135)	(0.106)	(0.027)	(0.019)	(0.014)
Credits above 36	1.195***	1.229***	1.262***	0.138***	0.106***	0.081***
	(0.146)	(0.114)	(0.095)	(0.022)	(0.017)	(0.013)
Observations	4,612	9,681	22,350	9,637	20,336	46,979

Note: The table reports DiD estimates of Eq. (3) on the full sample of students who apply for the scholarship at the beginning of their second curricular year, enrolled in a "Bachelor", which is equivalent to a Bachelor degree. Each column is a different regression, on the 10 outcomes, using 3 different bandwidths (750, 1500, 3000). Control variables included in the regressions are: academic year FE,region, age, gender, public university and field of study and income bins. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 14: DID estimates- sample of master students, second year

	750	1500	3000	750	1500	3000
	(1)	(2)	(3)	(4)	(5)	(6)
	Immediate dropout start of year 2			**Enrolled same course start of year 2**		
Income below* credits above 36	-0.019	0.001	-0.011	-0.009	-0.028	0.007
	(0.012)	(0.010)	(0.008)	(0.030)	(0.023)	(0.017)
Credits above 36	0.008	-0.006	0.002	-0.002	0.022	0.005
	(0.010)	(0.008)	(0.007)	(0.024)	(0.019)	(0.015)
Observations	2,783	5,994	13,597	2,783	5,994	13,597
	(7)	(8)	(9)	(10)	(11)	(12)
	Enrolled other course start of year 2			**Dropout end of year 2**		
Income below* credits above 36	0.026	0.037**	0.019	-0.018	0.042	0.003
	(0.023)	(0.017)	(0.013)	(0.071)	(0.050)	(0.038)
Credits above 36	-0.018	-0.030**	-0.018	-0.036	-0.033	-0.076**
	(0.018)	(0.015)	(0.012)	(0.057)	(0.042)	(0.034)
Observations	2,783	5,994	13,597	2,270	4,926	11,198
	(13)	(14)	(15)	(16)	(17)	(18)
	Graduated in time			**Graduated**		
Income below* credits above 36	-0.022	-0.047	-0.060	-0.043	-0.069	-0.046
	(0.080)	(0.055)	(0.042)	(0.077)	(0.053)	(0.040)
Credits above 36	0.041	0.064	0.111***	0.097	0.105**	0.145***
	(0.063)	(0.046)	(0.037)	(0.061)	(0.045)	(0.036)
Observations	2,274	4,935	11,221	2,274	4,935	11,221
	(19)	(20)	(21)			
	Final mark					
Income below* credits above 36	-0.028	-0.174	-0.273			
	(0.298)	(0.212)	(0.172)			
Credits above 36	0.383	0.534***	0.703***			
	(0.239)	(0.180)	(0.154)			
Observations	1,378	2,923	6,565			

Note: The table reports DiD estimates of Eq. (3) on the full sample of students who apply for the scholarship at the beginning of their second curricular year, enrolled in a "Master", Each column is a different regression, on the 7 outcomes, using 3 different bandwidths (750, 1500, 3000). Control variables included in the regressions are: academic year FE,region, age, gender, public university and field of study and income bins. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

has negative effects on immediate drop out probabilities, and positive effects on the credits obtained at the end of the year, and on the graduation probabilities. These effects are larger for female students (credits) and for students coming from less developed regions. and enrolled in public universities. Students who are eligible for the scholarship in the second year, despite not having received it during the first year, are still less likely to drop out immediately(in less developed regions only), or drop out at the end of the second year (especially male, from less developed regions and enrolled in public universities), and of reaching the 36 credits (female and students from private universities).

Table 15: DID estimates- sample of Integrated master students, second year

	750	1500	3000	750	1500	3000
	(1)	(2)	(3)	(4)	(5)	(6)
	Immediate dropout start of year 2			**Enrolled same course start of year 2**		
Income below* credits above 36	-0.010	-0.009	-0.009	0.007	-0.009	-0.002
	(0.010)	(0.006)	(0.006)	(0.022)	(0.016)	(0.012)
Credits above 36	0.004	0.001	0.000	-0.020	-0.002	0.001
	(0.007)	(0.005)	(0.005)	(0.017)	(0.014)	(0.010)
Observations	1,373	2,878	6,301	1,373	2,878	6,301
	(7)	(8)	(9)	(10)	(11)	(12)
	Enrolled other course start of year 2			**Dropout end of year 2**		
Income below* credits above 36	0.003	0.018	0.011	0.020	0.026	0.001
	(0.020)	(0.015)	(0.010)	(0.029)	(0.020)	(0.015)
Credits above 36	0.017	0.001	-0.001	-0.067***	-0.110***	-0.086***
	(0.016)	(0.012)	(0.009)	(0.022)	(0.016)	(0.013)
Observations	1,373	2,878	6,301	1,145	2,400	5,296
	(13)	(14)	(15)	(16)	(17)	(18)
	At least 36 credits end of year 2			**Reached enrolled credits end of year**		
Income below* credits above 36	-0.094	-0.115***	-0.055*	-0.102	-0.099	-0.031
	(0.059)	(0.044)	(0.032)	(0.098)	(0.070)	(0.052)
Credits above 36	0.454***	0.448***	0.430***	0.445***	0.432***	0.415***
	(0.045)	(0.036)	(0.029)	(0.074)	(0.058)	(0.047)
Observations	1,210	2,570	5,643	1,167	2,478	5,431
	(19)	(20)	(21)	(22)	(23)	(24)
	Graduated in time			**Graduated**		
Income below* credits above 36	0.051	-0.077	-0.008	0.044	-0.122	-0.074
	(0.141)	(0.096)	(0.070)	(0.137)	(0.094)	(0.068)
Credits above 36	0.309***	0.377***	0.322***	0.356***	0.446***	0.383***
	(0.101)	(0.078)	(0.062)	(0.099)	(0.076)	(0.061)
Observations	498	1,020	2,225	498	1,020	2,225
	(25)	(26)	(27)	(28)	(29)	(30)
	Final mark			**Apply next year**		
Income below* credits above 36	1.136	0.769	-0.399	0.221***	0.150***	0.202***
	(0.994)	(0.780)	(0.455)	(0.069)	(0.047)	(0.033)
Credits above 36	0.002	0.253	1.527***	0.189***	0.177***	0.154***
	(0.725)	(0.702)	(0.413)	(0.053)	(0.039)	(0.030)
Observations	277	548	1,176	1,377	2,883	6,310

Note: The table reports DiD estimates of Eq. (3) on the full sample of students who apply for the scholarship at the beginning of their second curricular year, enrolled in a "Integrated master". Each column is a different regression, on the 10 outcomes, using 3 different bandwidths (750, 1500, 3000). Control variables included in the regressions are: academic year FE, region, age, gender, public university and field of study, and income bins. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 16: DID estimates- sample of Bachelor students, heterogeneity by first year scholarship

	750	1500	3000	750	1500	3000
	(1)	(2)	(3)	(4)	(5)	(6)
	Immediate dropout start of year 2			**Enrolled same course start of year 2**		
Income below* credits above 36	-0.002	-0.013***	-0.008**	-0.004	0.017*	0.012*
for scholarship in year 1	(0.006)	(0.004)	(0.003)	(0.013)	(0.009)	(0.007)
Income below* credits above 36	0.001	-0.007	-0.001	0.008	0.021**	0.010
for NO scholarship in year 1	(0.006)	(0.004)	(0.003)	(0.013)	(0.009)	(0.007)
Scholarship in year 1	0.004	0.004*	0.005***	0.012*	0.010**	0.005
	(0.003)	(0.002)	(0.002)	(0.006)	(0.005)	(0.004)
Observations	9,618	20,297	46,898	9,618	20,297	46,898
	(7)	(8)	(9)	(10)	(11)	(12)
	Enrolled other course start of year 2			**Dropout end of year 2**		
Income below* credits above 36	0.006	-0.004	-0.004	-0.039***	-0.015	-0.028***
for scholarship in year 1	(0.012)	(0.008)	(0.006)	(0.015)	(0.011)	(0.008)
Income below* credits above 36	-0.009	-0.014	-0.009	-0.047***	-0.023**	-0.033***
for NO scholarship in year 1	(0.011)	(0.008)	(0.006)	(0.014)	(0.011)	(0.008)
Scholarship in year 1	-0.016***	-0.014***	-0.009***	-0.002	-0.012**	-0.010**
	(0.006)	(0.004)	(0.003)	(0.008)	(0.006)	(0.005)
Observations	9,618	20,297	46,898	7,974	16,882	39,049
	(13)	(14)	(15)	(16)	(17)	(18)
	At least 36 credits end of year 2			**Reached enrolled credits end of year**		
Income below* credits above 36	-0.007	0.006	0.000	0.027	0.049*	0.059***
for scholarship in year 1	(0.026)	(0.019)	(0.014)	(0.040)	(0.029)	(0.022)
Income below* credits above 36	0.013	0.040**	0.032**	-0.006	0.002	-0.013
for NO scholarship in year 1	(0.025)	(0.019)	(0.014)	(0.039)	(0.029)	(0.023)
Scholarship in year 1	0.018	0.032***	0.043***	-0.025	-0.038**	-0.032***
	(0.012)	(0.009)	(0.007)	(0.019)	(0.015)	(0.012)
Observations	8,098	17,185	40,080	7,926	16,822	39,151
	(19)	(20)	(21)	(22)	(23)	(24)
	Graduated in time			**Graduated**		
Income below* credits above 36	0.008	0.026	0.032	0.018	0.048*	0.062***
for scholarship in year 1	(0.042)	(0.031)	(0.023)	(0.035)	(0.026)	(0.020)
Income below* credits above 36	-0.046	-0.014	-0.015	-0.024	0.007	-0.004
for NO scholarship in year 1	(0.039)	(0.029)	(0.023)	(0.033)	(0.025)	(0.019)
Scholarship in year 1	-0.039*	-0.032*	-0.030**	-0.022	-0.033**	-0.044***
	(0.023)	(0.018)	(0.013)	(0.019)	(0.015)	(0.012)
Observations	6,470	13,691	31,707	6,470	13,691	31,707
	(25)	(26)	(27)	(28)	(29)	(30)
		Final mark			**Apply next year**	
Income below* credits above 36	0.213	0.037	0.006	0.234***	0.259***	0.278***
for scholarship in year 1	(0.193)	(0.143)	(0.112)	(0.029)	(0.020)	(0.015)
Income below* credits above 36	0.110	0.000	-0.046	0.342***	0.356***	0.365***
for NO scholarship in year 1	(0.187)	(0.139)	(0.108)	(0.028)	(0.020)	(0.015)
Scholarship in year 1	-0.047	0.033	0.058	0.172***	0.168***	0.160***
	(0.089)	(0.071)	(0.058)	(0.014)	(0.011)	(0.008)
Observations	4,612	9,681	22,350	9,637	20,336	46,979

Note: The table reports DiD estimates of Eq. (4) on the full sample of students who apply for the scholarship at the beginning of their second curricular year, enrolled in a "Bachelor", which corresponds to a Bachelor degree. Each column is a different regression, on the 10 outcomes, using 3 different bandwidths (750, 1500, 3000). Control variables included in the regressions are: academic year FE,region, age, gender, public university and field of study and income bins. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

6 Conclusions

In this report, we study the effectiveness of a higher education grant, awarded to Portuguese students, whose per-capita income is below a pre-defined threshold. From the second year onward, to receive the grant, the students also need to have completed at least 36 credits in the previous academic year. The grant covers the tuition fee of the university and provides additional financial support according to the per-capita income. (Poorer students receive more funding). The report first analyzes the impact of the scholarship for first-year students, who apply for the first time, and then it also covers second-year students. While for the first part of the analysis is possible to use Regression discontinuity design method, the analysis of the second-year students relies on difference-in-difference methodology.

Overall the scholarship has small but significant effects on:

— Reducing dropouts (immediate, end of first and second year)

— Increase probabilities of reaching at least 36 credits (need to get the scholarship also in the following year) and of reaching all credits the students are enrolled in

— Increase probability of graduating in time

— Increase probability of graduating (in some cases)

The effects are different according to students' characteristics: male students show higher effects in terms of dropouts, while females show higher effects on the credits obtained; students coming from less developed regions show higher effects for drop out and graduation rate and time, and most of the effects on dropouts are concentrated on bachelor students.

Receiving the scholarship for more than one year also has incremental effects: the more years the students can benefit from the scholarship, the better are the outcomes. We also observe that the merit requirement pushes students to reach the credits needed to have the scholarship again the following year, which pushes also other results

The methodologies used have both some positive and negative features:

— Regression discontinuity is very credible but very local: what we found is limited to the students who are close to the threshold: we cannot know what is the effect for the "very" poor students.

— Regression discontinuity relies on "continuity" of the running variable (per-capita income): having access only to the sample of applicants was a limitation in this respect, as the method could not be applied beyond first applicants. Many students are not used in the analysis (e.g. master students, who applied in the past for the scholarship during the Bachelor)

— The difference-in-difference analysis used to study the effects for the second year is based on a very selected sample: students who apply, despite having low credits and high income

The results we find could be expanded with more updated data, and data which could provide information about the credits and the final mark for everyone, and information about the current curricular year in which students are enrolled. In particular, the following points are suggested:

— Having access to outcome data for the most recent years would help check the robustness of the results found for the longer terms outcome (graduation, etc..) 2018, 2019, 2020 (and now also 2021)

— Knowing additional info such as: current year enrolled, and credits and final mark for ALL students (not only the ones enrolled in the same course of application) would help to have a clearer picture on the results on credits, and on progression and on the probability of repeating a year.

— Both would help to study the progression of students from Bachelor to Master, now based on a limited sample (2012 and 2013). And have a clearer picture for students in the Integrated master.

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Additional Tables

Table A.1: Placebo fake thresholds

	(4) -4000	(3) -3000	(2) -2000	(1) -1000	(5) 1000	(6) 2000	(7) 3000	(8) 4000
Immediate dropout	0.003	-0.001	0.006	0.002	-0.001	-0.018	0.015	0.016
	(0.006)	(0.003)	(0.004)	(0.007)	(0.016)	(0.014)	(0.013)	(0.028)
Observations	[18473:61652]	[38796:41329]	[56287:23838]	[70020:10105]	[5860:8979]	[9605:5234]	[12089:2750]	[13680:1159]
Bandwidth	[251:251]	[747:747]	[609:609]	[318:318]	[315:315]	[631:631]	[452:452]	[394:394]
Effect. observations	[5120:5144]	[15164:13380]	[10259:8919]	[3878:3593]	[1513:1372]	[2158:1660]	[1019:791]	[561:505]
Immediate dropout-B	0.004	-0.003	0.009**	-0.003	-0.005	-0.004	-0.002	-0.001
	(0.004)	(0.003)	(0.004)	(0.005)	(0.010)	(0.010)	(0.008)	(0.017)
Observations	[18396:61348]	[38629:41115]	[56053:23691]	[69704:10040]	[5797:8870]	[9490:5177]	[11953:2714]	[13523:1144]
Bandwidth	[292:292]	[612:612]	[441:441]	[299:299]	[345:345]	[670:670]	[522:522]	[496:496]
Effect. observations	[5939:5958]	[12311:11033]	[7283:6569]	[3629:3366]	[1645:1454]	[2294:1745]	[1185:887]	[714:625]
Never found	-0.002	0.000	-0.001	0.005	0.002	-0.014	0.014	0.016
	(0.004)	(0.002)	(0.003)	(0.005)	(0.011)	(0.010)	(0.010)	(0.021)
Observations	[18473:61652]	[38796:41329]	[56287:23838]	[70020:10105]	[5860:8979]	[9605:5234]	[12089:2750]	[13680:1159]
Bandwidth	[292:292]	[600:600]	[598:598]	[325:325]	[364:364]	[588:588]	[504:504]	[364:364]
Effect. observations	[5959:5985]	[12152:10854]	[10070:8781]	[3973:3661]	[1779:1564]	[1983:1548]	[1146:867]	[516:468]
Enrolled same course	0.004	-0.008	-0.015**	0.006	0.015	0.007	0.002	0.049
	(0.007)	(0.006)	(0.006)	(0.010)	(0.017)	(0.016)	(0.024)	(0.042)
Observations	[18396:61348]	[38629:41115]	[56053:23691]	[69704:10040]	[5797:8870]	[9490:5177]	[11953:2714]	[13523:1144]
Bandwidth	[422:422]	[669:669]	[717:717]	[393:393]	[313:313]	[960:960]	[557:557]	[257:257]
Effect. observations	[8571:8652]	[13448:12012]	[12213:10221]	[4810:4348]	[1469:1334]	[3496:2371]	[1267:929]	[351:339]
Enrolled other course	-0.008	0.002	0.004	-0.013*	0.002	-0.004	0.000	-0.028
	(0.006)	(0.004)	(0.005)	(0.008)	(0.012)	(0.013)	(0.016)	(0.023)
Observations	[18396:61348]	[38629:41115]	[56053:23691]	[69704:10040]	[5797:8870]	[9490:5177]	[11953:2714]	[13523:1144]
Bandwidth	[334:334]	[807:807]	[501:501]	[303:303]	[344:344]	[929:929]	[846:846]	[285:285]
Effect. observations	[6739:6854]	[16291:14272]	[8333:7367]	[3683:3402]	[1639:1447]	[3341:2298]	[2039:1356]	[394:373]
Dropout end year 1	0.023*	-0.016**	0.005	0.004	0.001	-0.012	0.040	-0.021
	(0.013)	(0.008)	(0.009)	(0.015)	(0.023)	(0.022)	(0.025)	(0.046)
Observations	[14735:50636]	[31388:33983]	[45747:19624]	[57039:8332]	[4705:7315]	[7726:4294]	[9748:2272]	[11059:961]
Bandwidth	[239:239]	[649:649]	[688:688]	[348:348]	[345:345]	[754:754]	[764:764]	[434:434]
Effect. observations	[3879:3972]	[10777:9610]	[9585:8181]	[3480:3233]	[1352:1174]	[2149:1595]	[1468:1050]	[514:445]
At least 36 credits	0.009	0.008	-0.008	-0.009	0.014	0.024	-0.015	0.098
	(0.018)	(0.010)	(0.013)	(0.023)	(0.037)	(0.037)	(0.050)	(0.075)
Observations	[15767:54183]	[33662:36288]	[49028:20922]	[61088:8862]	[4433:6482]	[7188:3727]	[8985:1930]	[10124:791]
Bandwidth	[254:254]	[782:782]	[651:651]	[300:300]	[422:422]	[653:653]	[628:628]	[273:273]
Effect. observations	[4530:4551]	[14020:12229]	[9695:8289]	[3225:2984]	[1579:1330]	[1665:1243]	[1052:766]	[268:248]
Reach enrolled credits	0.014	-0.019	-0.031*	-0.031	0.018	0.020	0.004	0.083
	(0.021)	(0.019)	(0.018)	(0.034)	(0.058)	(0.044)	(0.052)	(0.091)
Observations	[15585:53329]	[33223:35691]	[48358:20556]	[60231:8683]	[4380:6439]	[7102:3717]	[8894:1925]	[10028:791]
Bandwidth	[445:445]	[550:550]	[778:778]	[276:276]	[295:295]	[842:842]	[885:885]	[400:400]
Effect. observations	[7769:7910]	[9656:8638]	[11528:9544]	[2902:2708]	[1041:946]	[2194:1546]	[1553:1029]	[398:339]
Graduated	-0.016	0.014	0.041	-0.038	0.050	-0.008	0.002	-0.018
	(0.032)	(0.024)	(0.026)	(0.044)	(0.060)	(0.064)	(0.063)	(0.123)
Observations	[7378:29479]	[16694:20163]	[25117:11740]	[31816:5041]	[2695:4312]	[4451:2556]	[5630:1377]	[6425:582]
Bandwidth	[354:354]	[624:624]	[617:617]	[292:292]	[455:455]	[609:609]	[772:772]	[346:346]
Effect. observations	[3024:3221]	[5883:5402]	[5006:4380]	[1770:1668]	[1071:892]	[983:767]	[872:652]	[236:217]
Graduated In time	-0.053	0.009	0.028	-0.015	0.055	0.045	0.007	-0.171
	(0.034)	(0.025)	(0.023)	(0.042)	(0.061)	(0.064)	(0.069)	(0.113)
Observations	[7378:29479]	[16694:20163]	[25117:11740]	[31816:5041]	[2695:4312]	[4451:2556]	[5630:1377]	[6425:582]
Bandwidth	[289:289]	[564:564]	[802:802]	[324:324]	[395:395]	[569:569]	[623:623]	[346:346]
Effect. observations	[2482:2621]	[5307:4906]	[6620:5508]	[1963:1846]	[910:784]	[906:720]	[667:534]	[236:217]
Apply next year	-0.017	0.014	0.022	0.001	0.031	0.017	0.022	-0.022
	(0.021)	(0.011)	(0.014)	(0.019)	(0.046)	(0.039)	(0.038)	(0.063)
Observations	[18473:61652]	[38796:41329]	[56287:23838]	[70020:10105]	[5860:8979]	[9605:5234]	[12089:2750]	[13680:1159]
Bandwidth	[253:253]	[586:586]	[531:531]	[415:415]	[331:331]	[621:621]	[844:844]	[371:371]
Effect. observations	[5158:5175]	[11836:10628]	[8862:7827]	[5136:4609]	[1592:1424]	[2118:1639]	[2045:1372]	[524:477]
Final mark	-0.048	-0.053	0.093	-0.043	0.151	0.406	0.794**	-1.302*
	(0.178)	(0.111)	(0.097)	(0.181)	(0.273)	(0.294)	(0.370)	(0.734)
Observations	[3799:15947]	[8796:10950]	[13440:6306]	[17014:2732]	[1313:2015]	[2150:1178]	[2714:614]	[3055:273]
Bandwidth	[225:225]	[522:522]	[899:899]	[341:341]	[434:434]	[553:553]	[399:399]	[322:322]
Effect. observations	[970:1042]	[2723:2474]	[4132:3291]	[1064:1032]	[494:395]	[425:335]	[205:159]	[86:98]

Table A.2: Difference polynomial choice

	(1)	(2)	(3)	(4)	(5)	(6)
	Immediate dropout		**Immediate dropout -B**		**Never Found**	
Robust	-0.020***	-0.023***	-0.010**	-0.012**	-0.008**	-0.010**
	(0.007)	(0.007)	(0.005)	(0.005)	(0.004)	(0.005)
Observations	[80125:14839]	[80125:14839]	[79744:14667]	[79744:14667]	[80125:14839]	[80125:14839]
Bandwidth	[1787:1787]	[2425:2425]	[2189:2189]	[2658:2658]	[2120:2120]	[2516:2516]
Effect. observations	[20569:8963]	[30882:10764]	[26777:10016]	[34823:11207]	[25767:9965]	[32438:10986]
Order Loc. Poly. (p)	2	3	2	3	2	3
Order Bias (q)	3	4	3	4	3	4
	(7)	(8)	(9)	(10)	(11)	(12)
	Enrolled same course		**Enrolled other course**		**Dropout end year1**	
Robust	0.029***	0.029***	-0.019***	-0.022***	-0.019	-0.021
	(0.009)	(0.011)	(0.007)	(0.007)	(0.012)	(0.014)
Observations	[79744:14667]	[79744:14667]	[79744:14667]	[79744:14667]	[65371:12020]	[65371:12020]
Bandwidth	[2198:2198]	[2400:2400]	[2040:2040]	[2813:2813]	[1741:1741]	[2269:2269]
Effect. observations	[26915:10034]	[30320:10579]	[24318:9613]	[37575:11562]	[16340:7068]	[23224:8336]
Order Loc. Poly. (p)	2	3	2	3	2	3
Order Bias (q)	3	4	3	4	3	4
	(13)	(14)	(15)	(16)	(17)	(18)
	At leaast 36 credits		**Reach enrolled credits**		**Graduated in time**	
Robust	0.025	0.027	0.046**	0.065**	0.081**	0.084*
	(0.016)	(0.018)	(0.022)	(0.027)	(0.034)	(0.044)
Observations	[69950:10915]	[69950:10915]	[68914:10819]	[68914:10819]	[36857:7007]	[36857:7007]
Bandwidth	[2357:2357]	[2761:2761]	[2396:2396]	[2610:2610]	[1582:1582]	[1615:1615]
Effect. observations	[26095:7902]	[32349:8617]	[26263:7885]	[29447:8258]	[8699:3835]	[8926:3881]
Order Loc. Poly. (p)	2	3	2	3	2	3
Order Bias (q)	3	4	3	4	3	4
	(19)	(20)	(21)	(22)	(23)	(24)
	Graduated		**Final Mark**		**Apply next yar**	
Robust	0.045	0.041	0.245*	0.284*	0.404***	0.394***
	(0.032)	(0.041)	(0.136)	(0.162)	(0.019)	(0.022)
Observations	[36857:7007]	[36857:7007]	[19746:3328]	[19746:3328]	[80125:14839]	[80125:14839]
Bandwidth	[1924:1924]	[1881:1881]	[1784:1784]	[2132:2132]	[2102:2102]	[2345:2345]
Effect. observations	[11161:4337]	[10842:4282]	[5449:2000]	[6897:2228]	[25490:9913]	[29531:10560]
Order Loc. Poly. (p)	2	3	2	3	2	3
Order Bias (q)	3	4	3	4	3	4

Table A.3: Heterogeneity first year students

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Main	Female	Male	Private	Public	Bachelor	Master	Mestrado int	Less dev	Transition	Dev
Immediate drop out	-0.017***	-0.016**	-0.015*	0.022	-0.020***	-0.018***	-0.010	-0.004	-0.021***	-0.017	-0.015
	(0.006)	(0.007)	(0.009)	(0.021)	(0.006)	(0.006)	(0.020)	(0.015)	(0.007)	(0.014)	(0.013)
Observations	[80125:14839]	[51477:9061]	[28648:5778]	[6894:1499]	[73231:13340]	[65512:11143]	[6078:1612]	[8535:2084]	[62790:10958]	[4553:914]	[11977:2808]
Bandwidth	[1222:1222]	[1473:1473]	[1423:1423]	[1342:1342]	[1321:1321]	[1440:1440]	[1861:1861]	[1197:1197]	[1090:1090]	[906:906]	[1211:1211]
Effect. observations	[12775:6832]	[9923:4862]	[5876:2915]	[1287:692]	[12783:6562]	[12223:5934]	[2031:914]	[1513:925]	[8537:4741]	[504:343]	[2136:1173]
	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
	Main	Female	Male	Private	Public	Bachelor	Master	Mestrado int	Less dev	Transition	Dev
Immediate drop out-B	-0.010**	-0.006	-0.016**	0.017	-0.011***	-0.011***	-0.013	0.003	-0.009*	-0.003	-0.015**
	(0.004)	(0.004)	(0.008)	(0.019)	(0.004)	(0.004)	(0.015)	(0.010)	(0.005)	(0.007)	(0.008)
Observations	[79744:14667]	[51233:8955]	[28511:5712]	[6827:1479]	[72917:13188]	[65203:11008]	[6025:1584]	[8516:2075]	[62496:10838]	[4534:906]	[11915:2766]
Bandwidth	[1402:1402]	[1845:1845]	[1299:1299]	[1326:1326]	[1869:1869]	[1562:1562]	[1926:1926]	[1190:1190]	[1351:1351]	[1038:1038]	[1846:1846]
Effect. observations	[14956:7486]	[13263:5566]	[5235:2691]	[1237:678]	[19774:8253]	[13486:6227]	[2075:913]	[1499:917]	[11006:5474]	[592:378]	[3485:1628]
	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)
	Main	Female	Male	Private	Public	Bachelor	Master	Mestrado int	Less dev	Transition	Dev
Never found	-0.007**	-0.011**	-0.001	0.011	-0.009**	-0.006	0.004	-0.007	-0.010**	-0.013	-0.000
	(0.004)	(0.005)	(0.005)	(0.015)	(0.004)	(0.004)	(0.014)	(0.010)	(0.005)	(0.012)	(0.009)
Observations	[80125:14839]	[51477:9061]	[28648:5778]	[6894:1499]	[73231:13340]	[65512:11143]	[6078:1612]	[8535:2084]	[62790:10958]	[4553:914]	[11977:2808]
Bandwidth	[1177:1177]	[1266:1266]	[1232:1232]	[770:770]	[1230:1230]	[1393:1393]	[1910:1910]	[1223:1223]	[1024:1024]	[901:901]	[1236:1236]
Effect. observations	[12194:6639]	[8227:4355]	[4939:2611]	[666:470]	[11735:6207]	[11701:5778]	[2086:925]	[1551:947]	[7945:4518]	[501:342]	[2187:1199]
	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)	(44)
	Main	Female	Male	Private	Public	Bachelor	Master	Mestrado int	Less dev	Transition	Dev
Enrolled same degree	0.026***	0.018*	0.039***	-0.012	0.030***	0.021***	0.081**	0.014	0.030***	-0.006	0.012
	(0.009)	(0.009)	(0.015)	(0.027)	(0.009)	(0.007)	(0.038)	(0.019)	(0.010)	(0.040)	(0.015)
Observations	[79744:14667]	[51233:8955]	[28511:5712]	[6827:1479]	[72917:13188]	[65203:11008]	[6025:1584]	[8516:2075]	[62496:10838]	[4534:906]	[11915:2766]
Bandwidth	[1120:1120]	[1438:1438]	[1189:1189]	[1412:1412]	[1240:1240]	[1497:1497]	[1948:1948]	[1307:1307]	[1022:1022]	[873:873]	[1950:1950]
Effect. observations	[11456:6336]	[9553:4740]	[4697:2515]	[1350:711]	[11788:6187]	[12768:6015]	[2100:923]	[1655:977]	[7874:4457]	[473:333]	[3700:1681]
	(45)	(46)	(47)	(48)	(49)	(50)	(51)	(52)	(53)	(54)	(55)
	Main	Female	Male	Private	Public	Bachelor	Master	Mestrado int	Less dev	Transition	Dev
Enrolled other degreee	-0.015**	-0.010	-0.025**	-0.002	-0.017**	-0.009	-0.060**	-0.019	-0.021***	0.019	0.008
	(0.007)	(0.007)	(0.011)	(0.018)	(0.007)	(0.006)	(0.029)	(0.016)	(0.007)	(0.038)	(0.011)
Observations	[79744:14667]	[51233:8955]	[28511:5712]	[6827:1479]	[72917:13188]	[65203:11008]	[6025:1584]	[8516:2075]	[62496:10838]	[4534:906]	[11915:2766]
Bandwidth	[1147:1147]	[1319:1319]	[1279:1279]	[1255:1255]	[1300:1300]	[1537:1537]	[1116:1116]	[1407:1407]	[1027:1027]	[967:967]	[1817:1817]
Effect. observations	[11768:6458]	[8573:4435]	[5124:2658]	[1154:655]	[12490:6410]	[13189:6153]	[1151:610]	[1802:1028]	[7916:4477]	[540:360]	[3423:1607]
	(56)	(57)	(58)	(59)	(60)	(61)	(62)	(63)	(64)	(65)	(66)
	Main	Female	Male	Private	Public	Bachelor	Master	Mestrado int	Less dev	Transition	Dev
Dropout end year 1	-0.011	0.007	-0.041**	0.033	-0.013	-0.010	-0.012	0.000	-0.015	-0.007	0.018
	(0.009)	(0.010)	(0.018)	(0.038)	(0.009)	(0.010)	(0.042)	(0.016)	(0.010)	(0.039)	(0.024)
Observations	[65371:12020]	[42085:7385]	[23286:4635]	[5200:1167]	[60171:10853]	[52839:8893]	[5606:1446]	[6926:1681]	[51334:8886]	[3659:712]	[9686:2287]
Bandwidth	[1434:1434]	[1736:1736]	[1388:1388]	[1389:1389]	[1623:1623]	[1593:1593]	[1659:1659]	[1383:1383]	[1780:1780]	[830:830]	[1691:1691]
Effect. observations	[12717:6176]	[10103:4378]	[4699:2253]	[1013:556]	[13700:6156]	[11284:5030]	[1635:750]	[1443:828]	[12920:5351]	[388:256]	[2599:1247]

Table A.4: Heterogeneity first year students-cont

	(67)	(68)	(69)	(70)	(71)	(72)	(73)	(74)	(75)	(76)	(77)
	Main	Female	Male	Private	Public	Bachelor	Master	Mestrado int	Less dev	Transition	Dev
At least 36 credits	0.026**	0.031**	0.021	0.055	0.022	0.020	0.086**	0.001	0.024	0.101	0.021
	(0.012)	(0.013)	(0.025)	(0.047)	(0.014)	(0.016)	(0.043)	(0.048)	(0.015)	(0.082)	(0.032)
Observations	[69950:10915]	[45596:6855]	[24354:4060]	[5801:1041]	[64149:9874]	[57721:8239]	[4519:1059]	[7710:1617]	[54831:8106]	[4073:688]	[10375:2009]
Bandwidth	[1976:1976]	[1909:1909]	[1801:1801]	[1437:1437]	[1665:1665]	[1513:1513]	[1324:1324]	[1097:1097]	[1675:1675]	[581:581]	[1606:1606]
Effect. observations	[20597:7136]	[12434:4431]	[6711:2465]	[1201:522]	[14973:5843]	[11597:4649]	[1015:464]	[1244:690]	[12756:4829]	[295:192]	[2585:1096]
	(78)	(79)	(80)	(81)	(82)	(83)	(84)	(85)	(86)	(87)	(88)
	Main	Female	Male	Private	Public	Bachelor	Master	Mestrado int	Less dev	Transition	Dev
Reached enrolled credits	0.038**	0.049**	0.040	0.138*	0.035*	0.021	0.242***	0.129**	0.028	0.259**	0.045
	(0.017)	(0.024)	(0.035)	(0.072)	(0.018)	(0.021)	(0.088)	(0.065)	(0.023)	(0.102)	(0.040)
Observations	[68914:10819]	[44873:6772]	[24041:4047]	[5747:1042]	[63167:9777]	[56893:8170]	[4353:1049]	[7668:1600]	[54033:8025]	[3992:685]	[10227:1995]
Bandwidth	[2077:2077]	[1652:1652]	[1362:1362]	[1337:1337]	[2066:2066]	[1691:1691]	[538:538]	[1079:1079]	[1439:1439]	[610:610]	[2066:2066]
Effect. observations	[21620:7263]	[10056:3998]	[4728:2005]	[1092:497]	[19612:6578]	[13175:4925]	[358:212]	[1214:670]	[10336:4317]	[300:203]	[3453:1294]
	(89)	(90)	(91)	(92)	(93)	(94)	(95)	(96)	(97)	(98)	(99)
	Main	Female	Male	Private	Public	Bachelor	Master	Mestrado int	Less dev	Transition	Dev
Graduated in time	0.056**	0.060*	0.036	0.192*	0.043	0.067**	0.043	-0.047	0.051	-0.083	0.061
	(0.027)	(0.035)	(0.028)	(0.107)	(0.027)	(0.033)	(0.050)	(0.085)	(0.033)	(0.140)	(0.053)
Observations	[36857:7007]	[24151:4384]	[12706:2623]	[2557:625]	[34300:6382]	[30287:5327]	[5155:1287]	[1415:393]	[29000:5187]	[1971:349]	[5417:1374]
Bandwidth	[1364:1364]	[1289:1289]	[5000:5000]	[1170:1170]	[1450:1450]	[1221:1221]	[1907:1907]	[4996:4996]	[1215:1215]	[705:705]	[1773:1773]
Effect. observations	[7242:3421]	[4269:2131]	[12704:2623]	[445:260]	[7232:3278]	[5013:2437]	[1735:749]	[1414:393]	[4829:2359]	[194:102]	[1724:766]
	(100)	(101)	(102)	(103)	(104)	(105)	(106)	(107)	(108)	(109)	(110)
	Main	Female	Male	Private	Public	Bachelor	Master	Mestrado int	Less dev	Transition	Dev
Graduated	0.042	0.039	0.030	0.070	0.040	0.044	0.101	-0.047	0.045	-0.137	0.014
	(0.027)	(0.035)	(0.029)	(0.102)	(0.027)	(0.031)	(0.068)	(0.085)	(0.031)	(0.149)	(0.055)
Observations	[36857:7007]	[24151:4384]	[12706:2623]	[2557:625]	[34300:6382]	[30287:5327]	[5155:1287]	[1415:393]	[29000:5187]	[1971:349]	[5417:1374]
Bandwidth	[1329:1329]	[1230:1230]	[5000:5000]	[1265:1265]	[1460:1460]	[1284:1284]	[1235:1235]	[4996:4996]	[1282:1282]	[676:676]	[1905:1905]
Effect. observations	[7028:3348]	[4053:2059]	[12704:2623]	[491:279]	[7278:3292]	[5333:2532]	[1088:538]	[1414:393]	[5160:2455]	[185:100]	[1857:800]
	(111)	(112)	(113)	(114)	(115)	(116)	(117)	(118)	(119)	(120)	(121)
	Main	Female	Male	Private	Public	Bachelor	Master	Mestrado int	Less dev	Transition	Dev
Final mark	0.177	0.159	0.161	0.205	0.197*	0.172	-0.241	1.711***	0.191*		-0.126
	(0.110)	(0.130)	(0.142)	(0.424)	(0.118)	(0.108)	(0.259)	(0.596)	(0.116)		(0.283)
Observations	[19746:3328]	[13991:2285]	[5755:1043]	[1297:298]	[18449:3030]	[16834:2682]	[2384:516]	[528:130]	[15795:2480]		[2781:651]
Bandwidth	[1377:1377]	[1330:1330]	[4999:4999]	[1168:1168]	[1297:1297]	[1501:1501]	[1541:1541]	[938:938]	[1665:1665]		[1521:1521]
Effect. observations	[3926:1660]	[2569:1161]	[5754:1043]	[227:126]	[3401:1461]	[3645:1440]	[608:263]	[83:54]	[3859:1450]		[744:324]
	(122)	(123)	(124)	(125)	(126)	(127)	(128)	(129)	(130)	(131)	(132)
	Main	Female	Male	Private	Public	Bachelor	Master	Mestrado int	Less dev	Transition	Dev
Apply again	0.404***	0.416***	0.387***	0.466***	0.398***	0.404***	0.378***	0.441***	0.405***	0.421***	0.409***
	(0.017)	(0.020)	(0.028)	(0.050)	(0.018)	(0.018)	(0.046)	(0.046)	(0.018)	(0.082)	(0.035)
Observations	[80125:14839]	[51477:9061]	[28648:5778]	[6894:1499]	[73231:13340]	[65512:11143]	[6078:1612]	[8535:2084]	[62790:10958]	[4553:914]	[11977:2808]
Bandwidth	[1253:1253]	[1418:1418]	[1376:1376]	[1595:1595]	[1217:1217]	[1520:1520]	[1851:1851]	[1244:1244]	[1407:1407]	[686:686]	[1842:1842]
Effect. observations	[13152:6970]	[9439:4751]	[5649:2853]	[1587:782]	[11592:6158]	[13084:6185]	[2015:914]	[1574:956]	[11612:5720]	[385:278]	[3507:1653]

Table A.5: Heterogeneity by displaced students

	Immediate dropout			**Immediate dropout-B**			**Never found**		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Main	Displaced	Non disp	Main	Displaced	Non disp	Main	Displaced	Non disp
Robust	-0.017***	-0.013	-0.013**	-0.010**	-0.013*	-0.008	-0.007**	-0.000	-0.009**
	(0.006)	(0.009)	(0.006)	(0.004)	(0.007)	(0.005)	(0.004)	(0.005)	(0.004)
Obs.	[80125:14839]	[21803:3382]	[58322:11457]	[79744:14667]	[21736:3358]	[58008:11309]	[80125:14839]	[21803:3382]	[58322:11457]
Bandwidth	[1222:1222]	[1620:1620]	[1835:1835]	[1402:1402]	[1835:1835]	[1123:1123]	[1177:1177]	[1701:1701]	[1278:1278]
Effect. obs.	[12775:6832]	[4755:1925]	[15740:7036]	[14956:7486]	[5562:2070]	[8503:4921]	[12194:6639]	[5065:1976]	[9963:5475]

	Enrolled same course			**Enrolled other course**			**Dropout end year 1**		
	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
	Main	Displaced	Non disp	Main	Displaced	Non disp	Main	Displaced	Non disp
Robust	0.026***	0.025*	0.023**	-0.015**	-0.013	-0.014*	-0.011	-0.004	-0.015
	(0.009)	(0.014)	(0.010)	(0.007)	(0.009)	(0.008)	(0.009)	(0.015)	(0.012)
Obs.	[79744:14667]	[21736:3358]	[58008:11309]	[79744:14667]	[21736:3358]	[58008:11309]	[65371:12020]	[18033:2713]	[47338:9307]
Bandwidth	[1120:1120]	[1717:1717]	[1088:1088]	[1147:1147]	[1886:1886]	[1136:1136]	[1434:1434]	[1793:1793]	[1354:1354]
Effect. obs.	[11456:6336]	[5113:1974]	[8200:4815]	[11768:6458]	[5733:2102]	[8609:4973]	[12717:6176]	[4525:1647]	[8748:4551]

	At least 36 credits			**Reached all enrolled credits**			**Graduated time**		
	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)
	Main	Displaced	Non disp	Main	Displaced	Non disp	Main	Displaced	Non disp
Robust	0.026**	-0.055*	0.047***	0.038**	-0.024	0.074***	0.056**	0.030	0.060*
	(0.012)	(0.029)	(0.016)	(0.017)	(0.043)	(0.025)	(0.027)	(0.049)	(0.031)
Obs.	[69950:10915]	[19167:2546]	[50783:8369]	[68914:10819]	[18774:2516]	[50140:8303]	[36857:7007]	[10211:1466]	[26646:5541]
Bandwidth	[1976:1976]	[1284:1284]	[1455:1455]	[2077:2077]	[1308:1308]	[1139:1139]	[1364:1364]	[1773:1773]	[1339:1339]
Effect. obs.	[20597:7136]	[3142:1239]	[10193:4483]	[21620:7263]	[3134:1241]	[7465:3743]	[7242:3421]	[2638:862]	[5258:2662]

	Graduated			**Apply again**		
	(28)	**(29)**	**(30)**	**(31)**	**(32)**	
	Main	Displaced	Non disp	Main	Displaced	Non disp
Robust	0.042	0.040	0.044	0.404***	0.463***	0.387***
	(0.027)	(0.056)	(0.032)	(0.017)	(0.034)	(0.020)
Obs.	[36857:7007]	[10211:1466]	[26646:5541]	[80125:14839]	[21803:3382]	[58322:11457]
Bandwidth	[1329:1329]	[1417:1417]	[1309:1309]	[1253:1253]	[1244:1244]	[1290:1290]
Effect. obs.	[7028:3348]	[1955:740]	[5118:2626]	[13152:6970]	[3390:1554]	[10085:5507]

Table A.6: Heterogeneity analysis, first year students, receiving the scholarship in first and second year

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Immediate dropout	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Bachelor	Master	Integrated m.
beginning year 2	-0.027	0.005	-0.097***	-0.038*	0.059	-0.039**	-0.014	0.037	-0.024	-0.031	0.003
	(0.018)	(0.021)	(0.037)	(0.020)	(0.064)	(0.019)	(0.061)	(0.050)	(0.018)	(0.092)	(0.015)
Observations	[65371:12020]	[42085:7385]	[23286:4635]	[60171:10853]	[5200:1167]	[51334:8886]	[3659:712]	[9686:2287]	[52839:8893]	[5606:1446]	[6926:1681]
Bandwidth	[1158:1158]	[1039:1039]	[1271:1271]	[1051:1051]	[1420:1420]	[1243:1243]	[1199:1199]	[1414:1414]	[1310:1310]	[1589:1589]	[5000:5000]
Effect. observations	[9829:5272]	[5351:3046]	[4237:2113]	[8084:4449]	[1041:564]	[8209:4187]	[579:333]	[2083:1071]	[8790:4337]	[1571:733]	[6925:1681]
	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
Enrolled same course	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Bachelor	Master	Integrated m.
beginning year 2	0.101***	0.039	0.201***	0.084***	0.079	0.127***	0.245	-0.011	0.098***	0.174	0.039
	(0.029)	(0.029)	(0.055)	(0.026)	(0.090)	(0.035)	(0.168)	(0.077)	(0.032)	(0.113)	(0.042)
Observations	[65371:12020]	[42085:7385]	[23286:4635]	[60171:10853]	[5200:1167]	[51334:8886]	[3659:712]	[9686:2287]	[52839:8893]	[5606:1446]	[6926:1681]
Bandwidth	[1242:1242]	[1649:1649]	[1449:1449]	[1603:1603]	[1590:1590]	[1088:1088]	[460:460]	[1395:1395]	[1240:1240]	[1467:1467]	[5000:5000]
Effect. observations	[10716:5563]	[9413:4248]	[4937:2325]	[13469:6105]	[1192:608]	[6987:3801]	[219:154]	[2041:1053]	[8215:4172]	[1433:690]	[6925:1681]
	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)
Enrolled other course	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Bachelor	Master	Integrated m.
beginning year 2	-0.077***	-0.053*	-0.112***	-0.077***	-0.091	-0.086***	-0.189	-0.032	-0.079**	-0.085	-0.008
	(0.029)	(0.029)	(0.042)	(0.029)	(0.074)	(0.032)	(0.138)	(0.051)	(0.031)	(0.055)	(0.031)
Observations	[65371:12020]	[42085:7385]	[23286:4635]	[60171:10853]	[5200:1167]	[51334:8886]	[3659:712]	[9686:2287]	[52839:8893]	[5606:1446]	[6926:1681]
Bandwidth	[919:919]	[1135:1135]	[1649:1649]	[1021:1021]	[1337:1337]	[933:933]	[505:505]	[1732:1732]	[1116:1116]	[1892:1892]	[5000:5000]
Effect. observations	[7526:4417]	[5940:3250]	[5792:2576]	[7829:4343]	[968:537]	[5858:3359]	[240:171]	[2693:1274]	[7227:3866]	[1893:825]	[6925:1681]
	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)	(44)
Dropout	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Bachelor	Master	Integrated m.
end year 2	-0.028	-0.032	-0.061	-0.036	0.016	-0.057*	-0.011	0.014	-0.024	-0.167	-0.000
	(0.023)	(0.029)	(0.047)	(0.025)	(0.098)	(0.029)	(0.116)	(0.070)	(0.023)	(0.200)	(0.021)
Observations	[50648:9428]	[32504:5722]	[18144:3706]	[46879:8562]	[3769:866]	[39785:6968]	[2822:539]	[7480:1810]	[41453:7130]	[3656:956]	[5539:1342]
Bandwidth	[1745:1745]	[1437:1437]	[1667:1667]	[1644:1644]	[1358:1358]	[1244:1244]	[760:760]	[1784:1784]	[1453:1453]	[876:876]	[5000:5000]
Effect. observations	[12959:5550]	[6184:3028]	[4670:2046]	[11057:4871]	[739:414]	[6479:3274]	[284:169]	[2245:1037]	[8078:3741]	[531:308]	[5538:1342]
	(45)	(46)	(47)	(48)	(49)	(50)	(51)	(52)	(53)	(54)	(55)
Graduated	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Bachelor	Master	Integrated m.
	0.059	0.064	0.056	0.067	0.100	0.072	-0.224	0.033	0.072	0.126	-0.072
	(0.039)	(0.052)	(0.049)	(0.045)	(0.166)	(0.047)	(0.263)	(0.105)	(0.049)	(0.120)	(0.124)
Observations	[36857:7007]	[24151:4384]	[12706:2623]	[34300:6382]	[2557:625]	[29000:5187]	[1971:349]	[5417:1374]	[30287:5327]	[5155:1287]	[1415:393]
Bandwidth	[1814:1814]	[1337:1337]	[5000:5000]	[1499:1499]	[1317:1317]	[1526:1526]	[575:575]	[1776:1776]	[1364:1364]	[1956:1956]	[4996:4996]
Effect. observations	[10365:4178]	[4451:2192]	[12704:2623]	[7541:3355]	[516:285]	[6361:2800]	[156:90]	[1726:768]	[5730:2645]	[1790:763]	[1414:393]
	(56)	(57)	(58)	(59)	(60)	(61)	(62)	(63)	(64)	(65)	(66)
Graduated in time	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Bachelor	Master	Integrated m.
	0.074*	0.097*	0.070	0.045	0.282*	0.069	-0.090	0.206*	0.101**	0.092	-0.072
	(0.041)	(0.057)	(0.047)	(0.040)	(0.167)	(0.049)	(0.254)	(0.117)	(0.050)	(0.108)	(0.124)
Observations	[36857:7007]	[24151:4384]	[12706:2623]	[34300:6382]	[2557:625]	[29000:5187]	[1971:349]	[5417:1374]	[30287:5327]	[5155:1287]	[1415:393]
Bandwidth	[1616:1616]	[1165:1165]	[5000:5000]	[1883:1883]	[1265:1265]	[1427:1427]	[534:534]	[1213:1213]	[1337:1337]	[1994:1994]	[4996:4996]
Effect. observations	[8934:3881]	[3779:1975]	[12704:2623]	[10091:3923]	[492:279]	[5837:2661]	[145:87]	[1109:567]	[5592:2604]	[1835:769]	[1414:393]

Table A.7: Heterogeneity analysis, first year students, receiving the scholarship in first and second year-cont

	(67)	(68)	(69)	(70)	(71)	(72)	(73)	(74)	(75)	(76)	(77)
Final mark	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Bachelor	Master	Integrated m.
	0.336*	0.244	0.322	0.346*	0.283	0.388**	0.868	-0.150	0.181	-0.418	2.907***
	(0.186)	(0.198)	(0.283)	(0.190)	(0.576)	(0.194)	(0.864)	(0.421)	(0.135)	(0.436)	(1.101)
Observations	[19746:3328]	[13991:2285]	[5755:1043]	[18449:3030]	[1297:298]	[15795:2480]	[958:155]	[2781:651]	[16834:2682]	[2384:516]	[528:130]
Bandwidth	[1006:1006]	[1158:1158]	[1520:1520]	[1046:1046]	[1166:1166]	[1330:1330]	[444:444]	[1390:1390]	[1789:1789]	[1507:1507]	[938:938]
Effect. observations	[2750:1322]	[2193:1055]	[1385:518]	[2654:1247]	[227:126]	[2921:1237]	[57:35]	[660:300]	[4584:1625]	[592:257]	[83:54]
	(78)	(79)	(80)	(81)	(82)	(83)	(84)	(85)	(86)	(87)	(88)
Apply next year	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Bachelor	Master	Integrated m.
	0.711***	0.669***	0.802***	0.696***	0.850***	0.702***	0.703***	0.748***	0.691***	0.832***	0.663***
	(0.032)	(0.038)	(0.067)	(0.035)	(0.110)	(0.037)	(0.136)	(0.072)	(0.033)	(0.091)	(0.049)
Observations	[65613:12136]	[42238:7456]	[23375:4680]	[60358:10953]	[5255:1183]	[51514:8965]	[3670:716]	[9733:2319]	[53026:8982]	[5650:1469]	[6937:1685]
Bandwidth	[1398:1398]	[1352:1352]	[1232:1232]	[1263:1263]	[1386:1386]	[1369:1369]	[1095:1095]	[1816:1816]	[1627:1627]	[1926:1926]	[5000:5000]
Effect. observations	[12386:6128]	[7335:3729]	[4108:2087]	[10096:5154]	[1027:565]	[9261:4526]	[530:313]	[2873:1336]	[11657:5147]	[1956:847]	[6936:1685]

Table A.8: Heterogeneity analysis, first year students, receiving the scholarship in first, second, and third year

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Immediate dropout	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Bachelor	Integrated m.
beginning year 3	-0.038	-0.017	-0.028	-0.024	0.031	-0.035	0.034	-0.012	-0.028	-0.001
	(0.029)	(0.033)	(0.033)	(0.021)	(0.109)	(0.027)	(0.155)	(0.083)	(0.028)	(0.027)
Observations	[46992:8472]	[30040:5091]	[16952:3381]	[43428:7683]	[3564:789]	[36877:6295]	[2686:500]	[6936:1591]	[41453:7130]	[5539:1342]
Bandwidth	[1250:1250]	[1120:1120]	[5000:5000]	[1470:1470]	[1223:1223]	[1748:1748]	[827:827]	[1521:1521]	[1688:1688]	[5000:5000]
Effect. observations	[7744:3959]	[4092:2262]	[16951:3381]	[8720:4065]	[610:356]	[9061:3772]	[277:175]	[1662:808]	[9829:4156]	[5538:1342]
	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
Dropout	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Bachelor	Integrated m.
end year 3	-0.020	-0.037	-0.165	-0.070	0.085	-0.016	-0.189	-0.123	-0.014	0.030
	(0.036)	(0.037)	(0.135)	(0.097)	(0.199)	(0.038)	(0.238)	(0.257)	(0.091)	(0.037)
Observations	[22847:4433]	[13817:2518]	[9030:1915]	[21181:4055]	[1666:378]	[17965:3364]	[1272:236]	[3327:780]	[18778:3432]	[4069:1001]
BW Type	[5000:5000]	[5000:5000]	[1458:1458]	[254:254]	[1635:1635]	[5000:5000]	[1857:1857]	[1252:1252]	[1195:1195]	[4997:4997]
Effect. observations	[22846:4433]	[13816:2518]	[2055:950]	[603:482]	[405:201]	[17964:3364]	[368:151]	[670:331]	[2984:1522]	[4068:1001]
	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)
Graduated	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Bachelor	Integrated m.
	0.074	0.038	0.170	0.052	0.102	0.080	-0.206	0.162	0.096	-0.104
	(0.066)	(0.078)	(0.123)	(0.043)	(0.198)	(0.061)	(0.345)	(0.152)	(0.065)	(0.168)
Observations	[31702:5720]	[20652:3521]	[11050:2199]	[29390:5186]	[2312:534]	[24872:4255]	[1763:304]	[4687:1093]	[30287:5327]	[1415:393]
BW Type	[1242:1242]	[1132:1132]	[1181:1181]	[1795:1795]	[1519:1519]	[1810:1810]	[560:560]	[1310:1310]	[1355:1355]	[4996:4996]
Effect. observations	[5406:2641]	[2964:1589]	[1934:903]	[7945:3123]	[538:272]	[6645:2597]	[133:79]	[993:483]	[5685:2629]	[1414:393]
	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)
Graduated	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Bachelor	Integrated m.
in time	0.115*	0.089	0.247*	0.059	0.465*	0.070	-0.033	0.241*	0.127**	-0.104
	(0.065)	(0.081)	(0.128)	(0.049)	(0.248)	(0.064)	(0.362)	(0.141)	(0.064)	(0.168)
Observations	[31702:5720]	[20652:3521]	[11050:2199]	[29390:5186]	[2312:534]	[24872:4255]	[1763:304]	[4687:1093]	[30287:5327]	[1415:393]
BW Type	[1282:1282]	[1150:1150]	[961:961]	[1428:1428]	[1158:1158]	[1774:1774]	[507:507]	[1386:1386]	[1421:1421]	[4996:4996]
Effect. observations	[5625:2705]	[3015:1610]	[1548:759]	[5889:2671]	[389:224]	[6450:2568]	[122:74]	[1059:499]	[6012:2730]	[1414:393]
	(41)	(42)	(43)	(44)	(45)	(46)	(47)	(48)	(49)	(50)
Final mark	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Bachelor	Integrated m.
	0.268*	0.446*	0.477	0.381**	0.875	0.272	1.527	0.453	0.290	3.504**
	(0.162)	(0.256)	(0.315)	(0.185)	(0.672)	(0.206)	(1.117)	(0.374)	(0.181)	(1.475)
Observations	[17361:2810]	[12330:1922]	[5031:888]	[16177:2537]	[1184:274]	[13883:2086]	[844:141]	[2457:549]	[16833:2681]	[528:129]
BW Type	[1782:1782]	[1098:1098]	[1637:1637]	[1098:1098]	[1147:1147]	[1624:1624]	[477:477]	[1417:1417]	[1523:1523]	[941:941]
Effect. observations	[4725:1705]	[1758:868]	[1311:469]	[2389:1098]	[201:114]	[3245:1220]	[53:34]	[593:259]	[3721:1463]	[83:54]

Table A.9: Heterogeneity, second year students sample, RDD estimated

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Immediate dropout	Main	Female	Male	Private	Public	Less dev	Transition	Dev
beginning year 2	0.008	0.011	0.005	0.028	0.005	0.004	0.026	0.017
	(0.007)	(0.009)	(0.011)	(0.022)	(0.007)	(0.008)	(0.025)	(0.018)
Observations	[18817:4179]	[12668:2724]	[6149:1455]	[2402:749]	[16415:3430]	[14029:2910]	[1185:196]	[3312:1031]
Bandwidth	[1441:1441]	[1230:1230]	[1866:1866]	[1154:1154]	[1728:1728]	[1251:1251]	[1838:1838]	[1327:1327]
Effect. observations	[3993:2047]	[2220:1208]	[1845:830]	[438:303]	[4301:1923]	[2441:1327]	[314:118]	[760:428]
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Enrolled in same course	Main	Female	Male	Private	Public	Less dev	Transition	Dev
beginning year 2	-0.007	-0.011	0.013	-0.022	-0.008	-0.004	0.002	-0.015
	(0.012)	(0.015)	(0.023)	(0.054)	(0.013)	(0.015)	(0.112)	(0.031)
Observations	[18817:4179]	[12668:2724]	[6149:1455]	[2402:749]	[16415:3430]	[14029:2910]	[1185:196]	[3312:1031]
Bandwidth	[1671:1671]	[1780:1780]	[881:881]	[401:401]	[1773:1773]	[536:536]	[1110:1110]	[1808:1808]
Effect. observations	[4806:2283]	[3483:1581]	[757:483]	[151:124]	[4456:1956]	[917:681]	[176:79]	[1066:548]
	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
Enrolled in other course	Main	Female	Male	Private	Public	Less dev	Transition	Dev
beginning year 2	-0.003	0.002	-0.011	-0.009	0.002	-0.002	-0.046	-0.001
	(0.010)	(0.013)	(0.016)	(0.034)	(0.011)	(0.009)	(0.109)	(0.028)
Observations	[18817:4179]	[12668:2724]	[6149:1455]	[2402:749]	[16415:3430]	[14029:2910]	[1185:196]	[3312:1031]
Bandwidth	[1691:1691]	[1608:1608]	[1546:1546]	[531:531]	[1742:1742]	[543:543]	[1088:1088]	[1684:1684]
Effect. observations	[4859:2300]	[3032:1471]	[1465:728]	[188:160]	[4353:1934]	[928:688]	[173:77]	[966:517]
	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)
Dropout	Main	Female	Male	Private	Public	Less dev	Transition	Dev
end year 2	-0.023	-0.030**	-0.000	-0.019	-0.024	-0.009	-0.055	-0.039
	(0.014)	(0.015)	(0.028)	(0.047)	(0.016)	(0.019)	(0.060)	(0.034)
Observations	[17200:3710]	[11611:2411]	[5589:1299]	[2163:658]	[15037:3052]	[12872:2586]	[1069:171]	[2983:914]
Bandwidth	[1375:1375]	[1753:1753]	[1210:1210]	[905:905]	[1343:1343]	[665:665]	[1867:1867]	[1564:1564]
Effect. observations	[3560:1775]	[3205:1390]	[1009:557]	[314:223]	[2975:1440]	[1087:743]	[296:101]	[816:430]
	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)
At least 36 credits	Main	Female	Male	Private	Public	Less dev	Transition	Dev
	0.054**	0.047	0.072*	0.219***	0.028	0.079***	0.159	-0.005
	(0.027)	(0.031)	(0.038)	(0.078)	(0.027)	(0.023)	(0.136)	(0.054)
Observations	[14812:3255]	[10046:2143]	[4766:1112]	[1627:545]	[13185:2710]	[10894:2272]	[890:142]	[2803:809]
Bandwidth	[1494:1494]	[1364:1364]	[4999:4999]	[1910:1910]	[1568:1568]	[4999:4999]	[1623:1623]	[1258:1258]
Effect. observations	[3320:1626]	[2009:1012]	[4765:1112]	[539:313]	[3115:1415]	[10893:2272]	[204:79]	[605:324]
	(41)	(42)	(43)	(44)	(45)	(46)	(47)	(48)
Reached enrolled credits	Main	Female	Male	Private	Public	Less dev	Transition	Dev
	0.040	0.048	0.079	0.208	0.028	0.110*	0.191	0.042
	(0.035)	(0.046)	(0.075)	(0.127)	(0.044)	(0.061)	(0.176)	(0.077)
Observations	[15331:3269]	[10276:2144]	[5055:1125]	[1717:551]	[13614:2718]	[11407:2294]	[963:146]	[2727:796]
Bandwidth	[1869:1869]	[1711:1711]	[754:754]	[485:485]	[1361:1361]	[537:537]	[1221:1221]	[1854:1854]
Effect. observations	[4513:1918]	[2655:1201]	[524:333]	[129:117]	[2702:1276]	[752:528]	[166:65]	[902:431]
	(49)	(50)	(51)	(52)	(53)	(54)	(55)	(56)
Graduated in time	Main	Female	Male	Private	Public	Less dev	Transition	Dev
	-0.058	-0.055	-0.051	-0.158	-0.025	-0.079	0.132	-0.041
	(0.041)	(0.049)	(0.076)	(0.146)	(0.036)	(0.065)	(0.165)	(0.087)
Observations	[15675:3269]	[10592:2139]	[5083:1130]	[1946:570]	[13729:2699]	[11758:2273]	[974:149]	[2688:810]
Bandwidth	[1195:1195]	[1217:1217]	[828:828]	[435:435]	[1842:1842]	[541:541]	[1823:1823]	[1486:1486]
Effect. observations	[2821:1442]	[1917:974]	[620:371]	[134:107]	[4140:1601]	[794:567]	[276:90]	[733:368]
	(57)	(58)	(59)	(60)	(61)	(62)	(63)	(64)
Graduated	Main	Female	Male	Private	Public	Less dev	Transition	Dev
	-0.037	-0.018	-0.063	-0.192	-0.011	-0.086*	-0.028	-0.006
	(0.030)	(0.030)	(0.069)	(0.126)	(0.027)	(0.047)	(0.109)	(0.062)
Observations	[15675:3269]	[10592:2139]	[5083:1130]	[1946:570]	[13729:2699]	[11758:2273]	[974:149]	[2688:810]
Bandwidth	[1355:1355]	[1697:1697]	[619:619]	[415:415]	[1824:1824]	[506:506]	[1749:1749]	[1854:1854]
Effect. observations	[3301:1579]	[2882:1224]	[435:283]	[125:101]	[4093:1592]	[747:538]	[264:88]	[956:442]
	(65)	(66)	(67)	(68)	(69)	(70)	(71)	(72)
Final mark	Main	Female	Male	Private	Public	Less dev	Transition	Dev
	0.087	0.118	0.129	-0.227	0.154	0.216	0.431	-0.075
	(0.152)	(0.168)	(0.277)	(0.618)	(0.162)	(0.240)	(0.716)	(0.321)
Observations	[12411:2348]	[8592:1590]	[3819:758]	[1426:380]	[10985:1968]	[9542:1679]	[722:106]	[1958:536]
Bandwidth	[1381:1381]	[1617:1617]	[978:978]	[505:505]	[1471:1471]	[545:545]	[1616:1616]	[1521:1521]
Effect. observations	[2669:1185]	[2195:912]	[556:296]	[104:97]	[2507:1043]	[641:444]	[182:59]	[547:253]
	(73)	(74)	(75)	(76)	(77)	(78)	(79)	(80)
Apply again	Main	Female	Male	Private	Public	Less dev	Transition	Dev
	0.446***	0.462***	0.436***	0.474***	0.428***	0.445***	0.048	0.488***
	(0.032)	(0.039)	(0.061)	(0.100)	(0.033)	(0.051)	(0.169)	(0.059)
Observations	[18859:4196]	[12697:2734]	[6162:1462]	[2428:760]	[16431:3436]	[14058:2924]	[1186:196]	[3323:1034]
Bandwidth	[1452:1452]	[1404:1404]	[808:808]	[565:565]	[1573:1573]	[592:592]	[793:793]	[1756:1756]
Effect. observations	[4045:2069]	[2607:1331]	[699:451]	[198:171]	[3840:1806]	[1014:751]	[126:56]	[1031:534]

Note: The table reports RDD estimates of Eq. (1) on the sample of bachelor students who apply for the scholarship at the beginning of their second curricular year, for the first time, and who obtained at least 36 credits in the previous academic year.Each column is a Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.10: Covariate Balance Checks

	Second year bachelor, first time applicant		**Second year, all sample**		**Bachelor, second year**		**Master, second year**		**Mestrado inte. , second year**	
	Beta	se	Beta	se	Beta	se	Beta	se	Beta	se
A.M.L	-0.031	(0.031)	0.014	(0.017)	0.011	(0.020)	0.021	(0.038)	0.047	(0.048)
Alentejo	0.031	(0.021)	0.005	(0.012)	0.009	(0.014)	0.008	(0.028)	-0.025	(0.032)
Algarve	0.024*	(0.013)	0.015**	(0.007)	0.016*	(0.009)	0.028*	(0.015)	-0.006	(0.016)
Açores	0.009	(0.011)	-0.004	(0.006)	-0.007	(0.008)	-0.004	(0.014)	0.011	(0.014)
Centro	-0.040	(0.033)	-0.019	(0.019)	-0.012	(0.023)	-0.018	(0.047)	-0.054	(0.057)
Madeira	-0.004	(0.012)	-0.008	(0.008)	-0.004	(0.009)	0.001	(0.019)	-0.052**	(0.024)
Norte	0.011	(0.036)	-0.003	(0.021)	-0.013	(0.025)	-0.036	(0.052)	0.080	(0.065)
Female	0.001	(0.036)	0.000	(0.021)	0.011	(0.024)	-0.024	(0.048)	-0.039	(0.064)
Education	0.006	(0.017)	-0.006	(0.011)	-0.007	(0.011)	-0.031	(0.040)	0.000	(0.000)
Arts and Humanities	0.024	(0.025)	-0.018	(0.014)	-0.009	(0.018)	-0.050*	(0.029)	-0.001	(0.014)
Social sciences	-0.009	(0.036)	0.001	(0.020)	-0.005	(0.024)	0.055	(0.049)	0.011	(0.038)
Science	0.001	(0.020)	0.008	(0.012)	0.009	(0.014)	0.007	(0.034)	-0.020	(0.032)
Engeneering	-0.011	(0.024)	0.006	(0.015)	-0.015	(0.016)	-0.028	(0.036)	0.127**	(0.065)
Agriculture	0.000	(0.009)	0.008	(0.005)	0.009	(0.006)	0.008	(0.014)	0.005	(0.022)
Health	-0.025	(0.029)	-0.006	(0.016)	0.005	(0.020)	0.002	(0.025)	-0.064	(0.058)
Services	0.012	(0.021)	0.008	(0.011)	0.013	(0.015)	0.037	(0.025)	-0.058***	(0.019)
Unkown	0.002	(0.003)	0.000	(0.001)	0.000	(0.002)	0.000	(0.000)	-0.001	(0.004)
Age	0.513	(0.365)	0.378*	(0.204)	0.525**	(0.220)	-0.559	(0.531)	-0.331	(0.291)
Public	0.041	(0.027)	0.032**	(0.014)	0.029	(0.018)	0.028	(0.028)	0.021	(0.033)
Bachelor			-0.058***	(0.020)						
Master			0.041**	(0.018)						
Mestrado int.			0.017	(0.013)						
Observations	7,219		29,556		20,567		6,082		2,907	

Table A.11: Heterogeneity analysis, DID estimates, sample of bachelor students, second year

Immediate dropout	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
beginning year 2	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Displaced	Non-displaced
Income below*credits above 36	-0.010**	-0.010*	-0.008	-0.009**	-0.013	-0.013***	-0.018	0.005	-0.001	-0.012**
	(0.004)	(0.006)	(0.006)	(0.004)	(0.019)	(0.005)	(0.015)	(0.010)	(0.007)	(0.005)
Observations	20,297	13,079	7,218	17,561	2,736	15,177	1,309	3,811	6,082	14,215
Enrolled same course	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
beginning year 2	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Displaced	Non-displaced
Income below*credits above 36	0.020**	0.017	0.020	0.027***	-0.044	0.016*	0.093*	0.014	0.003	0.026**
	(0.009)	(0.013)	(0.013)	(0.009)	(0.034)	(0.009)	(0.054)	(0.024)	(0.015)	(0.011)
Observations	20,297	13,079	7,218	17,561	2,736	15,177	1,309	3,811	6,082	14,215
Enrolled other course	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)
beginning year 2	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Displaced	non-displaced
Income below*credits above 36	-0.010	-0.005	-0.012	-0.017**	0.056**	-0.003	-0.066	-0.019	-0.001	-0.013
	(0.008)	(0.011)	(0.011)	(0.008)	(0.028)	(0.007)	(0.052)	(0.022)	(0.013)	(0.010)
Observations	20,297	13,079	7,218	17,561	2,736	15,177	1,309	3,811	6,082	14,215
Dropout end year 2	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)
	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Displaced	Non-displaced
Income below*credits above 36	-0.020**	-0.011	-0.032*	-0.017	-0.053	-0.034***	0.192***	-0.052**	-0.035**	-0.015
	(0.010)	(0.013)	(0.017)	(0.011)	(0.038)	(0.012)	(0.042)	(0.026)	(0.016)	(0.013)
Observations	16,882	10,927	5,955	14,637	2,245	12,632	1,076	3,174	5,055	11,827
At least 36 credits	(41)	(42)	(43)	(44)	(45)	(46)	(47)	(48)	(49)	(50)
	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Displaced	Non-displaced
Income below*credits above 36	0.024	0.035	0.020	0.017	0.059	-0.001	0.262***	0.051	-0.019	0.039*
	(0.018)	(0.023)	(0.031)	(0.019)	(0.056)	(0.021)	(0.083)	(0.041)	(0.035)	(0.021)
Observations	17,185	11,222	5,963	15,059	2,126	12,918	1,066	3,201	5,225	11,960
Reached enrolled credits	(51)	(52)	(53)	(54)	(55)	(56)	(57)	(58)	(59)	(60)
	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Displaced	Non-displaced
Income below*credits above 36	0.025	0.075*	-0.031	0.033	-0.100	0.028	-0.005	0.007	0.060	0.015
	(0.028)	(0.040)	(0.039)	(0.030)	(0.085)	(0.032)	(0.124)	(0.066)	(0.054)	(0.033)
Observations	16,822	10,915	5,907	14,728	2,094	12,650	1,071	3,101	5,153	11,669
Graduated in time	(61)	(62)	(63)	(64)	(65)	(66)	(67)	(68)	(69)	(70)
	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Displaced	Non-displaced
Income below*credits above 36	0.001	0.003	0.010	-0.004	0.034	0.032	-0.002	-0.096	-0.008	0.001
	(0.028)	(0.040)	(0.041)	(0.030)	(0.088)	(0.033)	(0.122)	(0.063)	(0.055)	(0.033)
Observations	13,691	8,896	4,795	11,923	1,768	10,235	861	2,595	4,123	9,568
Graduated	(71)	(72)	(73)	(74)	(75)	(76)	(77)	(78)	(79)	(80)
	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Displaced	Non-displaced
Income below*credits above 36	0.023	-0.000	0.059	0.017	0.074	0.058**	-0.082	-0.070	-0.014	0.035
	(0.024)	(0.033)	(0.038)	(0.025)	(0.079)	(0.028)	(0.102)	(0.056)	(0.044)	(0.029)
Observations	13,691	8,896	4,795	11,923	1,768	10,235	861	2,595	4,123	9,568
Final Mark	(81)	(82)	(83)	(84)	(85)	(86)	(87)	(88)	(89)	(90)
	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Displaced	Non-displaced
Income below*credits above 36	0.023	0.115	-0.063	0.043	-0.325	0.069	-0.320	-0.141	0.125	-0.027
	(0.135)	(0.192)	(0.196)	(0.143)	(0.425)	(0.153)	(0.659)	(0.333)	(0.266)	(0.157)
Observations	9,681	6,568	3,113	8,519	1,162	7,390	558	1,733	3,076	6,605
Apply next year	(91)	(92)	(93)	(94)	(95)	(96)	(97)	(98)	(99)	(100)
	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Displaced	Non-displaced
Income below*credits above 36	0.322***	0.330***	0.327***	0.301***	0.462***	0.370***	0.182**	0.219***	0.292***	0.329***
	(0.019)	(0.027)	(0.029)	(0.021)	(0.059)	(0.023)	(0.080)	(0.044)	(0.037)	(0.023)
Observations	20,336	13,101	7,235	17,575	2,761	15,208	1,309	3,819	6,085	14,251

Table A.12: Heterogeneity analysis, student receiving the scholarship in second year,accounting for having received the scholarship also the first year

Immediate dropout	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
beginning year 2	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Displaced	Non displaced
T1 & T2	-0.013***	-0.013*	-0.012**	-0.012***	-0.014	-0.015***	-0.021	-0.002	-0.004	-0.016***
	(0.004)	(0.007)	(0.006)	(0.004)	(0.020)	(0.005)	(0.016)	(0.010)	(0.007)	(0.005)
T2 only	-0.007	-0.008	-0.005	-0.005	-0.014	-0.011**	-0.017	0.010	0.001	-0.009*
	(0.004)	(0.006)	(0.006)	(0.004)	(0.020)	(0.005)	(0.016)	(0.010)	(0.008)	(0.005)
T1 only	0.004*	0.003	0.006	0.003	0.011	0.003	0.008	0.008	0.003	0.005
	(0.002)	(0.003)	(0.003)	(0.002)	(0.010)	(0.003)	(0.008)	(0.005)	(0.004)	(0.003)
Observations	20,297	13,079	7,218	17,561	2,736	15,177	1,309	3,811	6,082	14,215
Enrolled same course	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
beginning year 2	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Displaced	Non displaced
T1 & T2	0.017*	0.010	0.020	0.025***	-0.053	0.016*	0.070	-0.001	0.008	0.019
	(0.009)	(0.013)	(0.013)	(0.009)	(0.035)	(0.009)	(0.057)	(0.026)	(0.015)	(0.011)
T2 only	0.021**	0.020	0.018	0.026***	-0.032	0.015	0.112**	0.015	-0.005	0.030***
	(0.009)	(0.013)	(0.013)	(0.009)	(0.035)	(0.009)	(0.057)	(0.025)	(0.015)	(0.011)
T1 only	0.010**	0.015**	0.004	0.011**	0.002	0.001	0.037	0.041***	-0.005	0.017***
	(0.005)	(0.006)	(0.008)	(0.005)	(0.017)	(0.005)	(0.029)	(0.014)	(0.007)	(0.006)
Observations	20,297	13,079	7,218	17,561	2,736	15,177	1,309	3,811	6,082	14,215
Enrolled other curse	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)
beginning year 2	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Displaced	Non displaced
T1 & T2	-0.004	0.004	-0.009	-0.012	0.067**	-0.001	-0.040	0.003	-0.004	-0.002
	(0.008)	(0.012)	(0.012)	(0.008)	(0.029)	(0.008)	(0.055)	(0.024)	(0.013)	(0.010)
T2 only	-0.014	-0.010	-0.014	-0.019**	0.044	-0.004	-0.087	-0.025	0.004	-0.020**
	(0.008)	(0.012)	(0.012)	(0.008)	(0.029)	(0.008)	(0.055)	(0.023)	(0.013)	(0.010)
T1 only	-0.014***	-0.017***	-0.009	-0.013***	-0.012	-0.003	-0.042	-0.048***	0.002	-0.021***
	(0.004)	(0.005)	(0.007)	(0.004)	(0.014)	(0.004)	(0.028)	(0.013)	(0.006)	(0.005)
Observations	20,297	13,079	7,218	17,561	2,736	15,177	1,309	3,811	6,082	14,215
	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)
Drop out end year 2	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Displaced	Non displaced
T1 & T2	-0.015	-0.004	-0.028	-0.012	-0.044	-0.030**	0.189***	-0.036	-0.029*	-0.010
	(0.011)	(0.014)	(0.018)	(0.011)	(0.041)	(0.012)	(0.045)	(0.028)	(0.017)	(0.014)
T2 only	-0.023**	-0.014	-0.033*	-0.021*	-0.052	-0.035***	0.192***	-0.060**	-0.041**	-0.016
	(0.011)	(0.014)	(0.018)	(0.011)	(0.040)	(0.012)	(0.044)	(0.027)	(0.017)	(0.013)
T1 only	-0.012**	-0.012*	-0.012	-0.009	-0.035*	-0.012*	0.008	-0.018	-0.008	-0.013*
	(0.006)	(0.007)	(0.011)	(0.006)	(0.020)	(0.007)	(0.024)	(0.016)	(0.009)	(0.008)
Observations	16,882	10,927	5,955	14,637	2,245	12,632	1,076	3,174	5,055	11,827
	(41)	(42)	(43)	(44)	(45)	(46)	(47)	(48)	(49)	(50)
At least 36 credits	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Displaced	Non displaced
T1 & T2	0.006	0.017	0.000	0.003	0.024	-0.022	0.249***	0.050	-0.055	0.031
	(0.019)	(0.024)	(0.032)	(0.020)	(0.057)	(0.022)	(0.086)	(0.043)	(0.036)	(0.022)
T2 only	0.040**	0.050**	0.039	0.029	0.100*	0.021	0.264***	0.053	0.025	0.045**
	(0.019)	(0.024)	(0.033)	(0.020)	(0.058)	(0.022)	(0.085)	(0.042)	(0.036)	(0.022)
T1 only	0.032***	0.030***	0.038**	0.029***	0.045*	0.039***	0.031	-0.002	0.059***	0.018
	(0.009)	(0.011)	(0.018)	(0.010)	(0.026)	(0.011)	(0.039)	(0.022)	(0.017)	(0.011)
Observations	17,185	11,222	5,963	15,059	2,126	12,918	1,066	3,201	5,225	11,960
	(51)	(52)	(53)	(54)	(55)	(56)	(57)	(58)	(59)	(60)
Reached the enrolled credits	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Displaced	Non displaced
T1 & T2	0.049*	0.095**	-0.002	0.062**	-0.098	0.051	-0.001	0.045	0.081	0.041
	(0.029)	(0.042)	(0.041)	(0.031)	(0.088)	(0.034)	(0.130)	(0.069)	(0.056)	(0.035)
T2 only	0.002	0.058	-0.060	0.005	-0.097	0.006	-0.029	-0.023	0.039	-0.010
	(0.029)	(0.042)	(0.042)	(0.031)	(0.088)	(0.034)	(0.128)	(0.068)	(0.056)	(0.034)
T1 only	-0.038**	-0.031	-0.043*	-0.041**	-0.022	-0.044**	0.027	-0.048	-0.040	-0.041**
	(0.015)	(0.019)	(0.024)	(0.016)	(0.042)	(0.017)	(0.059)	(0.035)	(0.027)	(0.018)
Observations	16,822	10,915	5,907	14,728	2,094	12,650	1,071	3,101	5,153	11,669
	(61)	(62)	(63)	(64)	(65)	(66)	(67)	(68)	(69)	(70)
Graduated in time	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Displaced	Non displaced
T1 & T2	0.026	0.019	0.049	0.026	0.010	0.058	0.008	-0.086	0.006	0.029
	(0.031)	(0.042)	(0.046)	(0.032)	(0.096)	(0.035)	(0.134)	(0.070)	(0.059)	(0.036)
T2 only	-0.014	-0.008	-0.012	-0.023	0.045	0.012	-0.030	-0.091	-0.018	-0.015
	(0.029)	(0.041)	(0.043)	(0.031)	(0.091)	(0.034)	(0.125)	(0.064)	(0.057)	(0.034)
T1 only	-0.032*	-0.016	-0.055*	-0.039**	0.033	-0.027	0.029	-0.059	-0.011	-0.039*
	(0.018)	(0.022)	(0.028)	(0.019)	(0.052)	(0.020)	(0.074)	(0.041)	(0.032)	(0.021)
Observations	13,691	8,896	4,795	11,923	1,768	10,235	861	2,595	4,123	9,568

Table A.13: Heterogeneity analysis, student receiving the scholarship in second year,accounting for having received the scholarship also the first year-cont

	(71)	(72)	(73)	(74)	(75)	(76)	(77)	(78)	(79)	(80)
Graduated	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Displaced	Non displaced
T1 & T2	0.048*	0.017	0.096**	0.048*	0.054	0.086***	-0.106	-0.053	0.021	0.054*
	(0.026)	(0.035)	(0.042)	(0.027)	(0.086)	(0.030)	(0.112)	(0.063)	(0.048)	(0.031)
T2 only	0.007	-0.011	0.036	-0.003	0.082	0.038	-0.091	-0.072	-0.034	0.023
	(0.025)	(0.033)	(0.039)	(0.026)	(0.081)	(0.029)	(0.105)	(0.058)	(0.046)	(0.030)
T1 only	-0.033**	-0.024	-0.044*	-0.042***	0.036	-0.034**	0.059	-0.043	-0.051*	-0.022
	(0.015)	(0.018)	(0.026)	(0.016)	(0.046)	(0.017)	(0.062)	(0.037)	(0.026)	(0.018)
Observations	13,691	8,896	4,795	11,923	1,768	10,235	861	2,595	4,123	9,568
	(81)	(82)	(83)	(84)	(85)	(86)	(87)	(88)	(89)	(90)
Final mark	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Displaced	Non displaced
T1 & T2	0.037	0.078	0.032	0.061	-0.331	0.113	-0.845	-0.192	0.098	-0.000
	(0.143)	(0.201)	(0.213)	(0.152)	(0.447)	(0.162)	(0.746)	(0.351)	(0.278)	(0.168)
T2 only	0.000	0.126	-0.141	0.014	-0.288	0.026	-0.459	-0.114	0.126	-0.051
	(0.139)	(0.195)	(0.203)	(0.147)	(0.433)	(0.157)	(0.665)	(0.341)	(0.273)	(0.161)
T1 only	0.033	0.089	-0.051	0.051	-0.081	-0.006	0.537*	0.092	0.123	-0.004
	(0.071)	(0.086)	(0.126)	(0.076)	(0.198)	(0.081)	(0.312)	(0.166)	(0.129)	(0.085)
Observations	9,681	6,568	3,113	8,519	1,162	7,390	558	1,733	3,076	6,605
	(91)	(92)	(93)	(94)	(95)	(96)	(97)	(98)	(99)	(100)
Apply next year	Main	Female	Male	Public	Private	Less dev	Transition	Dev	Displaced	Non displaced
T1 & T2	0.259***	0.256***	0.275***	0.239***	0.395***	0.310***	0.113	0.144***	0.200***	0.281***
	(0.020)	(0.028)	(0.031)	(0.021)	(0.061)	(0.023)	(0.083)	(0.047)	(0.038)	(0.024)
T2 only	0.356***	0.363***	0.358***	0.332***	0.507***	0.406***	0.213**	0.241***	0.366***	0.347***
	(0.020)	(0.028)	(0.031)	(0.021)	(0.061)	(0.024)	(0.083)	(0.045)	(0.038)	(0.024)
T1 only	0.168***	0.171***	0.169***	0.164***	0.191***	0.170***	0.169***	0.160***	0.226***	0.142***
	(0.011)	(0.013)	(0.018)	(0.011)	(0.029)	(0.012)	(0.042)	(0.025)	(0.019)	(0.013)
Observations	20,336	13,101	7,235	17,575	2,761	15,208	1,309	3,819	6,085	14,251

Additional Figures

Figure A.1: Discontinuity in covariates -1

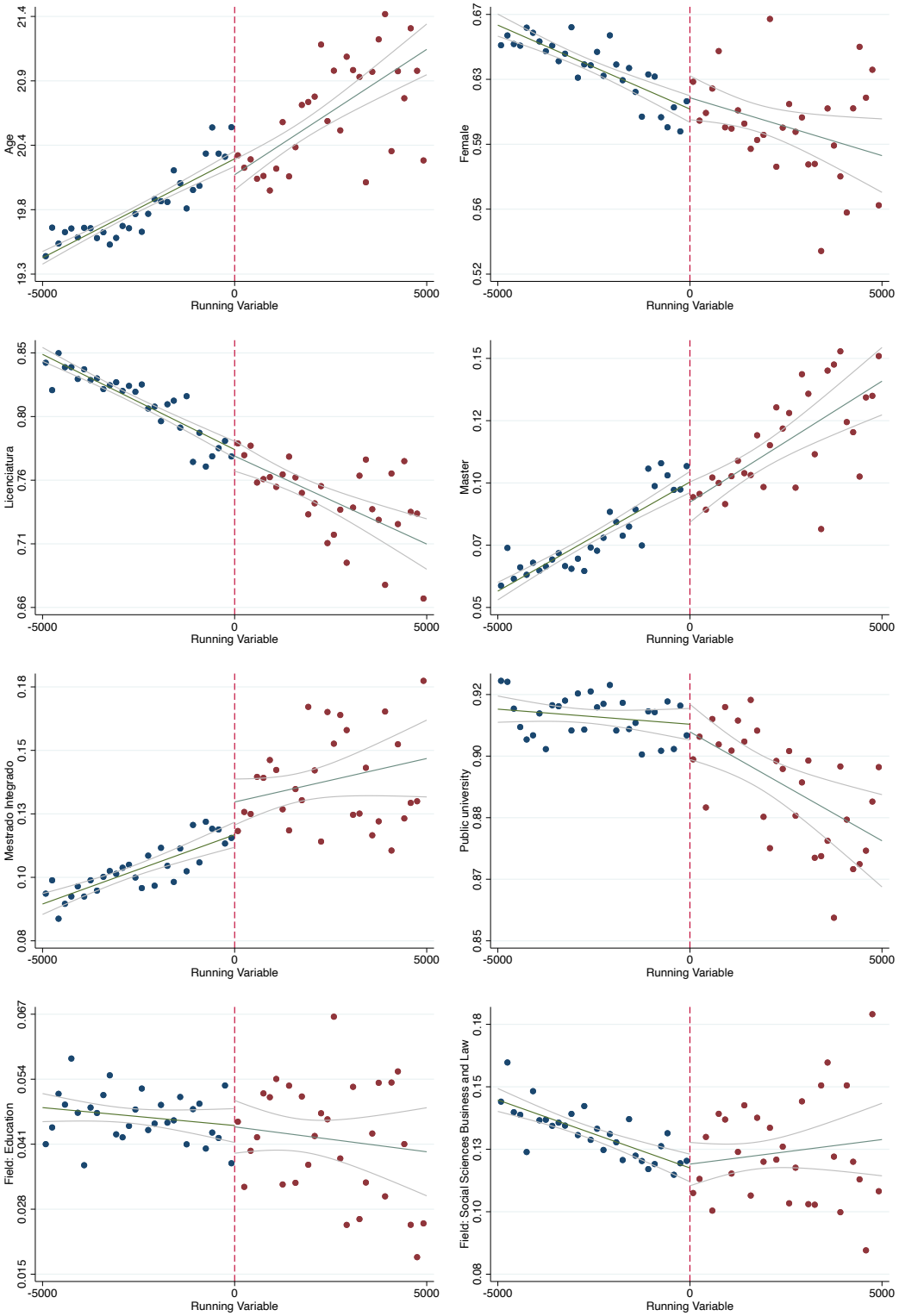


Figure A.2: Discontinuity in covariates -2

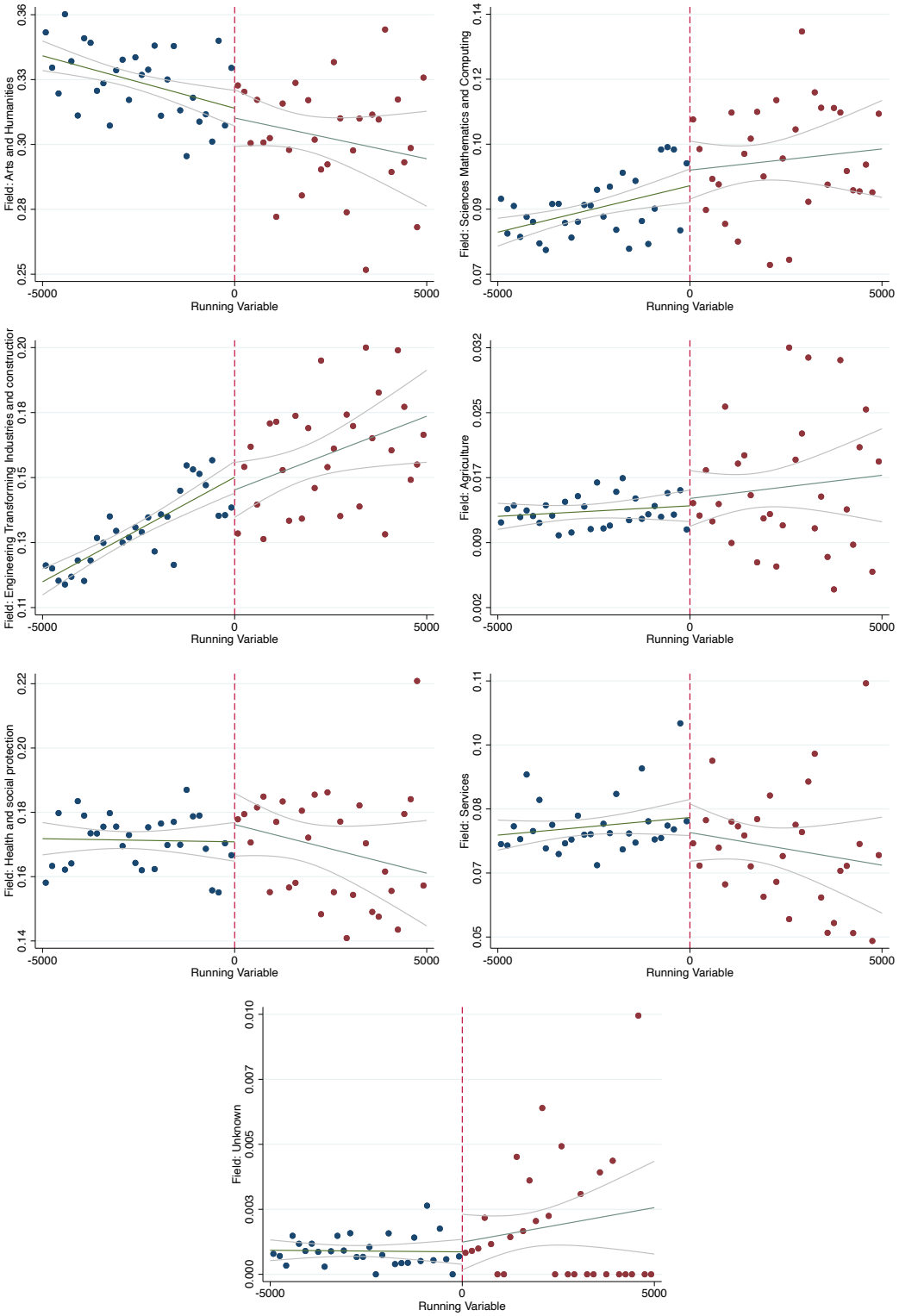
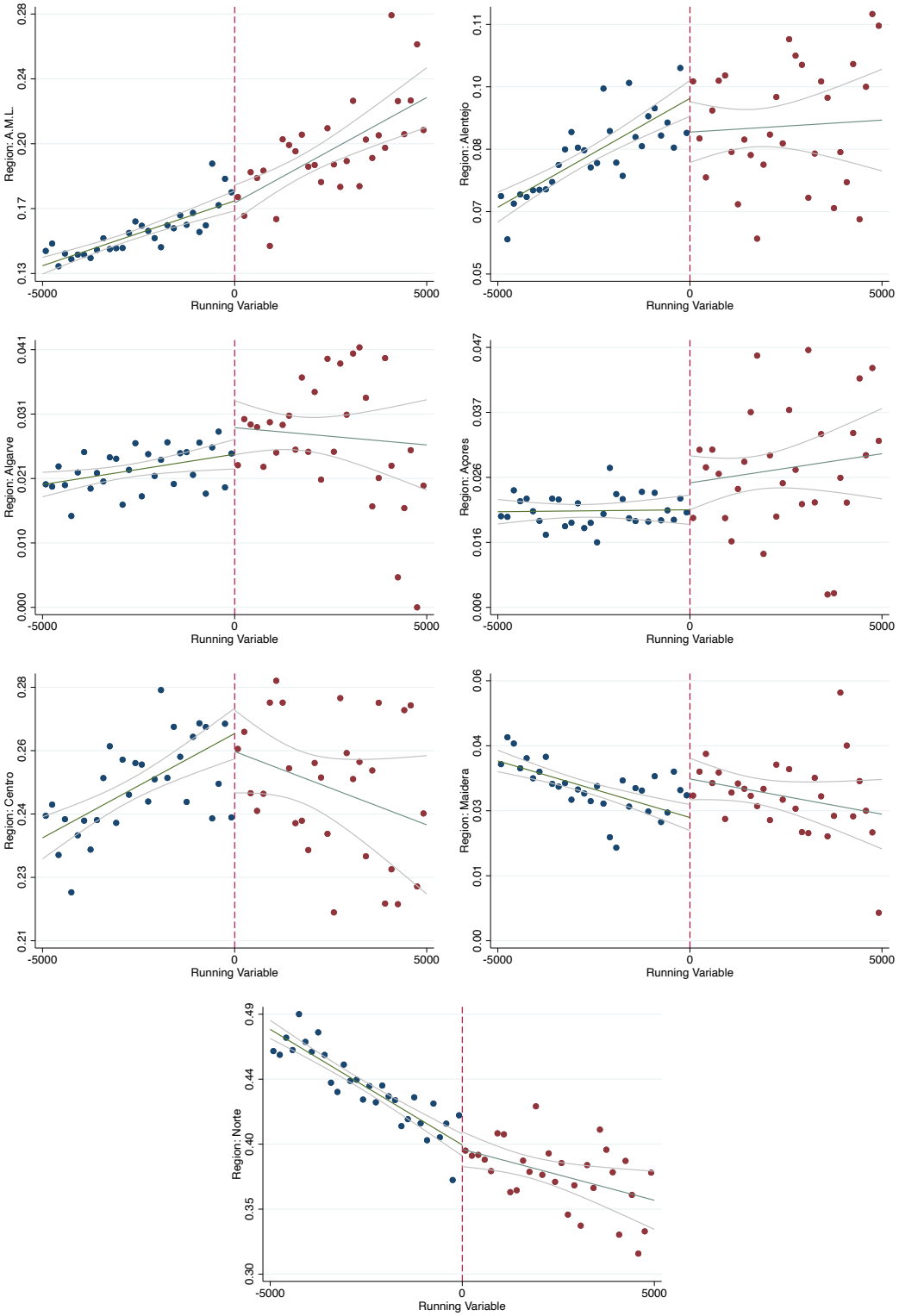
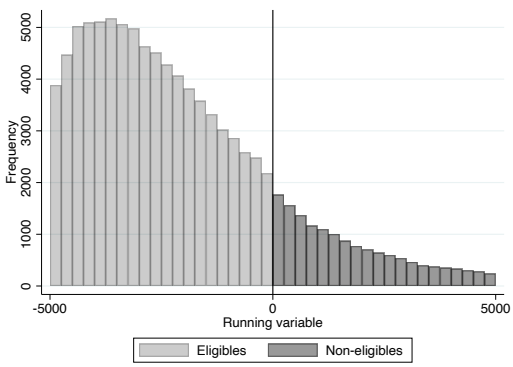


Figure A.3: Discontinuity in covariates -3

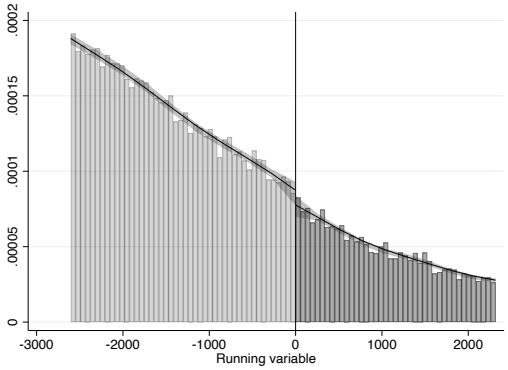


Note: Figures A.1, A.2, and A.3 display the distribution of observations around the income threshold by gender, age, type of degree, public university, field of study, region of living,

Figure A.4: No manipulation of the running variable around the threshold



(a) Distribution of the running variable



(b) Manipulation testing plot

Figure A.5: Manually selected bandwidth

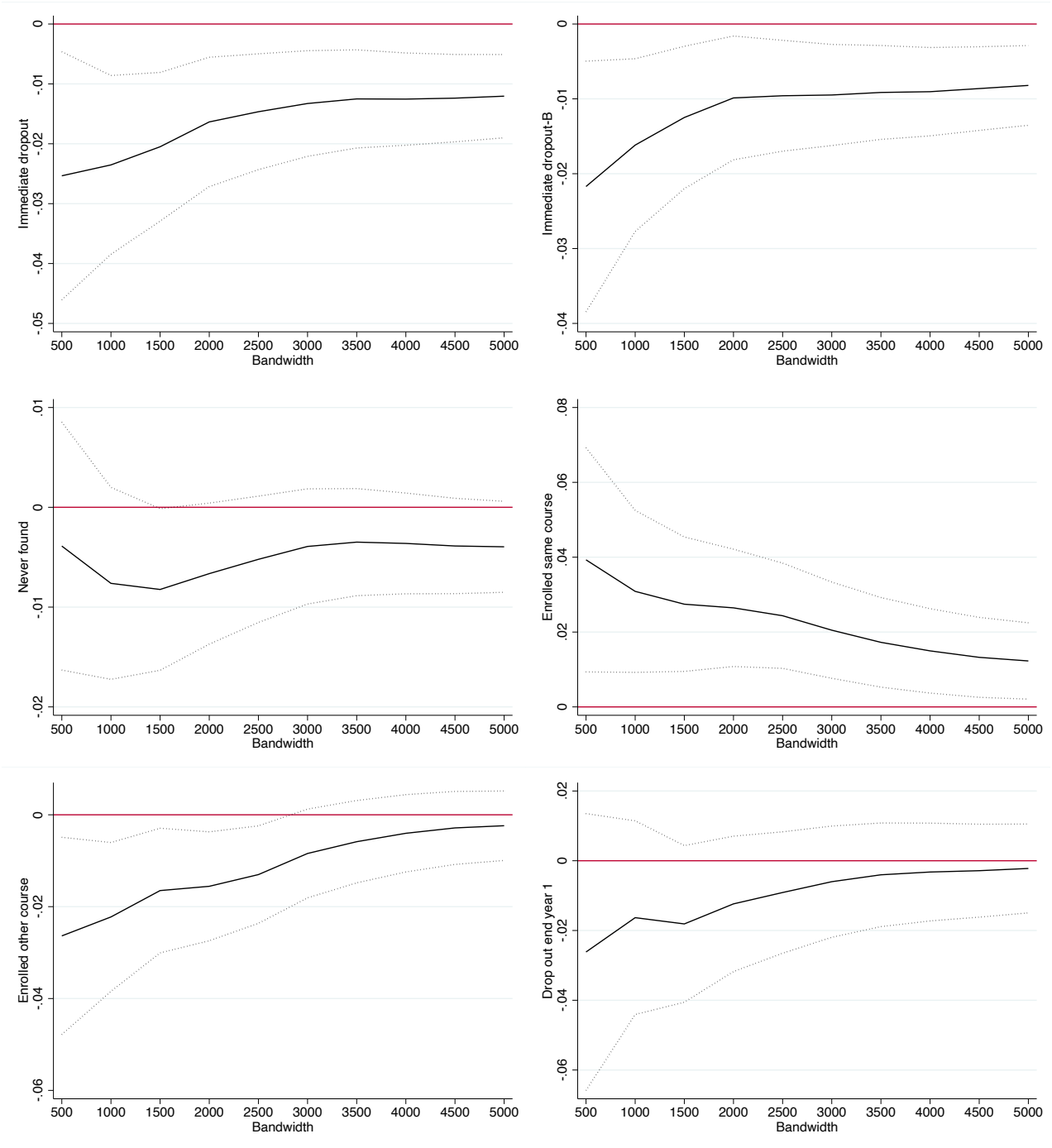
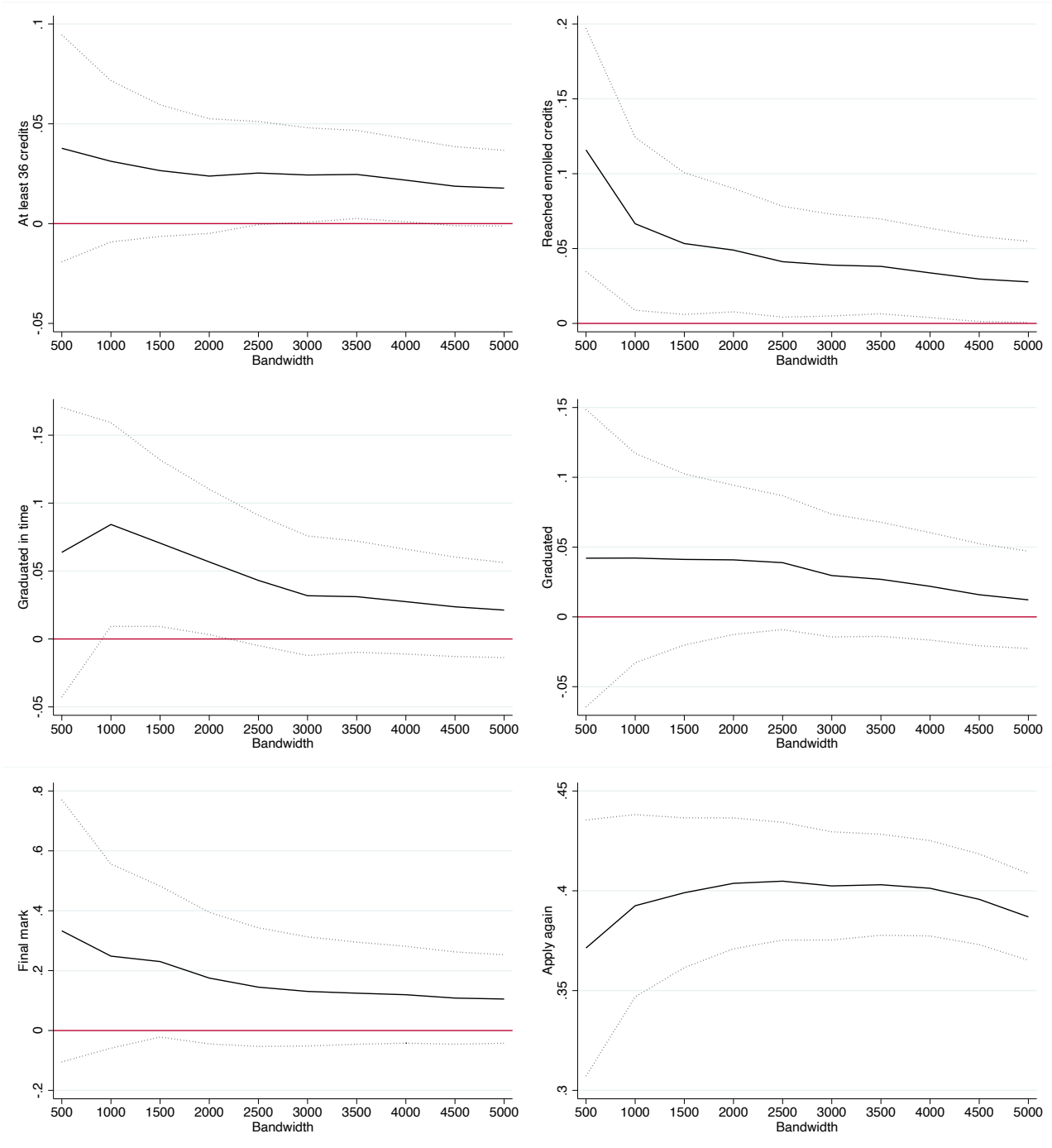


Figure A.6: Manually selected bandwidth-cont



Annexes

1 Higher Education Grant system: Maximum per capita income reference values

Below are listed the maximum per-capita income values used to assess eligibility to the grant.

Table A.14: Maximum reference values of the household per-capita income

Year	Reference value
2011-2012	6 868.79 €([1])
2012-2013	6 906.28 €([1])
2013-2014	6 934.80 €([1])
2014-2015	6 936.93 €([1])
2015-2016	7 770.99 €([2])
2016-2017	7 770.99 €([2])
2017-2018	7 804.59 €([2])
2018-2019	7 925.87 €([2])

([1]) 14 times the indexing of social benefits in force at the beginning of the school year, plus the amount of the tuition fee set for the 1st cycle of studies of public higher education, according to Despacho 12780-A/2011, September 23.
([2]) 16 times the indexing of social benefits in force at the beginning of the school year, plus the amount of the annual tuition fee set for the 1st cycle of studies of public higher education, as amended by Despacho 7031-B/2015, June 24.

2 Higher Education Grant system: Award conditions

Grants may be awarded to students under the following conditions:

1. Students who are:
   - — To be citizens nationals of Member States of the European Union with the right to a permanent residence in Portugal, and their families;
   - — To be third country nationals: holders of a permanent residence permit; beneficiaries of long-term resident status; coming from States with cooperation agreements providing for the application of such benefits;
   - — To be stateless people;
   - — To be political refugees.
2. To students attending Professional Higher Technical Courses, Degree, Integrated Master and Master courses, in Portuguese higher education institutions. Graduates of degree or master courses can also be awarded a grant when, in the period of 24 months after obtaining the degree, undergoing professional training for the exercise of a profession.
3. To students not holding a degree or diploma similar or higher in relation to the one which attends.
4. To be enrolled in a minimum of 30 ECTS credits, with some exceptions (to be completing the course or enrolled in a thesis).
5. To have had academic success in the previous school year (at least 36 credits, if enrolled in more than 36 or the total amount of credits, if enrolled in less).
6. To be able to complete the course within its normal duration plus 1 or 2 years, depending on the normal duration of the course.
7. To have a household per-capita income less or equal to 16 times the indexing of social benefits in force at the beginning of the school year, plus the amount of the annual tuition fee set for the 1st cycle of studies of public higher education.
8. To have, as of December 31 of the year prior to the beginning of the school year, movable assets not exceeding 240 times the indexing of social benefits.
9. To present the tax and contributory situation regularized.

3 Higher Education Grant system: Reasons for not awarding a grant

— Submission of the application outside the deadlines

— Process not complete

— Holder of a degree or diploma similar or higher in relation to the one which attends

— Household per-capita income higher than 16 times the indexing of social benefits in force at the beginning of the school year, plus the amount of the annual tuition fee set for the 1st cycle of studies of public higher education

— Not matriculated in a higher education institution and not enrolled in a course

— Completion of the course outside the established period

— Providing false information or omission of data

— Household with no income or with not perceptible income sources

— Fraud application

— Movable assets exceeding 240 times the indexing of social benefits

— Nationals of Member States of the European Union without the right to a permanent residence in Portugal

— Third country nationals without a regular permanence in Portugal

— To be enrolled in less than 30 ECTS credits

— To be enrolled simultaneously in several courses

— Professional training not covered

— Withdrawal of the application

— Student without the tax and/or contributory situation regularized

— Lack of academic success in the previous school year

— International student status

— Institution and/or course not covered

— One-person household with an income of less than 6 times the indexing of social benefits

4 Higher Education Grant system: Process and financing

The grant award conditions are common for both public and private higher education, although:

— In public higher education, analysis and decision on the applications fall within the responsibility of higher education institutions;

— In private higher education, analysis and decision on the applications fall within the responsibility of DGES.

Payment is ensured, in all cases, by DGES. Regions of North, Center and Alentejo are co-founded by the EU funds and students from other regions are financed by the State budget.

The grant application for an academic year must be regularly submitted:

— Between 25 June and 30 September;

— Within 20 working days following registration, when registration occurs after September 30;

— Within 20 working days following the initiation of internship in the case of graduates or masters who are undertaking professional internship.

First year students usually enroll into higher education in September. Students can apply to the grant even before enrolling in higher education, but they need to be enrolled in order to get it. By law students should know the result of their scholarship application within 30 working days. However, since it only starts from the moment the process is complete with academic and financial information, it varies. And as the financial information is only available from September onwards (also when most of the academic information is loaded), in fact, the deadline only starts to run in mid-September, therefore in ending in November or December. Besides, in all cases of document requests or student hearing, the deadline is extended, so it can even exceed December While most of students do not know the results of the application when they start the academic year (September),when we measure the first outcomes - December of the first year- around 80 % of the students know the results of their application.

5 Higher Education Grant system: Amounts

The reference grant equals 11 times the value of the indexing of social benefits in force at the beginning of the school year, plus the amount of the tuition fee actually paid (which can never be higher than the maximum amount fixed annually for the 1st cycle of studies of public higher education). The annual base grant equals the difference between the respective reference grant and the per-capita income of the household. The minimum grant guaranteed to all students is equal to the tuition fee they paid (up to 125% of the maximum amount fixed annually for the 1st cycle of studies of public higher education.) This implies that, the further the students' are from the per-capita income threshold, the higher would their grant be,and that for students close to the threshold, the grant consist only a tuition fee waiver of around 1000 euro. For those whose per-capita income is further away from the threshold, in addition to the tuition fee waiver additional cash is also provided.

$$Grant = (11 * IAS + PE) - C \tag{5}$$

Where, IAS is the index of social benefits(which is equal to 419,22 from 2012 to 2016; 421,32 in 2017)[35]; PE is the fee actually paid by the students (or the maximum fee fixed in public education) and C is the per-capita income. Assuming the amount fixed annually for the 1st cycle of studies of public higher education is set at 1000 (as it was in all the academic year considered), we can calculate how far one students needs to be from the per-capita income threshold so to get additional cash with respect to the tuition fee amount.

If we take for example academic year 2012, we know that the threshold to receive the grant is set to 6906.28, the maximum fee was 1038, so the reference grant for someone paying the maximum grant was 5648 (419.22 * 11 + 1038) euro. The grant received would equal to the maximum between the 1038 and the difference between 5648 and the per-capita income. So all those whose per-capita income (enrolled in course charging maximum fee)is above 4610 euro will get 1038 euro, and all those below will get 1038, plus additional cash according to their percapita income. Since the threshold to get the grant is 6906.28, we can conclude that all those whose per-capita income is between 4610 and 6906.28 will get more or less the same amount (they will get the reimbursement of the tuition fee). This is plotted in Figure A.7, for the sample of Bachelor students enrolled in public universities, for the 6 academic year included in our analysis. Per-capita income is rounded to the decine, and average grant received in that decine is plotted [36]

The following supplements may also be awarded:

1. Accommodation supplement for displaced students;
2. Transport benefits for students displaced from or to the autonomous regions;
3. Supplements for students taking mobility periods;
4. Supplements for students with special educational needs.

The Regulation for the Allocation of Grants to Higher Education Students provides for the definition of a calendar that sets the payment dates for the grants. According to the regulation:

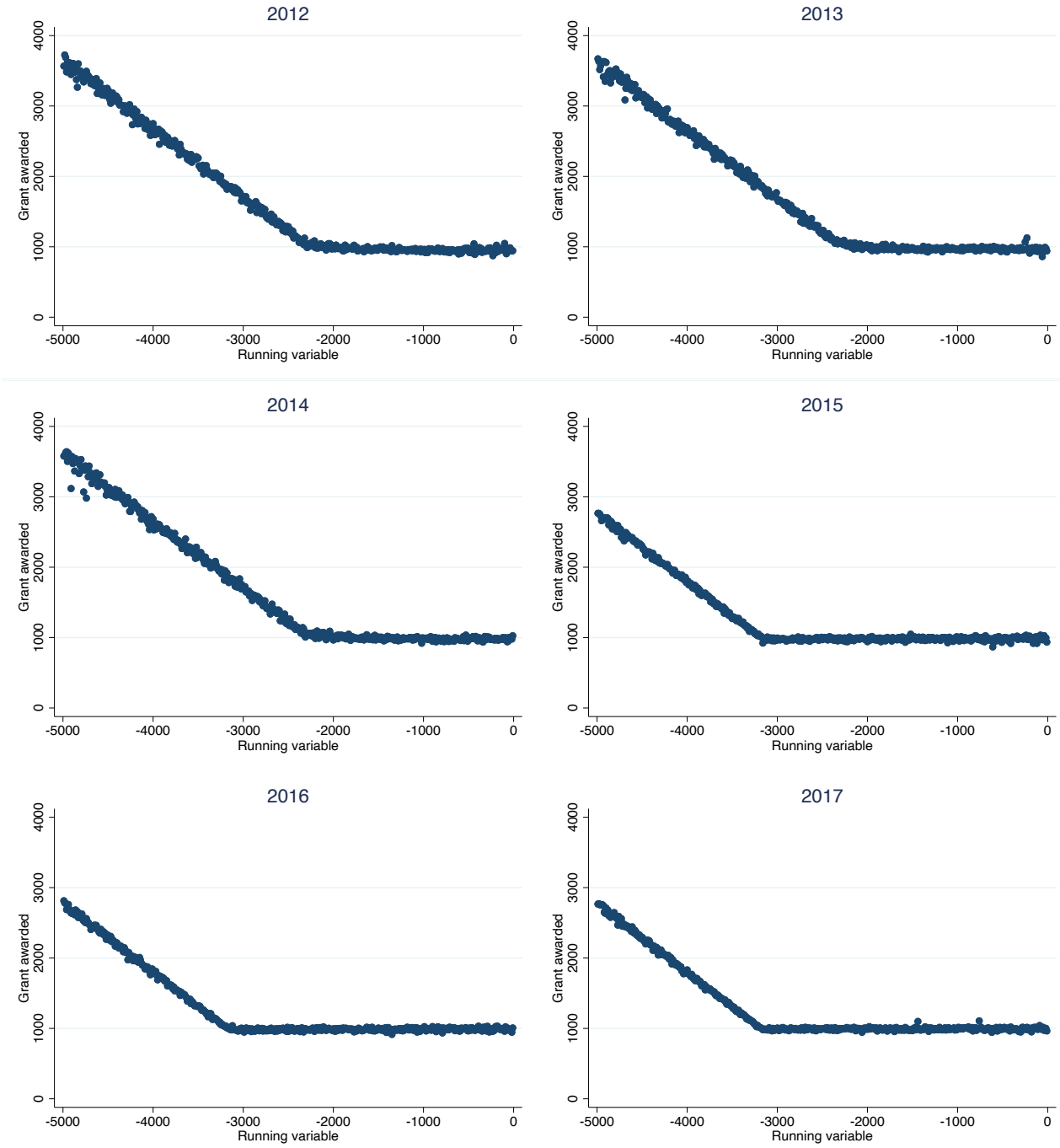
— The grant payment is made, monthly, directly to the student through bank transfer

— When making a monthly payment, compensation can be made in order to adjust the amounts delivered or to be delivered, to the annual value of the grant awarded.

[35] https://www.dgaep.gov.pt/index.cfm?OBJID=3E74CF19-DA87-4B8F-81E2-51E0649AAA9F

[36] The data used to create this graphs were shared with JRC at the beginning of the project, but are not the ones used for the rest of the analysis, as it only contains info from the application files, and no information on the outcomes are available in this set of data.

Figure A.7: Grant awarded according to the running variable



6 Empirical strategy for the measurement of the impact on the full set of students

This annex describes the methods that will be implemented to study the impact of the grant on the full set of students, that is including the impact for students in higher years than the first year of degree followed. Students who apply for the grant in their second year of Master or second or third year of Bachelor have to comply with a second eligibility condition; having obtained a certain number of credits in the previous year. This second eligibility condition is used in addition to the income eligibility criteria to measure the impact of the grant on academic success.

Formally, one aims to analyse the effect of the higher education grant on academic success. Our identification strategy relies on two running variables:

— s_{1i}, "household income", which is defined as the household income used for the assessment eligibility of

student i. Student i qualifies for the grant if her household income is below the income cut-off, c_{1i}. We define the dummy variable indicating whether student i has an household income below the eligibility cut-off as $d_{1i} = I(s_{1i} < c_{1i})$.

— s_{2i}, "credits the previous year", which is defined as the number of credits obtained and used for the assessment eligibility of student i. Student i qualifies for the grant if the number of credits she obtained is above the cutâĂŘoff, c_{2i}. The corresponding dummy variable can be written as $d_{2i} = I(s_{2i} > c_{2i})$.

Following Choi and Lee (2018) and Cattaneo et al. (2020c), the model can be written as:

$$E(y_i/s_{1i}, s_{2i}) = \beta_0 + \beta_1 d_{1i} + \beta_2 d_{2i} + \beta_3 d_{1i} * d_{2i} \tag{6}$$

where $y_i/s_{1i}, s_{2i}$ is the outcome variable. β_3 is the parameter of interest, that is the impact of meeting both eligibility criteria, also written as $D_i = d_{1i} * d_{2i}$. In our sample, all eligible students are receiving the grant. Thus, D_i corresponds to the treatment variable - holding the higher education grant. β_1 and β_2 measure both partial effects, that is meeting only one of the eligibility criteria on academic success.

7 Information on students' situation

From the database provided by Directorate-General for Statistics on Education and Science (DGEEC), we retrieve the student situation in the academic years from 2012/2013 to 2018/2019. For each of the academic year, each student could be classified in 8 possible categories. In 2015/2016 for instance, the student could be:

1. Graduated in the program (HEI/course) associated with the original grant application in the previous scholar year (2014/2015)
2. Didn't graduate, but is still enrolled in the program associated with the grant application;
3. None of the above, but left the program with an intermediary diploma corresponding to partial completion of the program, obtained in 2014/15 (e.g. a diploma for the course part of a masters program);
4. None of the above, but graduated in another program (HEI/course) with the same ISCED level (or above) as the program associated with the grant application (in the scholar year 2014/15);
5. None of the above, but is still enrolled in another program (HEI/course) with the same ISCED level (or above) as the program associated with the grant application;
6. None of the above, but graduated in another program (HEI/course) with lower ISCED level than the program associated with the grant application (in the scholar year 2014/15);
7. None of the above, but is still enrolled in another program (HEI/course) with lower ISCED level than the program associated with the grant application;
8. Was not found in any HEI database of graduates or enrolled students in this year.

Whenever a student is classified in situation 1 or 4, information about the final grade of the student at graduation, in the scale 10-20- is provided. Whenever the student is classified in situation 2, we known whether that is the first year of enrollment and the number of credits completed at the end of the first year.

8 Credit variable- first year students

The information on the number obtained at the end of the first year, come from two sources:

— Information retrieve from the application to the scholarship done by the same student at the end of the first year. This is available only for the students who apply again in the year following year t

— Information form the DGEC data, which indicates the number of credits completed so far by the students, which for students at the end of the first year coincide with the number of credit completed in the first year. This information is available only for students who in December of year t+1 from the application are still enrolled in the same course for which they apply to the scholarship.

The first year students' sample is composed by 94,964 students, of which 78,601 treated and 16,363 non treated. Of this 94,964 students, 17,215 are first year students in academic year 2017, which means that for those students the information on credits come only from the application file of academic year 2018, as the last outcome available from the DGEC information is from December 2017. Table A.15 report the number of students by academic year, for which the information about credit is available, from either one of the two sources.

Table A.15: Number of students with missing credits information

Academic year	Credit available	Credit Not available	Total
2012	14,992	1,697	16,689
2013	12,59	1,168	13,758
2014	14,468	1,401	15,869
2015	14,438	1,217	15,655
2016	14,626	1,152	15,778
2017	13,056	4,159	17,215
Total	84,170	10,794	94,964

Note: The table summarize the number of students per each academic year for which any information about the credit obtained at the end of the first year is available.

So, for some of the students there is no information on the number of credits obtained at the end of the first year, this can be due to:

— Students actually dropout during the first year, so they cannot have credits

— Students did not apply again to the scholarship at beginning of year two and was not enrolled in the same course of application at the end of year 1.

For the 84,170 students for which the credit variable is available, we compared the two sources of information. for 54,401 students we have info from both sources, while from 29,769 only from one of the two. If information is present only in one source, we use the available one. Among the 54,401 students which have info from both sources, for 40,958 (75%) the variables take the exact same values, while for 13,443 the two sources provided different information. For the 13,443 where information is not the same, we checked if both variables were above (below) 36 credits, and if both variables were above (or below) the number of credit enrolled. This is true for 10,138 for what regards the 36 credit threshold and more 9,006 for what regards the enrolled credit threshold. This means that we cannot use respectively 3,305 and 4,437 students out of 84,170 when estimating effects of the scholarship on these two outcomes. This is summarized in Table A.16 by academic year

Table A.16: Number of students with missing credits information

		At least 36 credits		Reach enrolled credits	
Academic year	(1)	(2a)	(3a)	(2b)	(3b)
2012	14992	1611	13381	1385	13607
2013	1590	487	12103	765	11825
2014	14468	373	14095	656	13812
2015	14438	467	13971	875	13563
2016	14626	367	14259	756	13870
2017	13056	0	13056	0	13056
Total	84170	3305	80865	4437	79733

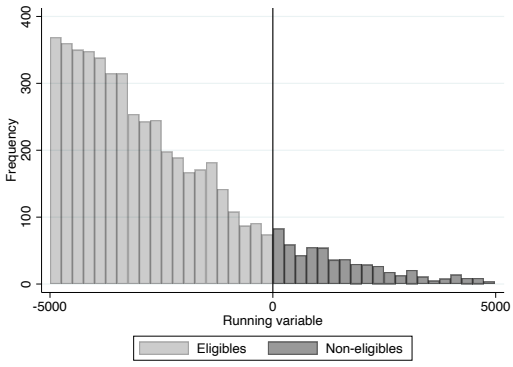
Note: The table summarize the number of students per each academic year for which we will use infomation about the credit variable to build the outcome variables "Student reached at least 36 credit at the end of the first year" (Columns 2a and 3a) , and "Student reached all the credit he was enrolled in at the end of the first year"(Coumns 2b and 3b).Columns (1) report the number of students for which at leas one course of info regarding the credit is available, - also reported in column (1) of Table A.15- columns (2a) and (2b) report the number of students for which the information will not be used, since the two sources provide contrasting information, and columns (3a) and (3b) report the number of students for which the info can be used since the two sources provide the same information.

9 Analysis on the first year students enrolled in the Curso técnico superior profissional (TESP)

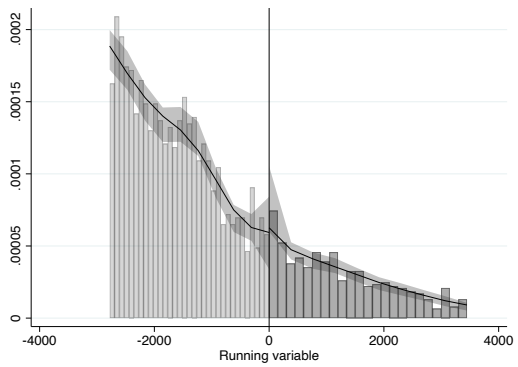
In this Annex, we replicate the analisys presented in Section 4 for the students enrolled in the Curso tÃľcnico superior profissional (TESP). The number of first year, first applicants is 5,111, applying for the scholarship between 2015 and 2017. For this set of students we will only focus on short term outcomes, as outcomes related to graduation are not observable -yet- for most of the students. Of the 5,111 students 4,496 have income lower than the threshold and are treated, 565 have income above the thresholds and are not treated, and 50 have income below the threshold but do not receive the scholarship. Given the -small- non compliance we follow the same approach as in the main section and we apply a fuzzy approach.

We first tested for manipulation of the running variable around the threshold, first by plotting the distribution of per-capita income around the threshold and second by using the density test. Figure A.8 plot the two graphs. Graph (a) of Figure A.8 displays no jump at the threshold. In addition, the presence of a discontinuity in the density function at the cut-off point is tested and rejected using tests proposed by Cattaneo et al. (2020b). Graph (b) of Figure A.8 reports the estimate of the local polynomial density estimation test (unrestricted model) by Cattaneo et al. (2020b). We can see that there is no significant discontinuity in the distribution of the income i.e. the running variable around the eligibility threshold. The corresponding coefficients are the following: the robust estimate equals -1.371 with p-value 0.170, (optimal bandwidth selection, default settings: $(p) = 2$ and $(q) = 3$).

Figure A.8: No manipulation of the running variable around the threshold - TESP sample



(a) Distribution of the running variable - TESP sample



(b) Manipulation testing plot -TESP sample

Table A.17: Discontinuity in covariates - TEPS sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	**A.M.L**	**Alentejo**	**Algarve**	**Açores**	**Centro**	**Madeira**	**Norte**
Robust	0.027	0.092	0.008	0.040**	-0.151*	-0.028	-0.002
	(0.064)	(0.060)	(0.019)	(0.020)	(0.086)	(0.018)	(0.080)
Observations	[4505:559]	[4505:559]	[4505:559]	[4505:559]	[4505:559]	[4505:559]	[4505:559]
Bandwidth	[1159:1159]	[1115:1115]	[985:985]	[1576:1576]	[1399:1399]	[1047:1047]	[1793:1793]
Effect. observations	[447:269]	[418:261]	[350:233]	[728:342]	[607:307]	[380:246]	[877:368]
	(9)	(10)	(11)	(12)	(13)	(14)	(15)
VARIABLES	**Less dev.**	**In transition**	**Dev.**	**Female**	**Age**	**Arts**	**Social Sciences**
Robust	-0.034	-0.028	0.027	0.108	-1.319	0.051	0.024
	(0.060)	(0.025)	(0.064)	(0.092)	(0.857)	(0.042)	(0.072)
Observations	[4505:559]	[4505:559]	[4505:559]	[4546:565]	[4546:565]	[4546:565]	[4546:565]
Bandwidth	[1479:1479]	[868:868]	[1159:1159]	[1134:1134]	[1259:1259]	[1746:1746]	[1592:1592]
Effect. observations	[666:321]	[294:210]	[447:269]	[432:268]	[509:295]	[850:366]	[750:347]
	(16)	(17)	(18)	(19)	(20)	(21)	
VARIABLES	**Sciences**	**Engineering**	**Agriculture**	**Health**	**Services**	**Public**	
Robust	-0.048	-0.030	0.053	-0.055	0.001	-0.084	
	(0.068)	(0.064)	(0.048)	(0.078)	(0.067)	(0.058)	
Observations	[4546:565]	[4546:565]	[4546:565]	[4546:565]	[4546:565]	[4546:565]	
Bandwidth	[1191:1191]	[1509:1509]	[888:888]	[986:986]	[1417:1417]	[1756:1756]	
Effect. observations	[469:283]	[690:334]	[313:216]	[353:238]	[619:312]	[856:369]	

Second, we checked for no discontinuity of predetermined covariates at the threshold.[37] Results are reported in Table A.17: overall there are no sign of discontinuity of covariates, with the excpetion of 2 regions: Açores and Centro. Howver if we group the students, following the division into “Less developed regions”, “In transition

[37] There are no students enrolled in the Education field

regions" and "Developed regions" there are no more differences at the threshold. Evidences provided in Table A.17 and Figure A.8 support the use of regression discontinuity design on this sample of TEPS students. We therefore proceed with the analysis of the effectiveness of receiving the grant among those students.

Table A.18: Main results -TEPS students

	(1)	(2)	(3)	(4)	(5)
	Immediate dropout	**Immediate dropout B**	**Never found**	**Erolled same course**	**Enrolled other course**
First stage	0.958***	0.947 ***	0.961***	0.955***	0.971***
	(0.031)	(0.038)	(0.026)	(0.030)	(0.020)
Robust	-0.022	-0.005	-0.000	0.006	-0.016
	(0.027)	(0.004)	(0.027)	(0.029)	(0.022)
Observations	[4546:565]	[4491:549]	[4546:565]	[4491:549]	[4491:549]
Bandwidth	[980:980]	[702:702]	[1201:1201]	[1017:1017]	[1690:1690]
Effect. obs.	[351:237]	[231:172]	[479:286]	[355:236]	[792:349]

	(6)	(7)	(8)	(9)
	Dropout end year1	**At least 36 credits**	**Reach enrolled credits**	**Apply again**
First stage	0.944***	0.969***	0.971***	0.973***
	(0.037)	(0.024)	(0.023)	(0.019)
Robust	-0.067	0.017	0.032	0.459***
	(0.076)	(0.050)	(0.107)	(0.067)
Observations	[2884:326]	[3781:334]	[3721:332]	[4546:565]
Bandwidth	[1417:1417]	[1112:1112]	[1244:1244]	[1750:1750]
Effect. obs.	[379:182]	[352:162]	[409:177]	[855:367]

Note: The table reports RDD estimates of Eq. (1). on the sample of TEPS students. Eq. (1) is estimated with the optimal bandwidth, triangular kernel, and local linear polynomial. The coefficients reported are bias-corrected and robust standard errors are in parentheses. Each column is a different regression. *** p<0.01, ** p<0.05, * p<0.1.

Results are reported in Table A.18. There are no significant effects of receiving the scholarship on any of the outcomes considered. The only effect is found on the probability of applying again for the scholarship the following year. Results are stable to the inclusion of covariates.

We also tried to perform heterogeneity analysis by gender, public or private university and regions of residence, but no results are found in any of the subgroups.