

# The effects of financial aid on university participation and academic performances in times of economic recession

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## Abstract

In this paper we investigate the effects of a scholarship known as Grant 5B on university participation and academic performances. This programme was active in the province of Trento (North-East of Italy) from 2009 to 2012 and consisted in a financial aid targeted to students from low-income families with outstanding upper secondary school achievement. We exploit a unique dataset resulting from the linkage of administrative data with an *ad hoc* survey carried out on a sample of upper secondary school graduates from 2009 to 2012. Using regression discontinuity design, we find that the programme has no significant effect on enrolment rates, but it exerts a positive effect on redirecting students to enrol away from their place of residence. However, this effect disappears as the economic recession persists. Finally, we estimate the effect of the programme on the academic performances finding that it has no effects on these outcomes.

**Keywords:** financial aid, university enrolment, academic performances, regression discontinuity design, programme evaluation.

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## 1. Introduction

The provision of financial aid to widen participation in higher education (HE henceforth) is a major component of education policies in many advanced countries. Evidence has shown that the share of university graduates influence positively the economic development of a country (OECD 2008; Hanushek and Wössman 2010) and that, at the individual level, holding a university degree can lead to better opportunities both in the labour market (OECD 2016) and in the social sphere, such as volunteering, trust and health (Putnam 2000). The rationale behind means-based financial aid is that students from lower disadvantaged backgrounds suffer of liquidity constraints and that widening participation could pass through the reduction of both direct costs (e.g. tuition fees, accommodation, school equipment) and/or opportunity costs (e.g. the income that university students give up by studying rather than working). As such, it can be argued that, for those progressing to HE, also academic performance can be influenced by financial aid.

Thus far, the literature on the effects of financial aid on HE participation and achievements has not been able to provide uncontroversial results on the effectiveness of such programmes (see, for a review, Dynarski and Scott-Clayton 2013 and Page and Scott-Clayton 2016). Furthermore, to the best of our knowledge, little (if any) evidence has been produced on the link between the impact of this kind of programmes and the socio-economic context they are implemented in (see, for an example, Vergolini and Zanini, 2013).

In this paper, we illustrate the main results of the evaluation of the effectiveness of a grant provision, named Grant 5B, implemented in the province of Trento, an area in the North-East of Italy. The programme, was first introduced in 2009 and carried over until 2012. For the first cohort of beneficiaries, Grant 5B proved to be not effective with respect to the main aim of the policy makers, that was increasing the likelihood to progress to HE (Covizzi et al. 2012). However, Vergolini and Zanini (2015) showed that the grant provision exerted a positive and fairly large effect on other choices related to HE participation, such as the location of the HE institution and the field of study.

Building on previous findings, evidence provided in this paper contribute to the literature on the effects of financial aid adding three elements of novelty. First, the fact that the grant provision was carried over four consecutive cohorts of students enables us to assess whether the effects of the Grant 5B changed over time. It has to be stressed that the analyses presented here cover four years, beginning just before families were hit by the effects of a prolonged economic recession. Second, this paper focuses on the study of the heterogeneity of the effects according to student's social origins in order to understand if the programme was able to reduce social inequalities, that was the second aim of the policy makers that has not yet been addressed by previous studies. Third, the availability of data on students during their university allow to evaluate the grant's impact on the academic performance (drop-out, average marks and number of credits) and the use of time (hours of study and hours of work) during the first year of university. The overall aim of this paper is, therefore, to shed light on the interplay between liquidity constraints, financial aids and HE choices of students from different backgrounds and how this is affected by the contextual economic situation.

The remainder of the paper is organised as follows. Section 2 briefly describes the Italian educational system, the main features of the province of Trento and the basic provisions of the Grant 5B. Section 3 summarises the results from previous studies about the role of financial aid and highlights the main research questions. Section 4 is devoted to the description of the data and to the evaluation strategy. Section 5 reports the main findings. Finally, section 6 draws some conclusive remarks and policy implications.

## 2. The context

### 2.1. The Italian education system

The Italian education system is organised into three levels<sup>1</sup>: primary, secondary and tertiary. Primary school is compulsory and lasts for five years. Secondary education is divided into two levels: lower and upper secondary school. The former lasts for three years and it is still undifferentiated, while the latter lasts 5 years and it is split in three tracks: academic (*liceo*), technical (*istituto tecnico*) and vocational (*istituto professionale*). In the 1960s the Italian educational system was reformed in a more egalitarian fashion by widening the university access to students with technical and vocational secondary qualifications. Therefore, the only constraint that students face in the access to university is the so-called *Esame di maturità*, the final examination taken by students of each track at the end of upper-secondary school.<sup>2</sup>

The HE system was reformed in 2001, replacing the old unitary system with a sequential system consisting of a 3-year bachelor and a 2-year master. The HE system in Italy is mainly based on state-founded universities, which award degrees with the same legal value. This implies that in many cases, and in particular for the public-sector entrance examinations, what really matters is the attainment of a degree, possibly in a specific field and with a good outcome, but not the prestige of the university attended.

### 2.2. The Grant 5B

In Italy, the main programme for funding university participation is the so-called *Diritto allo studio* ('Right to study') that is regulated at national level, administered by the universities and financed by local authorities. It is designed to cover direct costs (tuition, accommodation and living allowance), and students can access to it according to family income and academic performance. In addition to this scheme, there are few small programmes funded by local governments or by private foundations that offer further monetary aids.

Since the 2009/2010 academic year, the local government of the Province of Trento introduced the Grant 5B, a merit-based financial aid for students from low-income families. The aim of the policy maker was to

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<sup>1</sup> For a deeper description of the Italian education system and its main changes see Schizzerotto and Barone (2006) and the Eurydice website (<https://webgate.ec.europa.eu/fpfis/mwikis/eurydice/index.php/Italy:Overview>).

<sup>2</sup> This examination consists of three written tests plus an oral examination, which together form a final mark between 0 and 100, with the minimal threshold being 60. The national Ministry of Education designs the first two tests, while the remaining written test is left to each individual school, as well as the conduction of the oral examination. The examinations are overseen by a specific committee where only four members out of seven are external examiners.

increase university enrolment whilst reducing social inequalities. Grant 5B was designed to cover the opportunity costs connected with the participation to HE, while the direct costs are delegated to *Diritto allo studio*. It should be noted that, although introduced at local level, the introduction of the Grant 5B represented a novelty in the Italian HE funding regime, given that it was meant to work as a generous top-up of the national scheme, providing a remarkable reduction of the educational costs. In order to attract applications, the programme was widely advertised on the local media and in schools, before the end of the school year.

The target population comprises students who have been residing in the province of Trento for at least three years and have successfully completed the last year of upper secondary school, obtaining a final mark above 93/100, and whose family equivalent income is below € 30,000.<sup>3</sup> The amount of the benefit varies according to the family income and, to a lesser extent, the geographic location of the university chosen. In theory, students enrolling at universities located within the province of Trento are entitled to financial aid ranging from € 1,200 to € 4,800 per year, whilst students attending universities outside the province receive grants that range from € 1,800 to € 6,000 per year according to family income. Overall, the majority of Grant 5B recipients receive more than € 4,800 per year, which corresponds to a monthly grant of about € 400–500.

Beneficiaries must fulfil the eligibility criteria for renewal at the beginning of each academic year, both in terms of family income and the merit. Specifically, to obtain the renewal of the grant, students must achieve at least 83% of the total amount of credits required.

### 2.3. The province of Trento

The province of Trento is located in the North-East of Italy and it is an area that, when compared with the rest of the country, results characterised by a higher standard of living and a better economic situation. From Figure 1, however, it is apparent that the persistence of the economic crisis is coupled with a clear deterioration of key macro-economic indicators. In fact, both general and youth unemployment rates (Figure 1, panels a and b) are clearly lower in the province of Trento than in Italy, but there is an increase in both rates in particular in 2012. The GDP dynamic shows a recovery after 2009, but the situation worsens immediately after 2010 for Italy as well as for the province of Trento (Figure 1, panel c). Finally, the poverty rate, though consistently less worrying than in the rest of the country, shows a remarkable increase just after the beginning of the economic crisis and it is followed by a decline in the next two years and a further increase in 2012 (Figure 1, panel d). Focusing on the province of Trento, another sign of the worsening of the economic situation can be explored analysing the families' income. Table 1 shows the equivalent disposable income of pseudo-fathers, i.e. men

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<sup>3</sup> This threshold is measured by an *ad hoc* index called Icef (Household Economic Condition Index) which takes into account incomes and assets of each family using a scale of equivalence similar to the OECD one. This index is intended to give a measure of the general level of wealth of a given family. It is used by the local government to determine the access to the various means-tested policies. For sake of simplicity, we will refer to it as income in the rest of the paper.

aged 45-65, broken down by their level of education. It is interesting to note the worsening of this indicator over time for both groups, though the income's decline is much stronger for the less educated group.

[FIGURE 1 ABOUT HERE]

[TABLE 1 ABOUT HERE]

### **3. Theoretical framework and previous studies**

From a theoretical point of view, financial aid policies rely on the idea that social origins – in terms of cultural and economic resources – are crucial for the transition to HE as well as for academic performances (xxx). In fact, students and their families have to face several direct and indirect costs to enrol at the university and these costs are less affordable for people from lower socio-economic backgrounds. Therefore, programmes based on financial aids wish to weaken the link between social origins, educational choices and academic performances, through reducing costs connected to HE participation and, for those attending a degree course, providing a direct incentive to invest more time in studying. In the latter case, we suppose that monetary aid should act as incentives promoting effort and scholastic performance (Lazear 2000). In this sense, the economic reward works as a positive reinforce and this kind of programmes should change recipients' time allocation. It may be the case that, the monetary transfer saves them from financing their studies through occasional or part-time jobs, spending more time on their coursework. Hence, they could achieve better results at university: reduce the risk of dropout, improve their marks and the number of gained credits.

An alternative approach suggests that students from disadvantaged backgrounds do not study at university because of the role played by social origins when they are very young, not because of a lack of abilities and motivation (Cameron and Heckman 2001; Carneiro and Heckman 2002). This research strand suggests that public spending on financial aid to promote HE participation is a waste of money and that it will be more valuable to intervene on children motivations and competencies during their early school career. In fact, cognitive abilities are formed very soon in life and it becomes more difficult to intervene as children grow up (Cunha and Heckman 2009). This approach suggests that early interventions targeted to disadvantaged children can have higher returns than late interventions (Heckman 2006, Neugebauer and Schindler 2012).

Both these two approaches recall the distinction between primary and secondary effects (Boudon 1974) in the creation of class differentials in educational attainment. Whilst primary effects (either of a genetic or socio-cultural kind) regard the association between pupil's social origins and their school achievement, secondary effects are expressed by the educational choices that students from different socio-economic backgrounds make, within the range of choices allowed by their performance. Theoretically, since both approaches are plausible, policy makers should act on both primary and secondary effects if they want to foster education participation, which requires different kind of programmes. In practice, the problem arises in a world of limited or scarce resources in which it is not possible to implement all desirable educational policies, especially as it happens in times of recession. In a situation like this, it is particularly crucial to know which of the two effects

is more relevant for the reproduction of inequalities, as this would allow to streamline the limited amount of resources available. For Italy, Contini and Scagni (2013: 176) conclude that social-origin inequalities can largely be attributed to secondary effects. On this point, Jackson and Jonsson (2013) argue that a promising approach is the manipulation of financial costs along with persuasive guidance programmes addressed to both students and their families.

The available evidence of the effects of financial aid is mixed, not offering an uncontroversial view. This literature comes mainly from the United States, where, for example, Dynarski (2000) and Cornwell et al. (2006) analyse the merit-based Georgia's HOPE programme (Helping Outstanding Students Educationally), finding that it produces a significant increase in the HE attendance. For what concerns the Pell Grant, the main federal need-based programme, early studies failed to find positive effects on enrolment (Hansen 1983; Kane 1996), but it was able to affect the choice of the college (Kane 1999). More recent studies on Pell Grant shows that this programme successes in affecting adult students (Seftor and Turner 2002) and in increasing completion rates in the first year (Bettinger 2004).

Contrasting results are found also in Europe where the cost of attending university is substantially lower. Stenier and Wrohlich (2008) find that the monetary benefits supplied by the BAfoeG (*Berufsausbildungsfoerderungsgesetz*) programme raise the enrolment rates of German students, as well as similar programs in Sweden and Denmark (Fredriksson 1997; Nielsen et al. 2010, respectively). The effectiveness of BAfoeG, however, is not so clear since Baumgartner and Steiner (2006) find non-significant effects of it on the student decision of attending university. In France, Fack and Grenet (2015) find that a large need-based programme increases college enrolment and degree completion.

Looking at the impact of public support on academic performance, Leuven et al. (2003), analysing the case of the University of Amsterdam, find no effects of financial aids in the number of the collected credits and in the drop-out rate. On the contrary, Belot et al. (2007) exploit a major reform in the Dutch higher education system in order to identify the effect of student support on academic performance and students' time allocation. They find that there is a small positive effect on the marks (about 0.13 points on a ten-point scale), but drop-out and time allocation of students (hours spent on study and work, and incidence of jobs on the side) remain basically unchanged. With reference to the US case, Bettinger (2004, 2015) stress that in Ohio a need-based programme reduces the drop-out rate and increase the average grade point at the end of the first year. Dynarski (2005), using data from thirteen US states, finds that merit programmes increase college completion by 3 to 4 percentage points. This result is quite remarkable, because the share of the affected population with a college degree is about 26%. Cornwell et al. (2003) analyse the case of HOPE programme and find that the shift from need- to merit-based aid increase the probability to withdraw and reduce the average completed credits. Richburg-Hayes et al. (2009) analyse a programme implemented in New Orleans area showing how financial aid increase the number of credits earned and reduce the drop-out risk. Scott-Clayton (2011), using data from West Virginia, stresses how financial aids can have a slight effect also on the academic performance, but she

does not find any influence on drop-out rate. Analysing the Canadian case, Angrist et al. (2009) find sizeable effects only for female students who were entitled to both financial incentives and students services.

In Italy, there are few studies about the effectiveness of financial aid. Focussing on students already bound for university, Garibaldi et al. (2011) find that the time to complete a degree is affected by tuition fees reduction in an Italian private higher institution. Mealli and Rampichini (2012), analysing data from four big universities (Catania, Milan, Padua and Salerno), show that *Diritto allo Studio* has a positive role in reducing drop-out from higher education. Some other programmes, implemented at local level, find positive effects of financial aids on academic performances (Graziosi 2014, De Paola et al. 2012, Rattini 2014, Agasisti and Murtinu 2016). As for the grant's provision analysed in this paper, Covizzi et al. (2012) and Vergolini and Zanini (2015) find that the Grant 5B does not have any effects on enrolment, but it exerts a remarkable influence in enrolling in a university away from the Trento. However, so far, there is no evidence of the impact of the Grant 5B on academic performance.

It should be noted that the evaluation of the Grant 5B over time allows as to investigate the role of financial aid on influencing HE participation and how this interact not only with individual characteristics, namely social origins, but also contextual factors connected to the persistence of the economic crisis.

## **4. Data, descriptive statistics and identification strategy**

### *4.1. Data and variables*

The dataset used in this paper is the result from a linkage procedure of survey data covering four consecutive cohorts of students (those potentially entering HE in the academic years comprised between 2009/2010 and 2012/2013) and information from different administrative archives. The fieldwork was conducted by the Department of Sociology and Social Research of the University of Trento (UniTN henceforth) by means of a CATI (Computer-Assisted Telephone Interviewing) procedure. Across the four cohorts considered here, it was possible to gather information on 10,819 students, amounting to the 80% of the reference population. A follow-up interview was also carried out at the end of the first year to collect information on their academic performance and only for a small number of candidates this information could not be collected.<sup>4</sup>

We exploit other sources such as administrative data and publicly available databases to gather additional information. First, the archives of the agency in charge of the programme's administration (*Opera Universitaria*) provided the list of students entitled to Grant 5B and the exact amount of the monetary benefit for each of them. Second, the data on family income for each student in the sample was extracted from the databases compiled by the local agency which gathers information on the incomes and assets of households and which computes eligibility for social benefits provided by the local government (*Clesius*). Third, to measure the prestige of each faculty at the chosen university, we used the most popular Italian ranking, *i.e.* the

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<sup>4</sup> The attrition rate was 5.8. Undergraduates for those academic performance during the first year was not available were excluded from the analyses referred to academic performance, but included in the evaluation of the effects on enrolment choices.

Censis Guide from *La Repubblica* newspaper (CENSIS 2008, 2009, 2010, 2011), published every year and widely advertised by the national media. Fourth, we also measured the distance between Trento and the location of the course of study using Google Maps.

The linkage of the above mentioned data sources allowed us to rely on a comprehensive and unique dataset. For each upper secondary school leaver interviewed, we know: socio-demographic characteristics (sex, family size, geographic area of residence, age); social origins (parental social class and education); school career (type of upper secondary school attended and the mark obtained on conclusion of lower and upper secondary school); whether their family income is above/below the income threshold to access the grant provision<sup>5</sup>; if they are enrolled at university or not. For those enrolled at university we know their Grant 5B recipient status. In addition to this we have information on their enrolment choices (the HE institution, its location and prestige, the field of study) and their academic performances at the end of the first year.

In terms of educational choices we consider: enrolment probability; enrolment outside Trento; enrolment in faculties who are not available at UniTN; the distance from Trento; and the prestige of the chosen faculty. As for academic performances we look at: drop-out risk; average marks; number of credits achieved; hours of study per week and hours of work per week. The three outcomes about enrolment are dummy variables assuming value 1 if enrolled, enrolled outside Trento, enrolled in faculties absent from UniTN and 0 otherwise. As mentioned above, the distance from Trento is measured in kilometres using Google Maps<sup>6</sup>, while the prestige of the faculty comes from the Censis guide and it is a normalised score varying continuously from 0 to 1. Values close to 1 denoted a high-ranked course, while measures far from 1 indicated low-ranked courses. The drop-out risks is a dummy variable assuming value 1 if dropped and 0 otherwise. The average mark can vary between 18 (minimum) and 30 (maximum). The number of credits can assume values from 0 (minimum) to a maximum defined at faculty level.<sup>7</sup>

Table 2 shows that the enrolment rate at the university for upper secondary school graduates in the province of Trento is around 70% from 2009 to 2011, with a sharp decline of five percentage point for the last cohort considered. The other outcomes do not show any relevant trend in the observed cohorts. Indeed, the enrolment rate outside Trento varies from 36% to 39% and the enrolment in faculty absent at UniTN ranges from 21% to 26%. The distance from Trento is quite stable with a variation from 152 to 170 kilometres. This is particularly interesting, because it highlights a preference of the students to avoid faculties too far from home. An inspection of the data reveals that the majority of the students choose university located quite nearby, such as those of Bolzano, Verona, Padua and Bologna. These universities, along with UniTN, all performs very well in the national rankings and have courses (e.g. Sociology, Law and Natural Sciences for UniTN) at the top of

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<sup>5</sup> The income variable is not available for all the students. In fact, students are obliged to supply information about income for the Icef calculation only if they want to apply for some programmes. Families with an income above threshold are not eligible for any measure and do not apply or, even if they start their application, they do not submit it. It is therefore reasonable to assume that missing cases have been set as above the income threshold. See the appendix for a detailed explanation.

<sup>6</sup> We do not use the Euclidean distance, but we consider the shortest drive from Trento to the selected city. Alternative attempts based on the use of the shortest path via public transport showed similar results not reported here.

<sup>7</sup> Usually the maximum amount of credits expected at the end of the first year is 60.

the faculty rankings considered. This explains the high values on the prestige score. As for the academic performances, not any relevant trend over time emerges from Table 2: the drop-out varies around 14%-16%, the average mark is nearly 24/30, and the number of credits fluctuates between 37 and 39.

[TABLE 2 ABOUT HERE]

Table 3 shows the breakdown of the reference populations by the two eligibility criteria. It is evident that the merit criteria is more selective than the financial need one, since only 11% of students attained a mark of at least 93 out of 100 at the *Esame di maturità*. There are 729 students eligible for both income and merit. However, the administrative archives show that only 571 students (78.3%) claimed Grant 5B, because either some of the eligible did not enrol at university or did not claim the grant.

[TABLE 3 ABOUT HERE]

#### 4.2. Identification strategy

In order to identify the effects of the Grant 5B, it is possible to exploit the administrative rules assigning the eligibility to the Grant 5B. Table 3 clearly shows that, in order to be eligible, students must have achieved a final mark of at least 93/100 and have a family equivalent income below €30,000. These two thresholds (93/100 and €30,000) determine a discontinuity in the treatment and can be used in a Regression Discontinuity Design (Rdd henceforth) setting to retrieve unbiased estimates of the causal effects of the Grant 5B on HE participation, enrolment choices and academic performance (Imbens and Lemieux 2008; Lee and Lemieux 2010).

The basic idea underlying Rdd is that a subtle change in the assignment variable, which allows to move from one side to the other of the threshold, should not impact significantly the outcomes. This amounts to say that any change in choices and performance of students just above and just below an eligibility/treatment threshold would only be due to the Grant 5B. Relying on this design is particularly important in the case at hand where enrolment choices and university outcomes are strongly linked to the assignment variables (high school performance and family income).

In our case, considering that accurate data on income is only available for those individuals below the income threshold (for the others we can only reliably confirm that they are above the income threshold), we can only perform the threshold comparison based on the merit requisite. With respect to table 3, we can therefore focus the identification strategy on the comparison of the ‘eligible group’ – including students with a final mark above or equal to 93/100 and income lower than € 30,000 – and control group ‘A’ – including individuals with a final mark below 93/100 and income lower € 30,000. Control group ‘B’ and ‘C’ could only be used to provide an over-identification test, to demonstrate that no other discontinuities at the 93/100 threshold arises.

In the case at hand, it is important to stress that the Rdd enables us to exploit the eligibility to the grant

provision to estimate its impact on choices related to university participation and, conditioning on being enrolled at university, the impact of receiving the treatment on academic performance. In the former case the eligibility status is deterministic as, for all secondary school students with an income below threshold, it only depends on their merit. In this case a ‘sharp’ Rdd is feasible where the simple comparison of the average outcome just below and just below the threshold provides the estimate of the *average treatment effect* we are after:

$$E(Y|Final\ score = 93^+) - E(Y|Final\ score = 93^-) \quad (1)$$

where Y represents each outcome in turn. As for outcomes related to academic achievement, the impact of the Grant 5B can only be measured for those enrolled at university and only because the Grant 5B does not change the enrolment probability, otherwise it will end up affecting the selection of students enrolled at university. Furthermore, in order to account for the fact that not all eligible students have actually applied for the Grant 5B, the appropriate strategy to retrieve unbiased estimates is the ‘fuzzy’ Rdd. It should be noted that this only allows to retrieve the *local average treatment effect* for those effectively treated, that is:

$$\frac{E(Y|Final\ score = 93^+) - E(Y|Final\ score = 93^-)}{E(D|Final\ score = 93^+)} \quad (2)$$

where D is a dummy variable that indicates the treatment status.

It should be noted that equation (2), which allows for some students not to be treated, is a generalisation of the equation (1), which simply assumes that the eligibility status change for all students.

Both designs permit to estimate the causal effects using both parametric methods (through OLS and IV regressions) and non-parametric methods (local linear regressions). Both methods were adopted to check the robustness of the results, but only the estimates referred to local linear regressions are shown below, as this method has been proofed to guarantee better statistical properties of the estimates in a Rdd setting (Imbens and Lemieux, 2008).

In order to allow for like-for-like comparisons, the observational window was restricted to consider only those students whose final mark at *Esame di maturità* ranges from 85/100 to 100/100.

In line with recent literature (Lee, 2008; McCrary, 2008; Mazzarella et al. 2014) a set of tests were carried out.<sup>8</sup> First, it should be noted that a possible threat to our identification strategy could be linked to the possibility that other discontinuities arise at the 93/100 threshold. This is particularly relevant in our case study since the threshold value (93/100) was known by students and teacher before the final exam and thus before the assignment of the final mark. This implies in principle that, teachers might be inclined to grade students with a 93 instead of a 92 and, at the same time, students might put more effort in order to get a final mark

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<sup>8</sup> All these tests are reported in the appendix.

above 93. Testing this assumption is indispensable to demonstrate that, in the absence of the treatment, there would have not been any discontinuities on the threshold. Finally, we present some additional analysis to test that relevant characteristics are balanced around the merit threshold. The test is run following the Rdd logic using the relevant covariates as outcomes (Imbens and Lemieux, 2008) and to validate our identification strategy we have to observe no discontinuities around the threshold.

## 5. Empirical results

The main results of the paper are presented into two sub-sections. First, the effects of the programme on outcomes related to enrolment choices over time and for students from different social origins are presented. Second, the effects of the programme on the academic performances are discussed. Finally, as said in the previous section, the test of the Rdd assumptions are reported in the appendix.

### 5.1. *The effects on enrolment choices*

The Grant 5B was implemented in order to enhance university participation. Figure 2 shows the results on the first outcome considered: the probability to enrol at university. It proves that monetary incentives do not affect the enrolment probability for any of the four cohorts considered. In our opinion this evidence is not a sufficient condition to conclude that the liquidity constraint thesis is not supported by the data. Rather, it can be argued that it emphasizes a problem in the design of the programme. The enrolment probability around the merit threshold is very high (only around 10% of the whole cohort achieve more than 93/100), highlighting that the policy failed to target the programme to the right students. Eligible students, defined by merit and income criteria, would have enrolled at the university even in the absence of the programme. For students with high secondary school results the risk aversion associated to university attendance is quite low. Even if they belong to the lower social strata, which is likely to translate into more tighten liquidity constraints, their families are still keen to invest in HE, because their good academic career so far is intended as a good predictor of their future academic success.

[FIGURE 2 ABOUT HERE]

The fact that the Grant 5B does not make students changing their behaviour with respect to the decision to enrol at university means that those attending a degree course are not selected by the grant provision. This, in turn, allows us to focus on those enrolled at university and look at aspects of their choices to see if the Grant 5B exerts any effect on these outcomes and on the academic performance.

The first of these aspects is the location of the university. Eligible students show a higher probability to enrol outside Trento (Figure 3) and, above all, in faculties that are not available at UniTN (Figure 4). This result is noteworthy because it means that the programme acts as an incentive for students to choose their preferred faculty independently from its location. Hence, the policy, though not influencing the decision to enrol at university, is proved to be effective in allowing students to follow their preferences by reducing

liquidity constraints.<sup>9</sup> For example, a student from a low-income family who wishes to enrol in a medical school that is not available at UniTN, by the means of Grant 5B, can afford the living costs of moving to another city. In Vergolini and Zanini (2015) it has been shown that the choice of the location outside Trento is not influenced by the prestige of the faculty or by the cost of living, but by the distance from Trento. In fact, these students decide to attend universities not far away from their hometowns.

[FIGURE 3 ABOUT HERE]

[FIGURE 4 ABOUT HERE]

It has to be noted, however, for the last two cohorts for that a relevant change in the role played by the programme can be detected with respect to the probability of enrolment outside Trento and for the probability of enrolment in faculties not in UniTN (Figure 3 and 4). Whilst in 2009 and 2010 the causal effect is remarkable (40%, statistically significant), it starts lessening in 2011 and it vanishes by 2012. A promising/possible explanation of these dramatic changes refers to the persistence of the economic crisis that strikes Italy as well as the province of Trento starting from 2009 and the worsening of people's perception towards the consequences of it. The descriptive statistics supplied in the second section (Figure 1 and Table 1) show a deterioration in the economic situation especially in the 2012, the year in which the positive effects of the programme vanish completely. It is realistic to suppose that students and their families do not react immediately to the economic crisis and that in the first years of the programme they carry out their educational plans irrespective of the economic situation. However, the enduring adverse situation at the economic level, together with the negative forecasts for the future could have changed individual preferences about HE participation.

Turning the attention to the second policy goal set by the local government, reducing social inequalities HE participation, Figures 5-7 report the main relevant results for candidates stratified by parental education.<sup>10</sup> We comment the results only for the two outcomes who yield significant results: enrolment away from Trento (Figure 6) and enrolment in faculties not available in Trento (Figure 7).<sup>11</sup> We find that Grant 5B is more effective for students from disadvantage social background than for those from better-off families. The effect is positive even for children with high-educated parents, but the size of the effect is much higher for students whose parents are low educated. It is clear that the effects found in the main models (Figures 3 and 4) are mainly driven by the enrolment decision of people from lower social strata. Hence, Grant 5B succeeds in reducing inequalities in the choice of the university location at least in the short-run. In fact, these positive influences totally disappears with the persistence of the economic crisis (2011-2012 cohorts) and the decline

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<sup>9</sup> Given the small sample size we are not in the position to run a Rdd on the field of study, but the descriptive evidence shows that the eligible group is much more prone to enrol at Medicine than the control group (16.5% vs 9.5%).

<sup>10</sup> In order to maximise the sample size, we pool together the 2009-2010 and the 2011-2012 cohorts. Parental education is measured according to the dominance criterion and it is considered as a dummy variable. Low educated parents are those who possess at most a lower secondary school degree, while high educated parents earn an upper secondary or a tertiary degree.

<sup>11</sup> To be thorough in figure 5 are reported the results also for the enrolment probability

of the effects is greater for the students from less educated families. This result is coherent with the economic crisis argument since these students and their families are those who were more heavily hit by the persistence of the economic downturn (Table 1).

[FIGURE 5 ABOUT HERE]

[FIGURE 6 ABOUT HERE]

[FIGURE 7 ABOUT HERE]

### *5.2. The effects on academic performances*

The findings emerging from Table 4 depict a situation in which Grant 5B has proven not to be able of increasing recipients' academic performance. The only (marginally) significant effect is found on the average mark, which seems to be reduced by receiving the Grant 5B. This is not unexpected if we consider that the main renewal criterion is based on a floor set to the number of credits achieved, rather than on the average mark (third section). It is worth noting that, though not significant, the results on drop-out risk and hours of study are in the right direction: the sign of the effect on is negative on the drop-out positive on the hours of study.

[TABLE 4 ABOUT HERE]

One could single out also the fact that eligible students are enrolled in more demanding faculties (i.e. Medicine) arguing that they do not outperform students in the control group due to the difficulty of their field of study. This explanation does not hold up, because the average mark of Medicine students at the end of their coursework is 26.4 over 30 that is line with other fields of study such as Natural Sciences (26.1) and Engineering (26) and higher than Law (25.6). Only Humanities with an average mark of 26.8 is higher.<sup>12</sup>

A more plausible explanation singles out the ability of the target population. As mentioned for the null effect on enrolment probability, Grant 5B is awarded to students who probably would have performed well at university even in the absence of the programme. An alternative explanation is that the average effects reported in Table 4 could be different for students enrolled in different locations. Grant 5B pushes eligible students to enrol outside Trento in faculties not present in Trento and these students may be more motivated than those who do not have the economic resources to enrol outside Trento. Hence, it could be possible that students enrolled outside Trento tend to perform better than students in Trento do. Results reported in Table 4 about the difference between students enrolled in Trento and outside Trento do not show any significant effects, but the sign of the estimates seem to go in the right direction. Moreover, when the sign is different from what expected (drop-out and hours of work for students enrolled in Trento), the size of the estimate is almost negligible.

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<sup>12</sup> The detailed data on marks, coming from AlmaLaurea archives, are reported in the appendix.

## 6. Conclusions and policy implications

In this paper we have exploited the evaluation of the Grant 5B to contribute to the literature on the effects of financial aid on enrolment decisions and academic performances. We analyse data of four cohorts of students from the province of Trento, from 2009 to 2012. This allows us to investigate the role of liquidity constraints in times of economic downturn. The findings show that the measure does not enhance enrolment probability and academic performances, but it has remarkable effects on the choice of the university location. Eligible students show a higher propensity in enrolling at faculties outside the province of Trento that are not been activated by UniTN. In this way, the programme succeeds in matching individual preferences with budget constraints. Moreover, the students who benefit more from the programme are those with low educated parents, highlighting the capability of the programme in reducing social inequalities.

The overall picture is tangled by the diverging results emerged for the 2011 and 2012 cohorts. In fact, eligible students graduated in these cohorts prefer to enrol in faculties in Trento leading to a null effect of the Grant 5B also for the outcomes related to the choice of university location. The vanishing of the positive effects of the programme reported for the last two cohorts can be linked with the persistence of the economic crisis that affects students' decision regarding university participation, in spite of a generous monetary aid provided by the Grant 5B.

The null effect on the enrolment probability is not a sufficient condition to claim the failure of the liquidity constrain thesis, because the programme has been targeted to students whose academic ability is so high that they would have enrolled at university even in the absence of the grant provision. The same argument can be extended to academic performances. It is practically impossible to change behaviours and attitudes of students that are already at the top of the abilities' distribution. Based on the results and argumentations displayed in the paper, a possible solution for financial aid to increase HE participation and to improve performances could be to target the grant provision in order to favour the enrolment of students that otherwise would not attend university, *i.e.* students with less than outstanding academic ability and from less affluent families.

Moreover, the persistence of the economic crisis reduces the disposable income for students and their families, especially for those from lower social backgrounds. This reduction is mirrored in the vanishing effect of the Grant 5B on the choice of the university location, and it is coherent with the liquidity constraint thesis. In this case the null effect is not due to a wrong targeting, but we argue that the recipients, given the economic situation, need more resources to move away from Trento.

To conclude, the findings, along with the issues mentioned above, suggest that to be effective a programme based on financial aid should be designed taking into account the demand of HE as well as the socio-economic background of the area of implementation. As such, it is important for policy makers aiming at using the leverage of financial aid to widening participation in HE to monitor the effectiveness of these kind of measures over time. In fact, students' choices related to HE participation, especially for students of certain background, are influenced by a wide set of factors, such as the general economic situation, that could vary

over time. This translates into the fact that these programmes can have different effects if implemented in different contexts or when the economic conditions are different. The role of liquidity constraints in HE participation is not uniform, but it varies and can therefore produce changes in the effects exerted by programme aiming at removing such constraints.

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## Tables and figures

Table 1. Equivalent disposable income for pseudo-fathers<sup>a</sup> according to education and year.

Primary and lower secondary	Mean	S.E.	% variation (t/t-1)	% variation (2012/2009)
2009	21,592	817		
2010	22,550	916	4.4	
2011	21,269	646	-5.7	
2012	18,520	421	-12.9	-14.2

Upper secondary and tertiary	Mean	S.E.	Var. %
2009	27,967	939	
2010	28,850	982	3.2
2011	27,178	953	-5.8
2012	25,652	817	-5.6

Source: authors' own calculation on *Indagine panel sulle famiglie trentine*, 2009–2012.

(a) The pseudo-fathers are men aged 45-65. This choice is driven by the fact that in Italy the median age at the first child is approximately 29 years old.

Table 2. Descriptive evidence on outcomes variables by enrolment cohort.

	2009			2010			2011			2012		
	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.	N
<i>Enrolment choices</i>												
Enrolment	0.70	0.46	2,733	0.71	0.45	2,656	0.71	0.46	2,738	0.65	0.48	2,674
Enrolment outside Trento	0.39	0.49	1,915	0.37	0.48	1,897	0.36	0.48	1,931	0.37	0.48	1,727
Faculties not in UniTN	0.26	0.44	1,904	0.21	0.41	1,896	0.26	0.44	1,873	0.24	0.43	1,667
Faculty prestige	0.94	0.05	1,763	0.95	0.04	1,625	0.96	0.05	1,719	0.95	0.05	1,525
Distance from Trento <sup>(a)</sup>	162.62	104.35	728	169.32	122.57	690	151.93	85.30	640	165.77	97.70	568
<i>Academic performances</i>												
Drop-out	0.14	0.35	1,784	0.16	0.37	1,783	0.14	0.35	1,858	0.15	0.35	1,629
Average mark	24.46	4.25	1,550	24.49	4.54	1,549	23.97	5.09	1,661	24.32	4.49	1,420
Number of credits	38.84	21.50	1,728	36.93	21.68	1,740	38.53	21.27	1,821	38.84	21.75	1,580
Hours of study	33.20	14.32	1,400	34.12	14.57	1,512	33.98	14.04	1,614	35.12	14.50	1,462
Hours of work	3.20	8.95	1,428	3.39	9.53	1,539	3.20	8.60	1,633	2.91	8.21	1,476

<sup>(a)</sup> These statistics are computed only for students enrolled outside Trento.

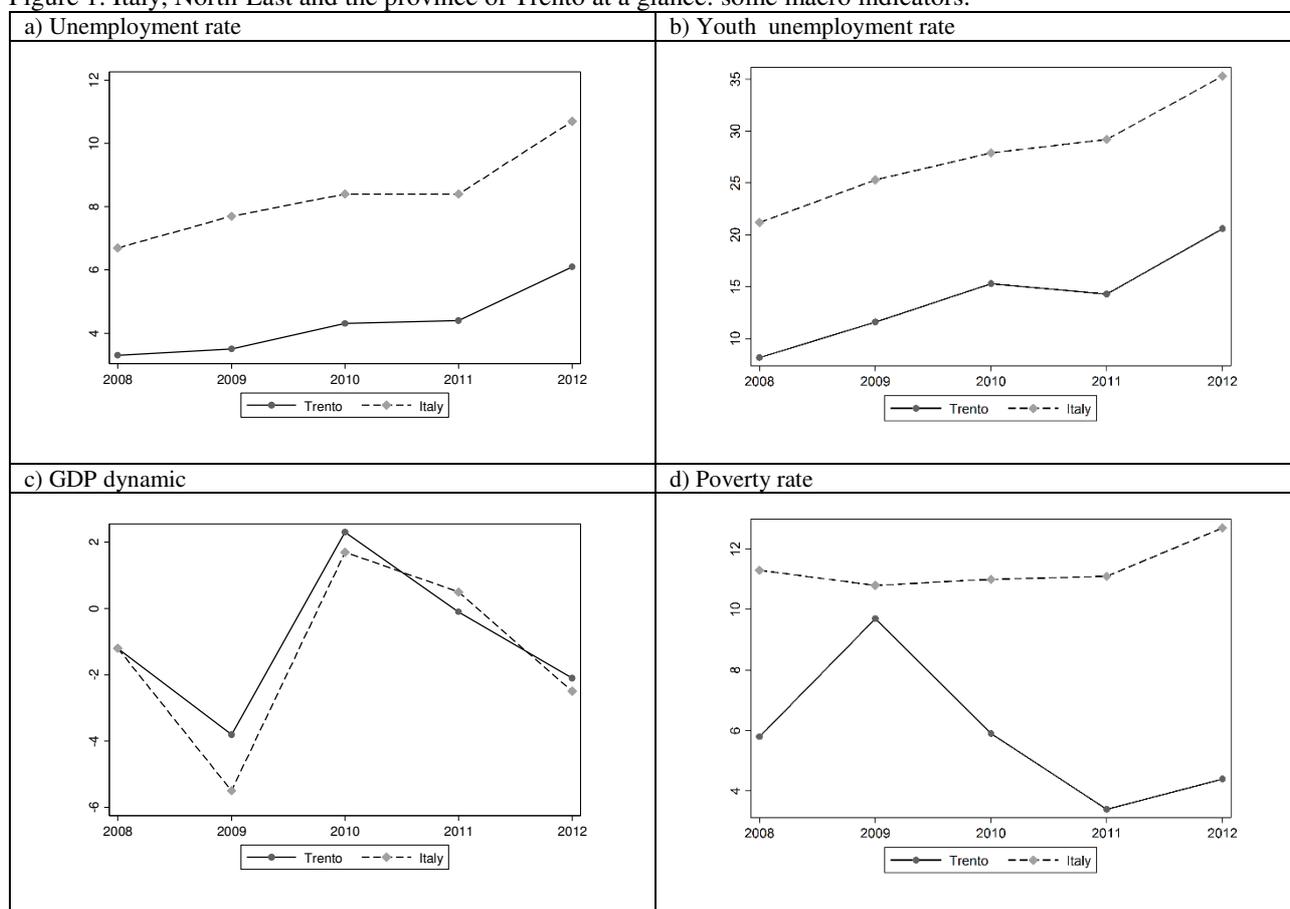
Table 3. Subpopulations for the upper secondary school graduates, 2009/2010-2012/2013 academic years.

		Final mark at <i>Esame di maturità</i>		Total
		< 93	≥ 930	
Income	≤ € 30,000	Control group A N=4,806	Eligible group N=729	N=5,535
	> € 30,000	Control group B N=4,770	Control group C N=506	N=5,276
Total		N=9,576	N=1,235	N=10,881

Table 4. The effects of Grant 5B on academic performances.

	Total			Enrolled outside Trento			Enrolled in Trento		
	LATE	SE	t-test	LATE	SE	t-test	LATE	SE	t-test
Drop-out	-0.049	0.072	-0.681	0.011	0.018	0.611	-0.026	0.088	-0.295
Average mark	-1.547	0.943	-1.641	-3.441	2.411	-1.427	-0.793	0.535	-1.482
Number of credits	-2.628	3.717	-0.707	1.070	6.062	0.177	-3.899	4.644	-0.840
Hours of study	1.306	2.788	0.469	7.091	4.866	1.457	-1.825	3.687	-0.495
Hours of work	1.398	1.980	0.706	0.687	0.986	0.697	2.088	2.818	0.741

Figure 1. Italy, North-East and the province of Trento at a glance: some macro indicators.



Source: Province of Trento Statistical Office.

Note: panel *a* reports the general unemployment rate for people older than 15 years old, while in panel *b* is shown the unemployment rates for people aged 15–24. Panel *c* reports the variation in the GDP at chained prices, and panel *d* shows the percentage of poor families measured according to their consumption.

Figure 2. The effects of the eligibility to Grant 5B on enrolment probability according to graduation cohort.

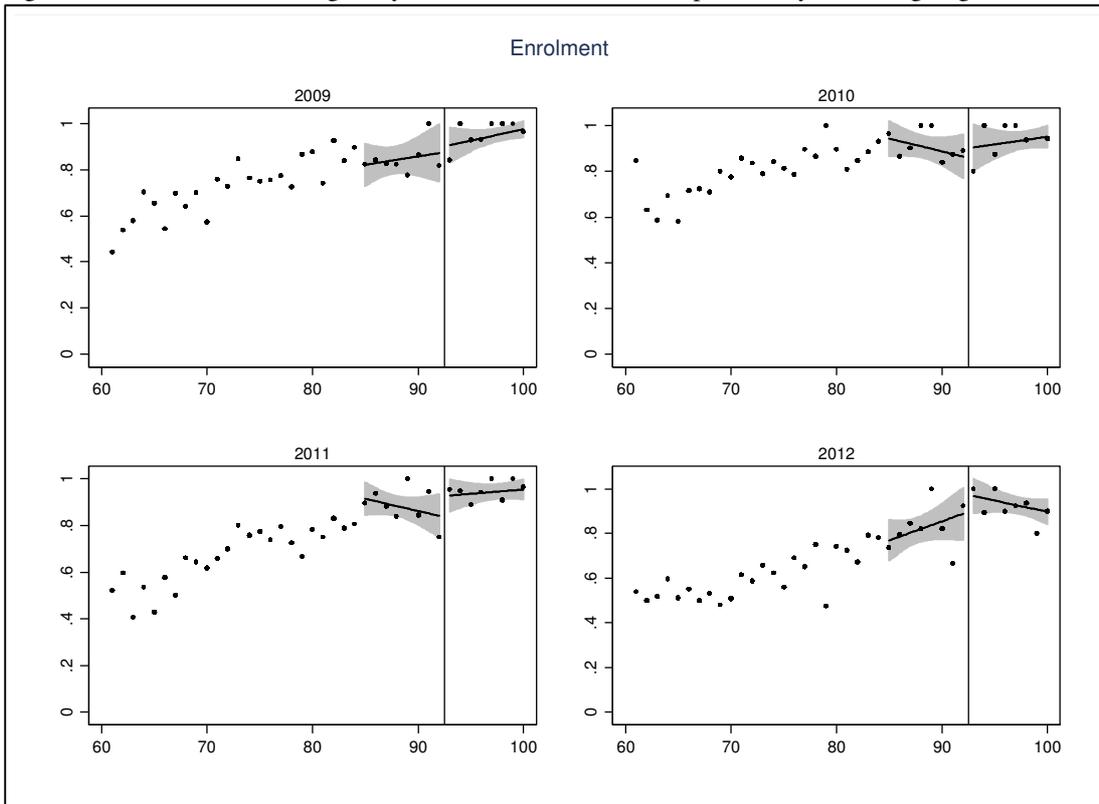


Figure 3. The effects of the eligibility to Grant 5B on the probability to enrol outside Trento according to graduation cohort.

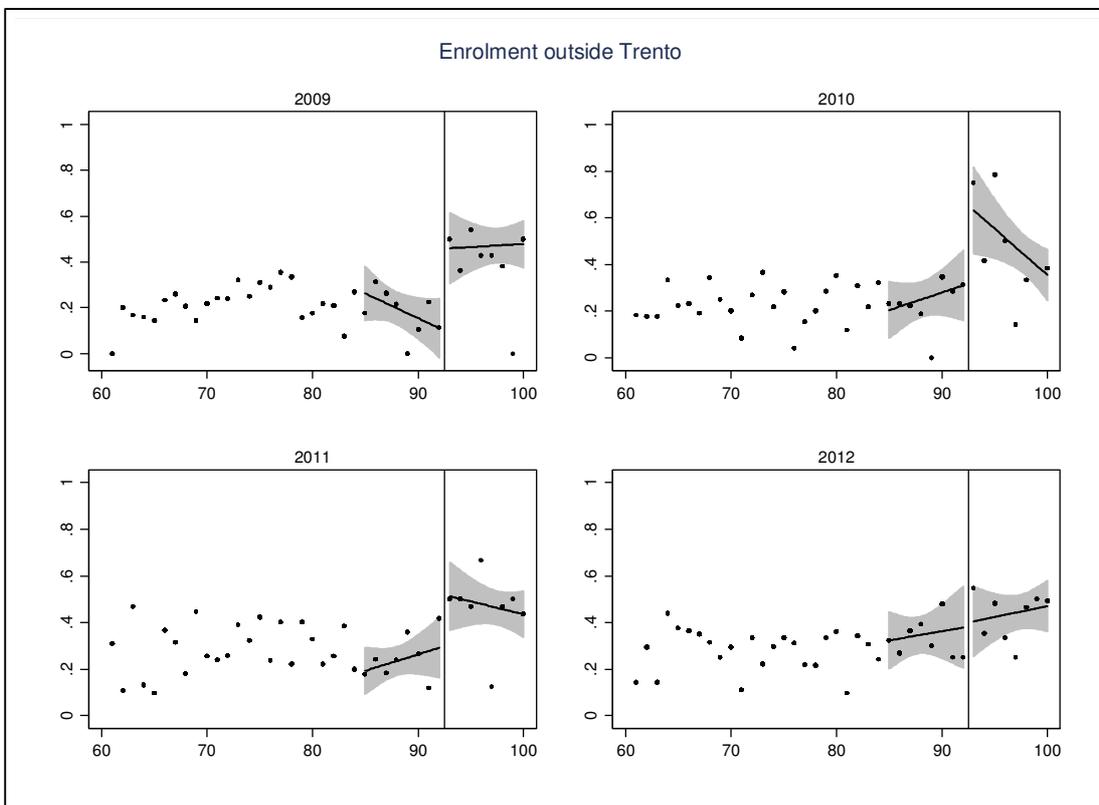


Figure 4. The effects of the eligibility to Grant 5B on the probability to enrol outside Trento in faculties absent from UniTN according to graduation cohort.

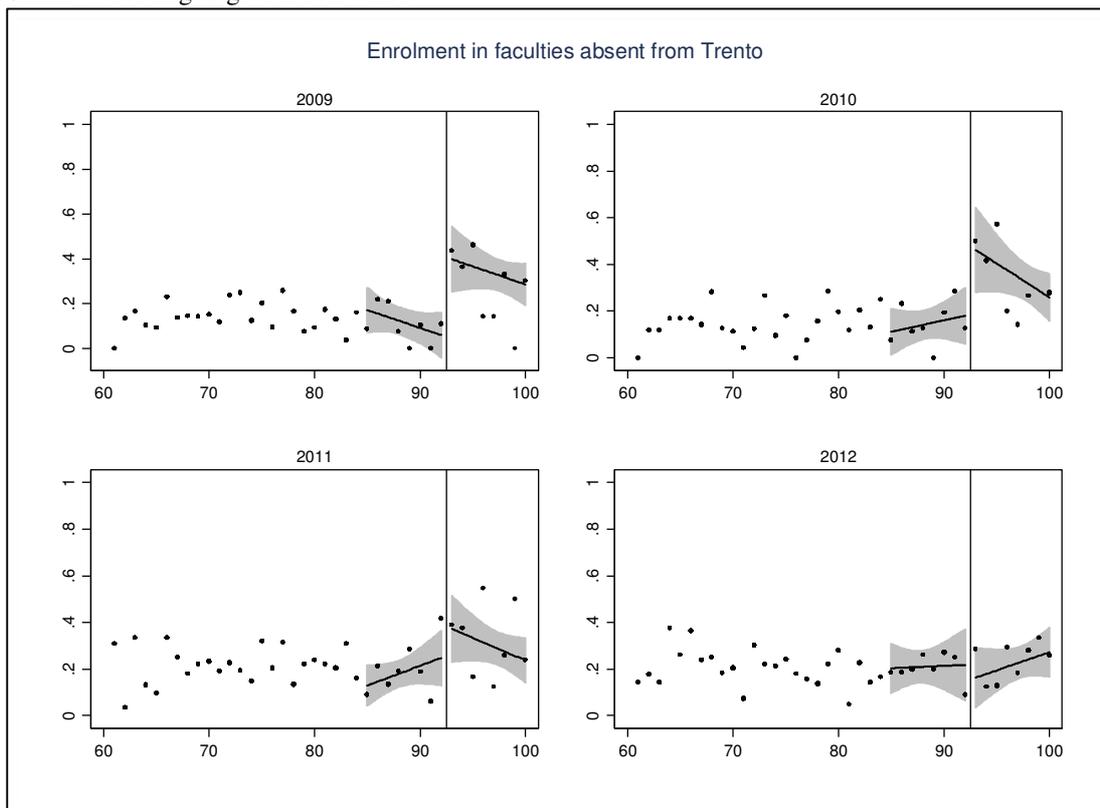


Figure 5. The effects of the eligibility to Grant 5B on the probability to enrol at the university according to graduation cohort and parental education.

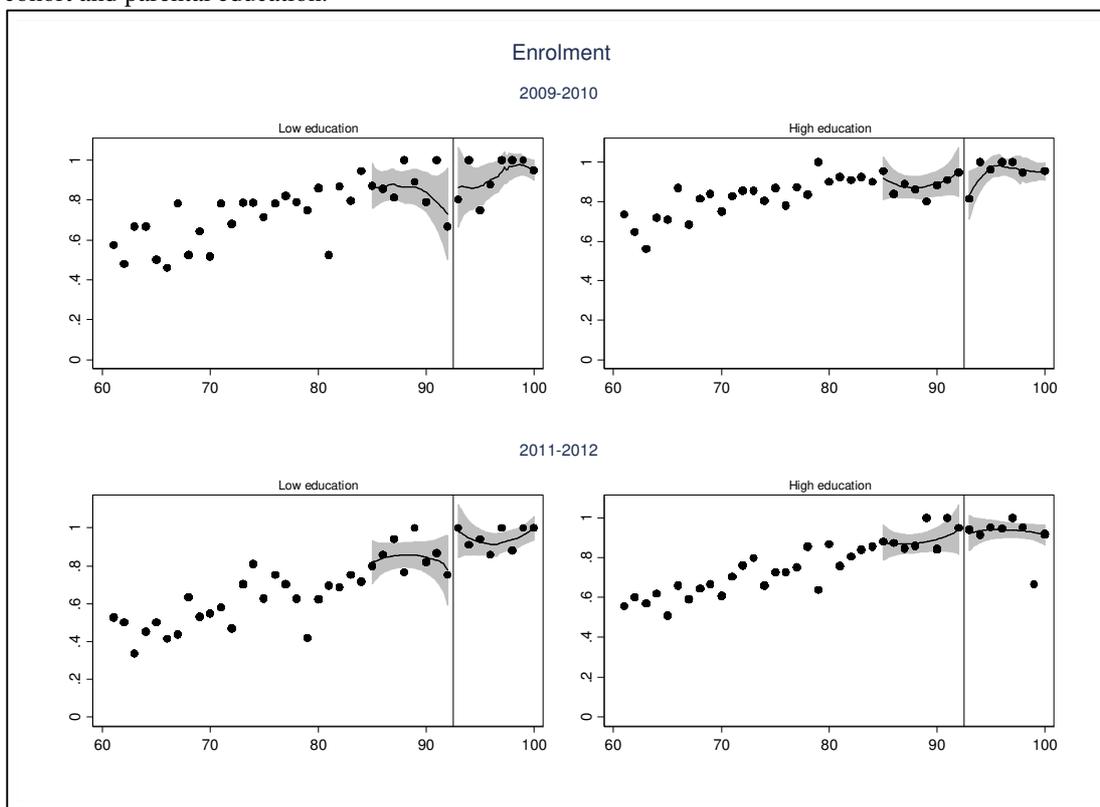


Figure 6. The effects of the eligibility to Grant 5B on the probability to enrol outside Trento according to graduation cohort and parental education.

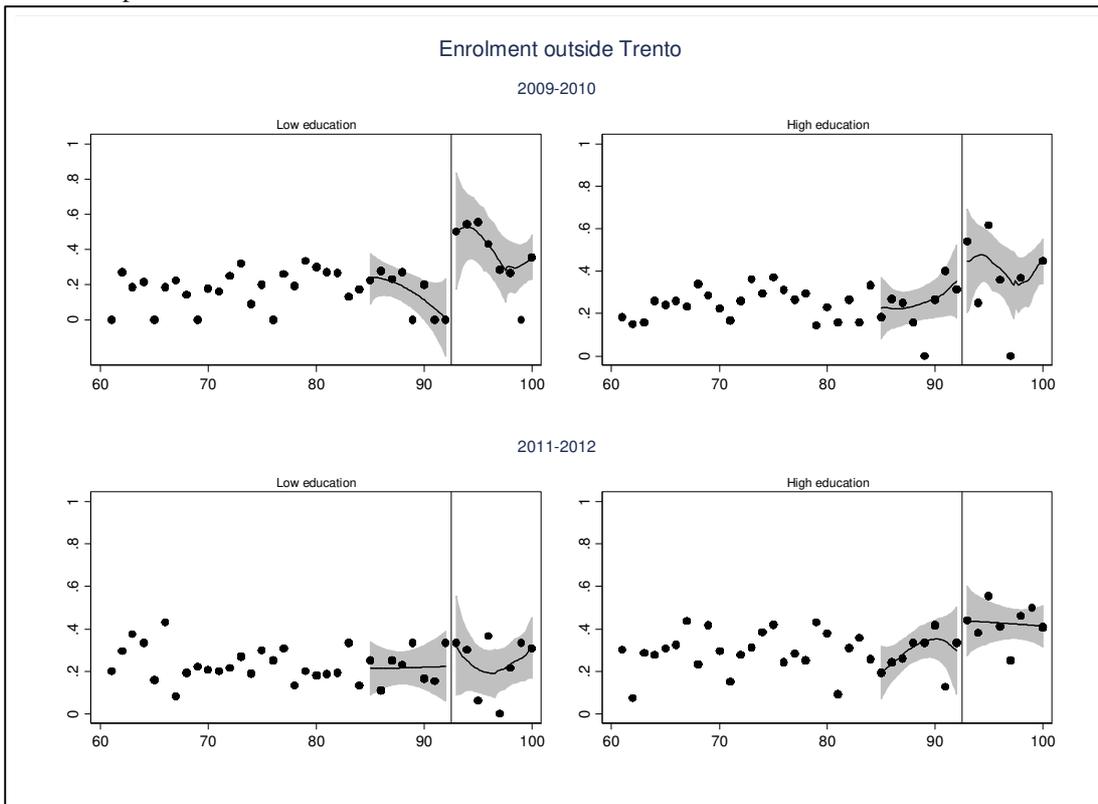
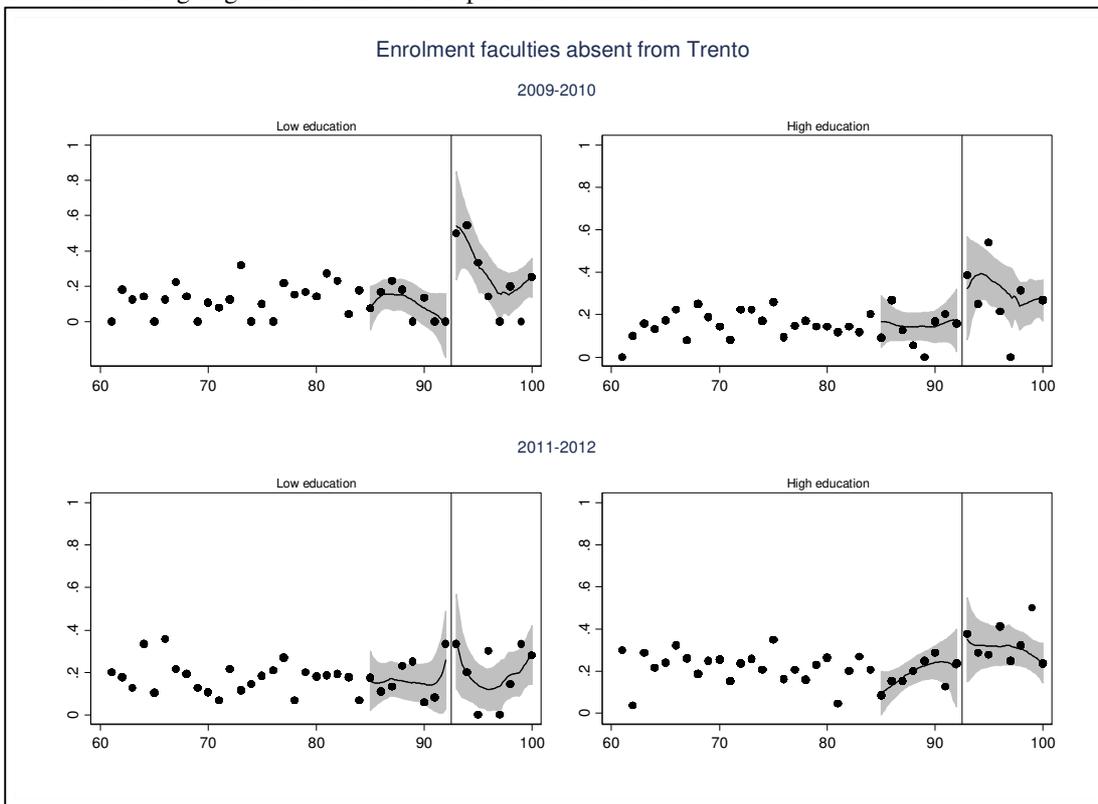


Figure 7. The effects of the eligibility to Grant 5B on the probability to enrol outside Trento in faculties absent from UniTN according to graduation cohort and parental education.



## Appendix

This appendix reports a set of additional analysis that are mentioned in the main text, but not fully reported for the sake of brevity.

Figures A1 report the McCrary test (McCrary 2008) respectively for all the students and only for enrolled ones (see footnote 8). As mentioned in the main text this test is based on the comparison of the score variable distribution around the threshold. Even if it is possible to notice a slight discontinuity on the threshold, this “jump” is not statistically significant. Hence, we can conclude that there is no reason to think that a manipulation of the final mark took place, thus we can retain that the estimates of the effects of the Grant 5B provided by the identification strategy adopted are unbiased.

Figure A2 reports the test for the balancing of relevant covariates around the merit threshold (see footnote 8). The covariates considered are parental education, parental social class, sex, number of siblings and area of residence. Parental education, parental class, sex and area of residence are dummy variables, while the number of siblings is presented in a continuous form. More precisely, parental education assumes value 1 if parents earn an upper secondary or a tertiary degree and 0 for those who possess at most a lower secondary school degree. Parental social class assumes 1 for parents from service class and from white collars and 0 otherwise (self-employed and working class). Sex is coded with 1 for males and 0 for females, while the area of residence takes assumes value 1 for urban areas and 0 for the rural ones. If the students are allocated randomly around the threshold we should observe no discontinuities. The results of the non-parametric estimates show that there are no significant discontinuities on the 93 threshold.

Figure A3 shows the detailed results for the average marks at the end of the coursework (see footnote 12).

Table A1 reports the distribution in the Icef application according to parental class and parental education (see footnote 5). It emerges that students with well educated parents and from higher social classes are less likely to apply for Icef with respect to students from lower social backgrounds.

Figure A1. McCrary test for the manipulation of the score variable, according to enrolment cohort.

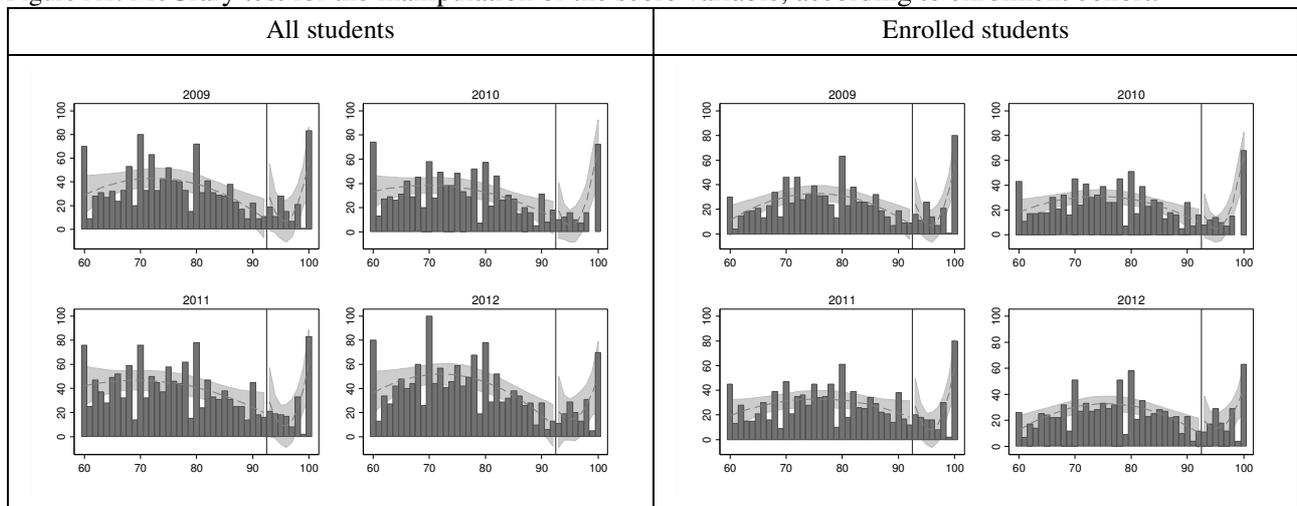


Figure A2. Test for the continuity of the relevant covariates on the threshold point.

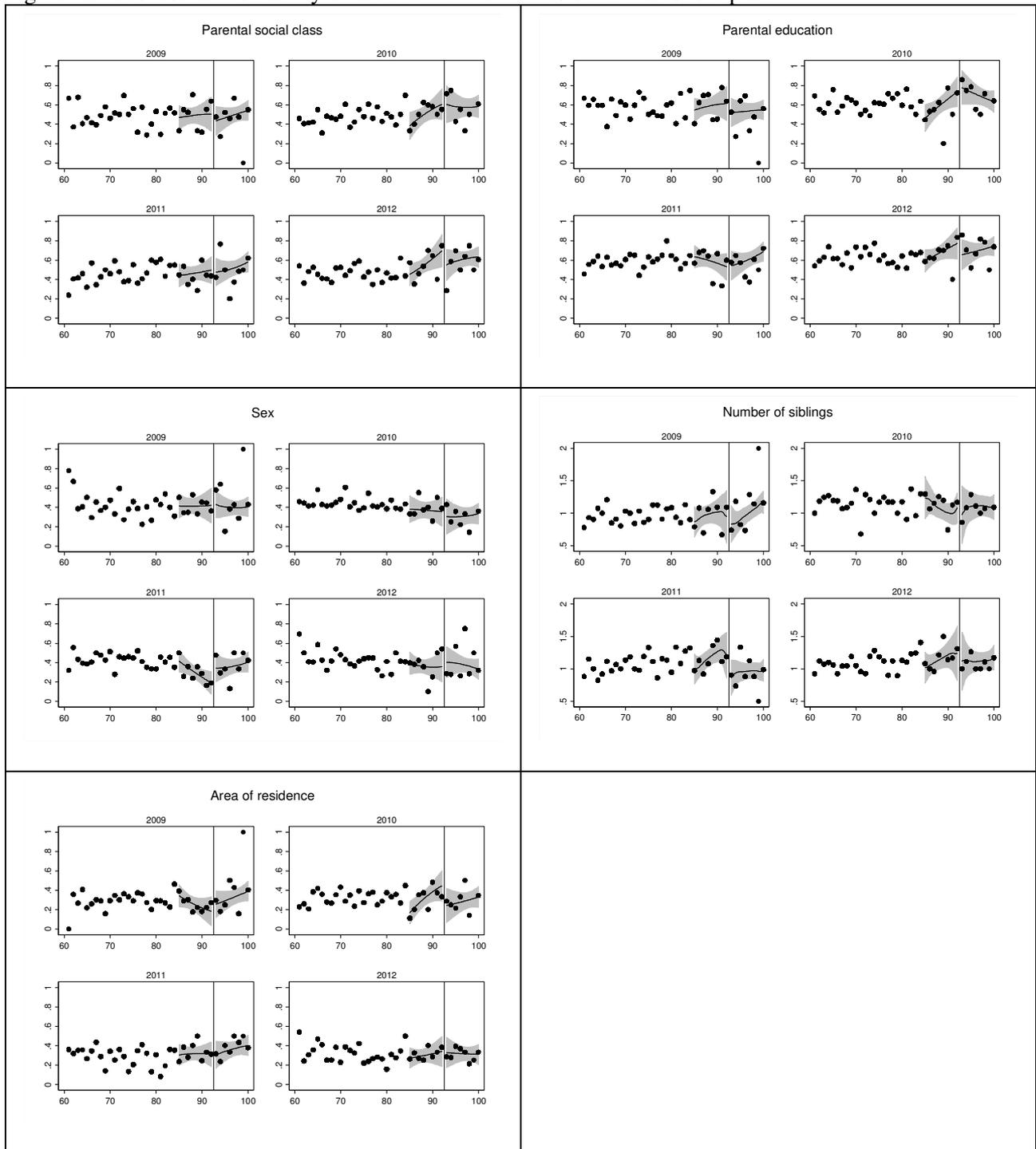
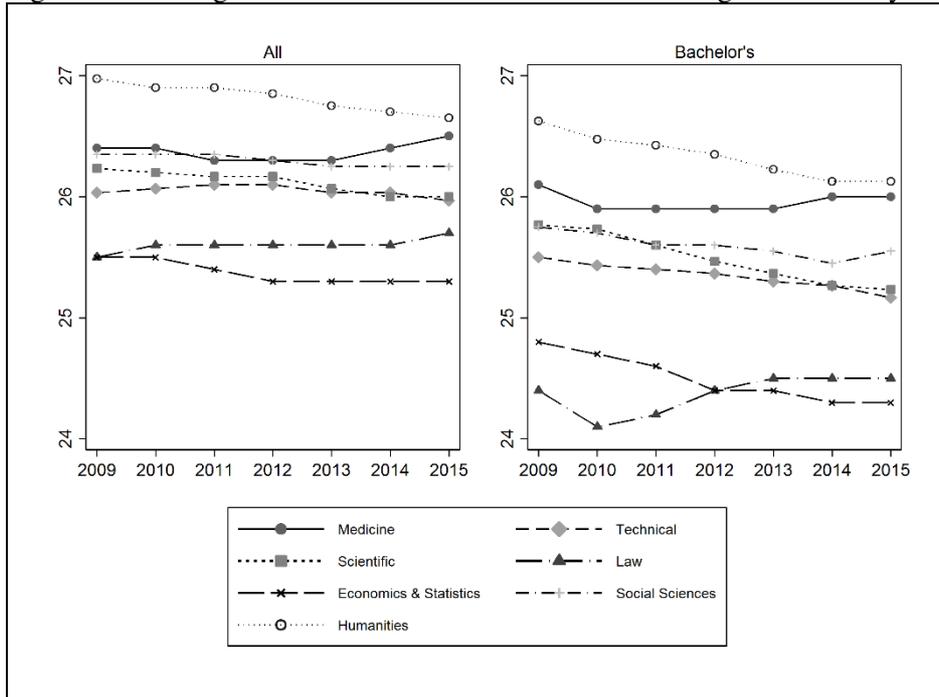


Figure A3. Average mark at the end of coursework according to academic year and field of study.



Source: AlmaLaurea, 2009-2015.

Table A1. Distribution of the Icef application according to parental education and parental class.

	Parental education			Parental class			
	Compulsory	Upper secondary	Tertiary	Service class	White collars	Self-employed	Working class
Not applied	38.4	41.8	54.6	57.3	40.4	54.2	31.9
Applied and not eligible	4.2	6.0	7.6	7.1	7.1	4.8	3.4
Applied and eligible	57.4	52.2	37.8	35.6	52.5	41.0	64.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
N	3,601	4,669	2,029	1,764	3,703	1,989	3,031