

# The role of financial aid in shaping university participation and academic performances: evidence from a small-scale programme

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## Abstract

In this paper we investigate the effects of a scholarship known as Grant 5B on university participation and on academic performances at the end of the first year of university. This programme was active in the province of Trento (North-East of Italy) from 2009 to 2012 and consisted in a generous financial aid targeted to students from low-income families with outstanding 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. We use a sharp regression discontinuity design to estimate the impact of the intervention on educational choices. We find that the programme has no significant effect on enrolment rates, but it exerts a positive and remarkable effect on redirecting students already bound for university to enrol away from their place of residence. However, that effect changes over time and, as the economic recession persists, it disappears. Moreover, we employ a fuzzy regression discontinuity design to estimate the effect of the programme on the academic performance measured in terms of drop-out, average mark and numbers of credit achieved, finding that the scholarship has no effects on these outcomes.

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

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We are grateful to Nicola Bazoli and Joan Madia for their excellent research assistance.

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## 1. Introduction

The provision of financial aid to encourage the progression to higher education (HE henceforth) of young people from disadvantaged backgrounds is a major component of education policies of governments in many advanced countries. It has been found 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, a university degree can result in better outcomes with regards to labour market and social outcomes, such as volunteering, trust and health (OECD 2014). The underlying idea of programmes providing financial aid to foster HE participation is that university enrolment and academic performances are heavily influenced by liquidity constraints connected to the costs of university attendance, in both a direct (e.g. tuition fees, accommodation, school equipment) and indirect (e.g. the renounce of a labour income) way. Hence, with the reduction of these costs through the provisions of scholarships, students will be more likely to enrol at the university and to pass more time studying. However, the empirical literature on the effects of financial aid on HE participation has not been able so far to provide uncontroversial results on its effectiveness (for a recent literature review, see Dynarski and Scott-Clayton 2013).

In this paper, we illustrate the main empirical results of a research project aimed at evaluating the effectiveness of a grant provision, named Grant 5B, implemented in the province of Trento – an area in the North-East of Italy – from 2009 to 2012. Our aim is threefold: first, we provide an evaluation of the programme in order to draw some policy recommendations to improve the effectiveness of the intervention. Second, we contribute to the literature on the role of liquidity constraints on university participation, with a special focus on the four-year period of Great Recession. Third, we evaluate the role of Grant 5B in shaping academic performances at the end of the first year of university.

The university participation of the first cohort of students awarded with the Grant 5B has been previously assessed. The Grant has proven not effective on the enrolment probability (Covizzi et al. 2012), but has exerted a positive and quite large effect on other choices related to HE participation, such the location of the HE institution and the field of study (Vergolini and Zanini 2013, 2015). Those studies focussed on one cohort of students and therefore they relied on samples appropriate only to retrieve average effects, but not sufficiently large to study their heterogeneity across subgroups of students. The current availability of data from four cohorts of students allowed us to analyse the heterogeneity of the effects according to social origins and therefore to understand whether the programme had been able to reduce social inequalities among students from different backgrounds. Furthermore, this paper adds from the previous studies as it investigates whether, and to what extent, the effects of the Grant 5B varies over a four-years period of prolonged recession (2009-2012). Therefore, our paper could shed light on the interplay between liquidity constraints,

financial aids and HE choices of students from different backgrounds and how these are affected by the conjunctural cycle. Moreover, with this data it is also possible to evaluate the effects of the Grant 5B on the academic performance at the end of the first year of university. In this way, it is also possible to test the efficacy of economic incentives on drop-out, marks and credits.

The remainder of the paper is organised as follows. Section 2 describes the main characteristics of the programme and supplies some information on the Italian educational system. Section 3 reports 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 Italian education system and the Grant 5B programme**

The Italian education system is organised into three steps<sup>1</sup>: primary, secondary and tertiary. 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 that students have to take to complete upper-secondary school. The examination is graded and the marks range between 60 and 100. Even if access to university is open to students coming from both academic, technical and vocational secondary tracks, a set of upper secondary schools (*licei*) is specifically conceived to prepare students for university. The HE system is mainly based on public universities, which award degrees with the same legal value. This implies that, in particular for the competitive public-sector entrance examinations, what really matters is the attainment of a degree and not the prestige of the university attended.

For what concerns financial aids in Italy, the main national programme for facilitating university participation is the so called *Diritto allo studio* ('Right to study') that is regulated at national level and administered by the universities and financed by local authorities. It covers direct costs (tuition, accommodation and living allowance), and students can access to it according to family income and academic performance. In addition to the national scheme, there are a 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 increase university enrolment and reducing inequalities among social classes.

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

Grant 5B covers the indirect costs connected with the participation to HE, while the direct costs are covered by *Diritto allo studio*. The novelty of Grant 5B is that it works as a generous top-up of the national schemes and thus it provides a remarkable reduction of the educational costs. In order to attract applications, the programme was widely advertised on the local media before the end of the school year.

The target population comprises students resident in the Province of Trento for at least three years who have successfully completed the last year of secondary school, obtaining a final mark above 93/100, and whose family equivalent income is below € 30,000.<sup>2</sup> The amount of the benefit varies according to the family income and the geographic location of the university chosen. In principle, students enrolling at universities located within the Province of Trento are entitled to financial aid ranging from € 1,200 to € 4,800 per year. Differently, students enrolling at 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 an amount larger 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 criterion and the merit condition required. Specifically, to obtain the renewal of the grant, students must achieve at least 83% of the total amount of credits required.

### **3. Previous studies and theoretical framework**

#### ***3.1. Previous studies***

Previous studies on the effects of financial aids on enrolment show controversial results. Yet, they are not completely comparable in terms of both the context in which programmes have been implemented and the eligibility rules adopted. It should be noted that the latter has a key role in the design of this kind of programmes, as the eligibility criteria may have relevant consequences in terms of social inequalities. Grants based only on merit tend to favour well off students due to the strong correlation between social origins and educational attainment (Orfield 2002). On the other side, if based only on the financial need, the risk is that the applicants exploits the financial aid to enrol at the university even if they do not have enough motivations and skills to obtain a degree. Moreover, the comparison between different studies is complicated by the fact that the costs of HE vary a lot across countries. Furthermore, it should be considered that HE attendance can be supported through different kind of incentives such as tuition cuts, asset building, loans or monetary transfers. However,

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<sup>2</sup> This predetermined threshold is measured by an *ad hoc* index called Icef (Household Economic Condition Index) which summarizes the incomes and assets of each family using a scale of equivalence similar to the OECD one.

the common aim of all these programmes is to provide financial incentives in order to reduce (or postpone in the case of loans) the educational costs.

For example, in the United States, the Georgia's HOPE programme (Helping Outstanding Students Educationally) is based only on merit, while the federal Pell Grant and the Social Security Student Benefit Programme consider only financial need. Dynarski (2000) and Cornwell et al. (2006) show that HOPE produces a significant increase in the HE attendance, while Hansen (1983) and Kane (1994, 1995) find no significant effects for the Pell Grant. At the same time, Manski and Wise (1983) and Seftor and Turner (2002) find a significant effect of the Pell Grant. Moreover, Dynarski (2003) finds significant effects for the Social Security Student Benefit Programme that was addressed to children of deceased or retired social security beneficiaries and the composition of this group resembles the one who usually apply for need-based programme.

Contrasting results are found also in Europe where the cost of attending university is substantially lower. Lauer (2002) and 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 is not so clear because Baumgartner and Steiner (2006) find non-significant effects of that programme on the student decision of attending university.

On the other side, there are only few studies that try to assess the impact of public support on academic performance. More precisely, 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) stress that in Ohio a programme of means-tested financial assistance exerts a remarkable reduction (about 9% points) in the drop-out rate. 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 in Georgia (US) and they 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 increase the persistence in the university. A similar result has been found also by Miller et al. (2011) who show some preliminary results from a new programme established by the University of New Mexico. More

precisely, they find that the intervention encouraged students to earn more credit, they are 8.8 percentage points more likely to have gained 30 or more credits by the end of the first year. Eventually, Scott-Clayton (2011), using data from West Virginia, stresses how financial aids can have a slightly effect also on the average mark, but she does not find any influence on drop-out rate. Analysing the Canadian case Angrist et al. (2009) find sizeable effects only for women who were offered of both financial incentives and students services.

In Italy, there are few studies about the effectiveness of financial aid. 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 Italian university grants have a positive role in reducing drop-out from higher education. For what concern local programmes<sup>3</sup>, 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.

### ***3.2. Theoretical framework***

From a theoretical point of view, financial aid policies rely on the idea that the role of students' family income and social origins is crucial for their transition to HE and also for their academic performances. Indeed, several studies point out that there is a direct influence of family income on school attainment (Mayer 1997, Hobcraft 1998, Levy and Duncan 2000, Gregg and Machin 2001, Huston et al. 2001, Clark-Kaufman et al. 2003). Students and their families have to face several direct and indirect costs if they want to enrol at the university and these costs are less affordable for people from lower social strata. This means that they have a liquidity constraint problem and, therefore, a generous grant could foster HE participation by reducing major costs.

Another approach suggests that social origins shape both ability and expectations of children (Cameron and Heckman 2001, Carneiro and Heckman 2002). Hence, students from disadvantaged background do not enrol for a lack in abilities and motivations, while the role of liquidity constraints is marginal. This research strand suggests that public spending on financial aid is a waste of money and that it will be more valuable to intervene on children motivations and competencies during their school career, when they are very young. Indeed, cognitive abilities are formed very early in life and it is more difficult to intervene as children grow up (Cunha and Heckman 2009).

The above argumentations may be better understood once integrated in the frame of primary and secondary effects developed by Boudon (1974). Primary effects regard the association between pupil's social origins and their academic performances. Secondary effects are expressed by the

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<sup>3</sup> Other studies find positive effects of financial aids on academic performances at the local level (Graziosi 2012, De Paola et al. 2012, Rattini 2014).

educational choices that students from different socio-economic backgrounds make at net of performances. Following Erikson et al. (2005) and Jackson (2013), we represent the interplay between primary and secondary effects using a graph (figure 1). The primary effects are represented by the line that connects social origins with school career (b), while the secondary effects are the direct link between social origins and university choices (a). Obviously, social origins have also an indirect effect on university choices via previous school career ( $b*d$ ). In this setting, we consider as university choices both enrolment and the choice of the field of study. In fact, social inequalities can appear in their vertical (enrolment) or horizontal (field of study) dimension.

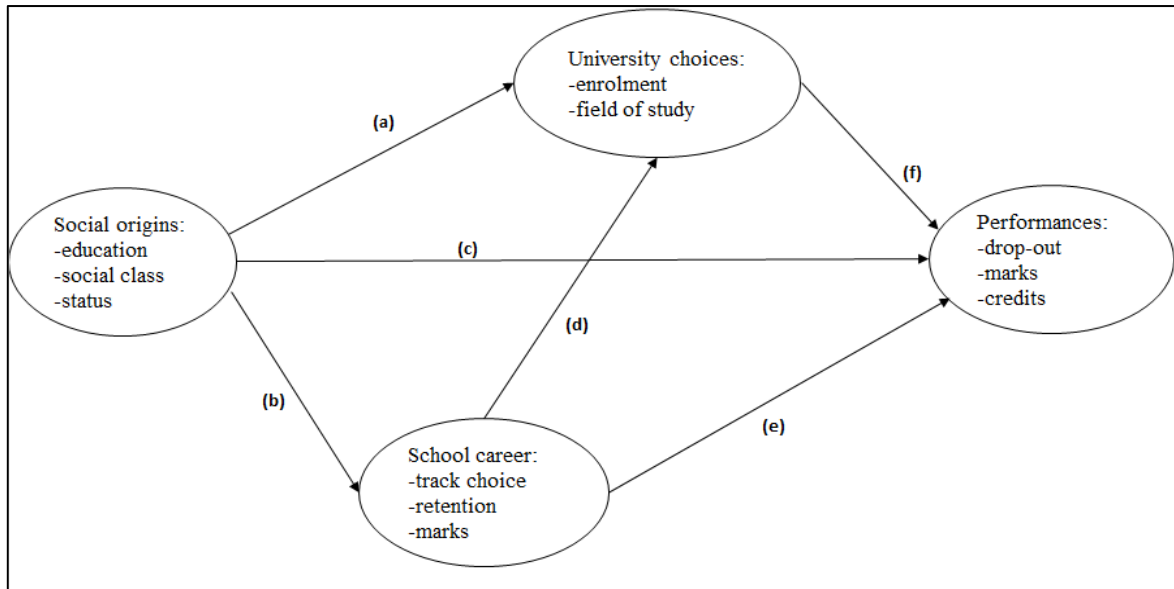
At the same time, social origins exert a direct effect on academic performances (c). In fact, students with affluent parents could spend their time in studying instead in working or children with well educated parents can have a best knowledge of the university system. At the same time social origins could affect the academic performances through their effect on school career ( $b*e$ ) or via the choice of the field of study ( $a*f$ ). In the first case, the better performances of well off students occur through primary effects, while in the latter individual from advantage social backgrounds may choose the most appropriate field of study not having to face any liquidity constraints. This means that they can choose the faculty they prefer even if this means a relocation to another city with a huge increase in costs. At the same time, having parents with university degrees means that they can also supply a set of useful information about costs and returns connected with the different fields of study facilitating in this way the choice of their children.

Given this rough representation of the relationship between social origins, performance and enrolment, the programmes based on financial aids wish to have an impact above all on the (a) and (c) links, thus reducing direct and indirect costs connected to HE participation and furnishing a direct incentive to invest more time in studying once enrolled. In the latter case, relying on economic theory, it is possible to 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 reinforcement for the desired behaviour. As a consequence 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 drop-out, improve their marks and the number of gained credits as well as accelerate the progress towards college completion. Moreover, as stressed in the previous section, the renewal of Grant 5B is based only on the number of the achieved credit. As a consequence, given the renewal constraints, Grant 5B will exert a positive effect on number of credits achieved, but a null or negative effect on the average mark.

At the same time, a generous scholarship could also influence the choice of the field of study and the university location, pushing students in enrolling in faculty not present in the closest university. Hence, the grant may also supply a match between liquidity constraints and preferences and this

matching could affect also academic performances (a\*f). In fact, student who have the chance to enrol in the preferred faculty, will be more motivated and this higher motivation could be mirrored in higher marks and credits and in a lower drop-out risk.

**Figure 1.** Graphical representation of the interplay between the various dimensions affecting university choice and performances.



On the other side, the Heckman approach suggests to improve enrolment reducing the connection between social origins and performances. The idea is that early interventions targeted to disadvantaged children can have higher returns than late interventions (Heckman 2006, Neugebauer and Schindler 2012). Since both approaches are plausible, policy makers should act on both primary and secondary effects if they want to enhance university enrolment. The problem arises in a world of limited or scarce resources in which there is not enough money to implement a wide range of educational policies, especially as it happens in times of recession. In a situation like this, it is crucial to know which of the two effects is more relevant for the reproduction of inequalities. For what concerns 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 together with persuasive guidance programmes addressed to both students and their families.

Our goal is to study the effects of a specific grant introduced at local level that aims to increase university enrolment, academic performances and to reduce social inequalities by manipulating financial costs, *i.e.* it acts on the (a) and (c) arrows in figure 1. Our main contribution to the existing literature is to provide empirical evidence on how liquidity constraints affect university participation and academic performances. Moreover, we look the variation of the effects of the scholarship over time and for specific subgroups of students.



## 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 list of the entire cohort of upper secondary school graduates residing in the Province of Trento who could enrol at university came from the records of the Department of Education of the Province of Trento. The total reference population consisted of 10,819 students (table 1). Exploiting CAWI (Computer-Assisted Web Interviewing) and CATI (Computer-Assisted Telephone Interviewing) procedures, it was possible to gather information on more than 10,000 students and the attrition rate at the end of the first year of university is, on average, lower than 6%.

The information on students enrolled at the University of Trento (UniTN) are gathered with a CAWI questionnaire administrated at the moment of enrolment by the Research Office of UniTN. While for the students enrolled outside the province of Trento and for those not enrolled in tertiary education, we rely on CATI procedure. The fieldwork was carried out by the Department of Sociology and Social Research of UniTN.

**Table 1.** Comparison between sample size and the total reference population.

Academic year	Sample size		Attrition <sup>(a)</sup> (%)
	Enrolment <sup>(b)</sup>	Academic performances	
2009/2010	2,733 (1,915)	1,784	6.8
2010/2011	2,656 (1,897)	1,790	5.6
2011/2012	2,738 (1,933)	1,843	4.7
2012/2013	2,692 (1,736)	1,629	6.2
Total	10,819 (7,481)	7,046	5.8

<sup>(a)</sup> Attrition is calculated only on enrolled students.

<sup>(b)</sup> In parentheses is reported the number of enrolled students.

Other sources of data were used to gather the necessary information. 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. 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*). Additional information was gathered from publicly available databases. To measure the prestige of each faculty at the chosen university, we used the most popular Italian ranking, *i.e.* the Censis Guide from *La Repubblica* newspaper (CENSIS 2008, 2009, 2010, 2011), published every year and advertised by the national

media. We also measured the distance between Trento and the location of the course of study using Google Maps.

The linkage of survey data with administrative archives and other available data sources allowed us to rely on a comprehensive and unique datasets. For each school leaver interviewed, we know: a) participation decisions (enrolment status, and for those enrolled at university: the field of study, the prestige of the course attended of study, the distance from Trento of the university chosen, and the cost of living in that city); b) Grant 5B recipient status (whether the student was receiving the monetary transfer and, if so, the actual amount received) and eligibility for the grant (exact final mark at *Esame di maturità*; if above or below the household equivalent income threshold, and for those below this threshold, the exact amount); c) background characteristics of students and their families (socio-demographic characteristics such as gender, family size, geographic area of residence, age; social origins such as parental social class, parental education, economic resources, parental support; type of upper-secondary school attended, and the mark obtained on conclusion of lower-secondary school as a measure of prior attainment). The main data sources are summarised in table 2.

Table 3 shows the breakdown of the reference populations by the two eligibility criteria.<sup>4</sup> 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 claimed Grant 5B, because either some of the eligible did not enrol at university or did not claim the grant.

**Table 2.** Data sources for the main variables.

Group of variables	Source
Enrolment choices	Survey data
Academic performances	Survey data
Background characteristics	Survey data
Income	Administrative archive ( <i>Clesius</i> )
Recipient status	Administrative archive ( <i>Opera Universitaria</i> )
Faculty's prestige	Censis Guide
Distance from Trento	Google maps

<sup>4</sup> Table 3 highlights a problem of missing values for what concerns income, in particular for students above the income threshold. Indeed, students are obliged to supply information about income for the Icef calculation only if they want to apply for some programmes.

**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	$\geq 93$	
Income	$\leq \text{€ } 30,000$	Control group A N=4,806	Eligible group N=729	N=5,535
	$> \text{€ } 30,000$	Control group B N=480	Control group C N=116	N=596
Total		N=5,286	N=845	N=6,131

Table 4 reports descriptive information about outcomes related to educational choices and to academic performances. In the first case 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. In the second case 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>5</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 and 30, while the number of credits

The higher value on the prestige score can be explained by taking into account that the majority of the students are enrolled at UniTN, which performs very well in the national rankings, with a set of courses (Sociology, Law and Natural Sciences) at the top of the faculty rankings considered. In general, the enrolment rate at the university for upper secondary school graduates in the province of Trento is about 70%, with a sharp decline for the last cohort considered. This result is not surprising, it simply mirrors what is going on in Italy for what concerns participation in HE (Schizzerotto and Vergolini 2016). 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%. Finally, even the distance from Trento is quite stable with a variation from 152 to 170 kilometres. This last result is particularly interesting, because it highlights a preference of the students to avoid faculties very far from home. Indeed the majority of these students choose university located quite nearby such as those of Bolzano, Verona, Padua and

<sup>5</sup> We do not use the Euclidean distance, but we consider the shorter path from Trento to the selected city.

Bologna. The same is true for the outcomes connected to the academic performances, the drop-out varies in range from 14% to 16%, the average mark is about 24/30, and the number of credits fluctuates between about 37 and about 39.

**Table 4.** 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	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

Note: the statistics for the distance from Trento are computed only for students enrolled outside Trento.

#### 4.2. Identification strategy

In order to identify the effects of the Grant 5B, we cannot rely on the rough difference in the outcomes between eligible and ineligible because this difference is affected by *selection bias*, in fact the eligible students have higher marks than non-eligible ones and marks are one of the determinants of enrolment probability and of academic performances. To solve this issue, it is possible to exploit the administrative rules determining the eligibility to the Grant 5B. As mentioned earlier, the eligibility is based on two thresholds, one based on merit and the other one based on financial need. Those thresholds outline clearly a discontinuity in the treatment. Only students with the final mark above 93/100 and from families with an equivalent income below € 30,000 are eligible, while other students are excluded. Given this setting, the most suitable identification strategy consists in the comparison in terms of students progression and other enrolment decisions around the threshold values. This strategy is known as Regression Discontinuity Design (Rdd henceforth).<sup>6</sup>

The basic idea underlying Rdd is that a subtle change in the assignment variable should not have significant impacts on the individuals' behaviours. Indeed, in our case, albeit the final mark depends also on the previous scholastic career and so that is a determinant of the enrolment decisions, it is

<sup>6</sup> For recent development regarding Rdd see Imbens and Lemieux (2008) and Lee and Lemieux (2010).

feasible to suppose that slightly variations in the mark and in the income are not influential. As a consequence, we can compare subjects immediately below and just above the given threshold because we can consider them equivalent except for the eligibility to the treatment.

As shown in table 3, we have two different thresholds (based on merit and income) and thus we deal with four subpopulations:

- i) eligible group: students with a mark above or equal to 93/100 and income lower € 30,000;
- ii) control group A: individuals with a final mark below 93/100 and income lower € 30,000;
- iii) control group B: subjects with a mark of at least 93/100 and income above € 30,000;
- iv) control group C: those with a final mark below 93/100 and income above € 30,000.

In this specific case, given the fact that accurate data on income is only available for those individuals below the income threshold, we can only perform the threshold comparison based on the merit requisite. This means that the causal effect of the programme is estimated comparing groups i) and ii) around the merit threshold.

In this paper we are interested in evaluating the effects of Grant 5B on both educational choices and academic performances. In the first case, we consider the eligibility to the grant as out treatment variable. This is a situation in which the probability of being eligible is 0 below the threshold and it becomes 1 above the threshold (Figure 2, left panel), giving the possibility to exploit a sharp regression discontinuity design. In the second case, the treatment is being beneficiary of the grant and the probability of benefit is 0 below the threshold, but it is lower than 1 above the threshold (Figure 2, right panel). This because not all the eligible students apply for Grant 5B.

In formula, for the enrolment decisions we look at the effect of being eligible for the grant, estimating the so-called intention-to-treat (ITT):

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

where Y represents the various outcome. For the academic performance, we look at the local average treatment effect (LATE):

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

where Y represents the various outcomes and D is a dummy variable that assumes value 1 if the student benefits of the Grant 5B and 0 otherwise. While the numerator supplies an estimate of the jump around the threshold, the denominator is the share of the eligible students who effectively apply for the programme. Both ITT and LATE will be estimated using local linear regression, a non-parametric estimation method which guarantees better statistical properties of the estimates (Imbens

& Lemieux, 2008). Moreover, in order to consider only comparable individuals, we restrict our observational window considering those students whose final mark at *Esame di maturità* ranges from 85/100 to 100/100.

For the enrolment rate, the analyses are conducted on the whole cohorts of secondary school leavers. Differently, for the evaluation of the effects of the programme on other enrolment decisions (such as the location of the HE institution and the field of study) and on academic performances (drop-out, marks, credits, time use), the sample of analysis is restricted to those enrolled at university. It should be noted that our evaluation strategy provides unbiased estimates only if there is no selection of university students due to the Grant 5B. This means that the evaluation strategy for the enrolment decisions and for the academic performances holds only under the assumption that the Grant 5B does not affect the enrolment probability.

A possible threat to our identification strategy could be linked to the manipulability of the score variable. Testing this assumption is indispensable to demonstrate that, in the absence of the treatment, there would have not been any discontinuities on the 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 above 93. We address this point in appendix A.

## **5. Empirical results**

The main results of this paper are divide into two sub-sections. In the first one, we provide some evidence about the effects of the programme on the enrolment choices over time. In the second one, the focus is on the academic performances.

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

In this sub-section we present the results of the effects of the policy on the various outcomes relating to university choices. In this way, we supply an overall evaluation of the programme and, at the same time, it is possible to look at the variation of the effects over time. Table 5 shows first of all that Grant 5B does not influence the enrolment rate. The main problem of this programme is that it is targeted to very good students that possess a high propensity to enrol at the university.<sup>7</sup> Such finding suggests that perhaps the policy is not properly designed and it targets students that would have enrolled anyway.

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<sup>7</sup> It is relevant to take in mind that the enrolment rate around the merit threshold for students from low-income families is above 80%.

Nevertheless, we find some interesting and policy relevant results when we look at the choice of the university location (Table 5). More precisely, eligible students show a higher probability to enrol outside Trento and, above all, in faculties that are not available at UniTN. This result is noteworthy because the policy act as an incentive for students to choose their preferred faculty independently from its location. Hence, the policy is effective in allowing students to follow their preferences by reducing liquidity constraints. 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. Furthermore, we aim at understanding which are the mechanism underlying the choice to move away from Trento. Even if it could be reasonable to suppose that students wish to enrol in a prestigious faculty, the empirical evidence does not support this hypothesis. Indeed, the results seems to be negative, in particular for the 2010 cohort. At the same time, even the impact on the distance from Trento is almost statistically non-significant. Even when the result for the distance is marginally significant (2011 cohort), the size of the effect is modest. This means that eligible students decide to not move far away from home

Some relevant changes in the role played by the programme can be detected for the last two cohorts for the probability of enrolment outside Trento and for the probability of enrolment in faculties not in UniTN (Table 5). In this case, a clear trend emerges by which the effect of the policy tends to disappear. More precisely, in 2009 and 2010 the effect is still remarkable and significant, while in 2011 and in 2012 the effects tend to disappear. A potential explanation of the dramatic changes just highlighted refers to the persistence/worsening of the economic crisis that strikes Italy starting from 2009. Indeed, it is realistic to suppose that students do not react immediately to the economic crisis and that in the first years of the programme they act in an optimistic way. However, the enduring adverse situation at the economic level, together with the negative forecasts for the future could have changed the individual preferences toward the HE participation. In particular, in the province of Trento youth unemployment rate raised dramatically from 11.5% in 2009 to 20.5% in 2012, while in 2010 and 2011 it is respectively 15.1% and 14.5%. In 2008, before the economic crisis and before the implementation of the measure, youth unemployment rate was equal to 8.5%.<sup>8</sup> It is evident that the largest jump in unemployment happened in 2012 (6 percentage points), while from 2008 to 2009 the variation was smaller (3 percentage points). It seems reasonable to suppose that the complete disappearance of the Grant 5B effect could be partially due to the persistence of

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<sup>8</sup> Data on youth unemployment rate for the province of Trento come from the elaboration of the Local Statistical Office ([www.statweb.provincia.tn.it/INDICATORISTRUTTURALI/indicatore.aspx?idInd=33](http://www.statweb.provincia.tn.it/INDICATORISTRUTTURALI/indicatore.aspx?idInd=33)) starting from data on the labour forces at national level supplied by the Italian Statistical Office (Istat) ([http://timeseries.istat.it/index.php?id=60&user\\_100ind\\_pi1%5Bbid\\_pagina%5D=163&cHash=953962bf6f630c6448bb30c0b84d966d](http://timeseries.istat.it/index.php?id=60&user_100ind_pi1%5Bbid_pagina%5D=163&cHash=953962bf6f630c6448bb30c0b84d966d)).

the unfavourable economic conditions. In other words, after few years students stop to be optimistic and they began to perceive an increase in the HE costs.

**Table 5.** The effects of the eligibility to Grant 5B on university choices according to graduation cohort.

	2009			2010		
	ITT	SE	t-test	ITT	SE	t-test
Enrolment	-0.009	0.130	-0.070	0.042	0.085	0.494
Enrolment outside Trento	0.393	0.139	2.831	0.296	0.142	2.077
Faculties not in UniTN	0.359	0.126	2.839	0.338	0.141	2.389
Faculty prestige	-0.002	0.031	-0.069	-0.044	0.019	-2.381
Distance from Trento	-16.708	77.596	-0.215	27.498	24.415	1.126
	2011			2012		
	ITT	SE	t-test	ITT	SE	t-test
Enrolment	0.193	0.115	1.677	0.072	0.144	0.498
Enrolment outside Trento	0.183	0.174	1.052	0.178	0.164	1.082
Faculties not in UniTN	0.031	0.162	0.190	0.020	0.142	0.139
Faculty prestige	-0.010	0.023	-0.438	-0.030	0.021	-1.392
Distance from Trento	32.895	19.822	1.660	-40.353	30.524	-1.322

Another policy goal set by the local government was the attempt to reduce social inequalities in the enrolment chances. In table 6, we report the main relevant results from the previous models once it has been stratified according to parental education. We comment the results only for the two outcomes who yield significant results: enrolment away from Trento and enrolment in faculties not available in Trento. It emerges that Grant 5b is more effective for students from disadvantage social background. Indeed, for what concerns children with high-educated parents, the effect is positive 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 (Table 5) 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 time. In fact, these positive influence totally disappears with the persistence of the economic crisis (2011-2012 cohorts) and the decline of the effects is greater for the students with disadvantageous backgrounds.



**Table 6.** The effects of the eligibility to Grant 5B on university choices according to graduation cohort and parental education.

	2009-2010					
	Low education			High education		
	ITT	SE	t-test	ITT	SE	t-test
Enrolment	-0.015	0.120	-0.122	0.009	0.075	0.120
Enrolment outside Trento	0.449	0.102	4.401	0.209	0.107	1.949
Faculties not in UniTN	0.438	0.109	4.005	0.276	0.090	3.078
Faculty prestige	-0.021	0.026	-0.810	-0.021	0.018	-1.188
Distance from Trento	6.318	53.599	0.118	-8.735	37.134	-0.235
	2011-2012					
	Low education			High education		
	ITT	SE	t-test	ITT	SE	t-test
Enrolment	0.149	0.094	1.590	0.088	0.074	1.185
Enrolment outside Trento	0.188	0.144	1.304	0.158	0.154	1.025
Faculties not in UniTN	0.055	0.128	0.428	0.108	0.135	0.802
Faculty prestige	-0.007	0.021	-0.348	-0.022	0.018	-1.204
Distance from Trento	20.040	17.206	1.165	7.301	18.251	0.400

Note: 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.

### 5.2. The effects on academic performances

The results emerging from Table 7 depict a situation in which Grant 5B was not able to increase the academic performances of the recipients. In fact, the only (marginally) significant results suggest a negative effect on the average mark that also could be predicted on the basis of the renewal mechanism mentioned in the third section. All the other results are not statistically significant. In any case, the results regarding drop-out risk and hours of study go in the right direction, in fact the sign for the drop-out is negative, while it is positive for the hours of study. The same is not true for what concerns the number of achieved credits (negative) and for the hours of work (positive).

One possible explanation singles out the ability of the target population. In fact, as mentioned with reference to the null effect on enrolment probability, Grant 5B is given to students who probably will have obtain good performances even in the absence of the programme. Another explanation is that the average effects reported in table 7 could be different for students enrolled in different locations. We know that the Grant 5B pushes eligible students to enrol outside Trento in faculties not present in Trento and these students may be more motivated that the ones 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 from table 7 about the difference between students enrolled in Trento and outside Trento do not show any significant effects, but at least the signs seem to go in the right direction. Moreover, when the signs goes in the not supposed direction (drop-out and hours of work for students enrolled in Trento), the size of the estimate is very small. Also in this case, it is possible to suppose a role of the persistence of the economic crisis and its interaction with the propensity to enrol outside Trento, but the stratification according to enrolment outside Trento and wave it is not feasible due to the small sample size.

**Table 7.** 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

## 6. Conclusions and policy implications

This paper presents the main results concerning the evaluation of the effects of Grant 5B on enrolment decisions and academic performances of students resident in the province of Trento. We analyse data of four cohorts of students, from 2009 to 2012, which allows us to investigate the role of liquidity constraints in times of recession. 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. Indeed, eligible students show a higher propensity in enrolling at faculties outside the Province of Trento that are not been activated by UniTN. The overall picture is tangled by the diverging results emerged for the 2011 and 2012 cohorts. The different findings reported for the last two cohorts suggest that the persistence of the negative economic growth affects students' decision regarding university participation, in spite of a generous monetary aid provided by the Grant 5B. This makes difficult to propose an uncontroversial recipe to improve the design of the policy. Hence, we try to give some suggestions that could be useful in the rethinking of the grant system.

The null effect that we find in our analyses cannot be interpreted as a sign of the failure of the liquidity constrain theory, because we show that the policy targets students whose academic ability are so high that they would have enrolled at the university even in the absence of the policy. The first recommendation for a policy maker, who wish to implement this kind of grant, is to carry out a

Careful analysis of the demand of HE and of the social and economic background. In this way, it is possible to define more accurately the target population that will benefit the most from the financial aids.

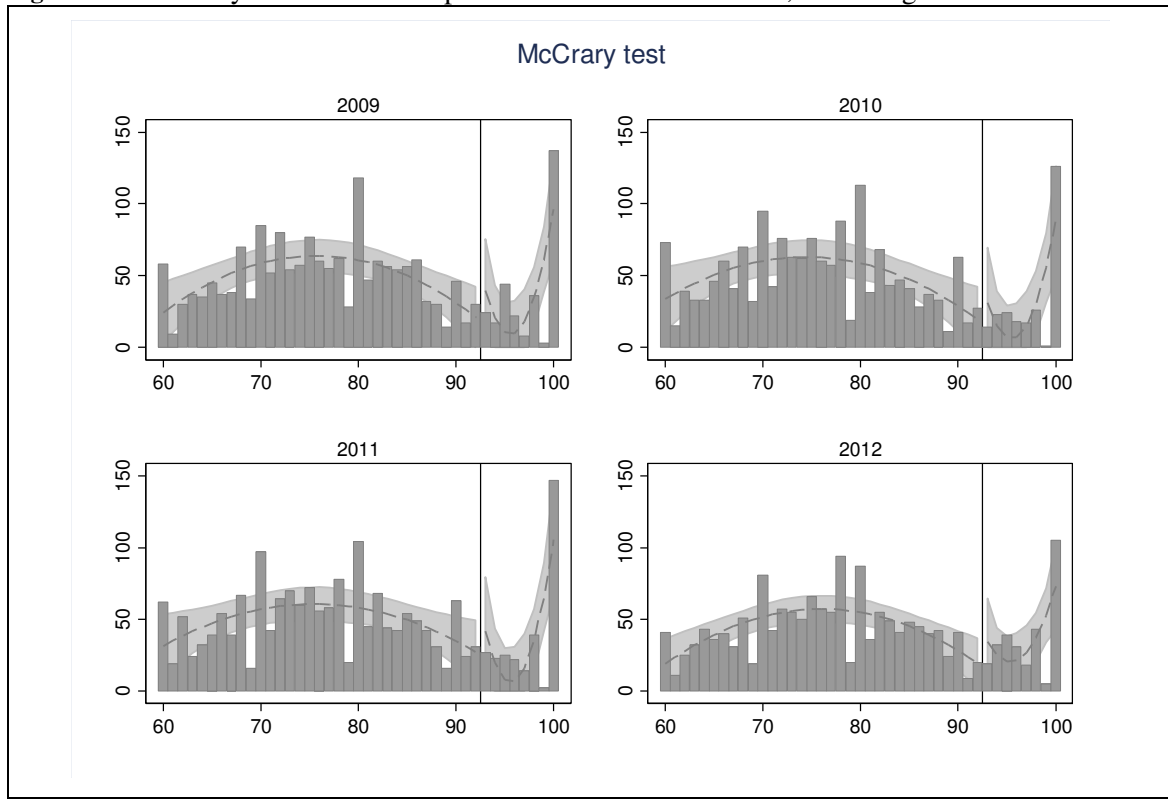
Based on the results and argumentations displayed in the paper, a reliable solution for the null effect on enrolment could be the reduction of the final mark threshold in order to favour the enrolment of students that otherwise would not attend university, *i.e.* students with relatively low marks and from disadvantaged social backgrounds. Moreover, we would recommend to target financial aids to students from 'true' low-income families. Therefore, in this particular case, since middle-income students are also eligible for the scholarship, we suggest reducing the financial threshold, together with the merit constraint, to improve policy efficacy. This suggestion seems reasonable if we look at the results stratified by social origins. It emerges that the Grant 5B produces significant results in particular for pupils from lower social strata.

Furthermore, money by itself could be not sufficient to change the attitudes towards HE participation. Low-income families could have a biased perception of the economic returns of HE, as well as the necessary workload to complete the university. Obviously, these attitudes have a strong influence in the formation of risk aversion and they could be changed only by means of guidance programmes addressed to students and their families. These programmes should guide them through a better understanding of the university offer and of the returns to education and of higher education in particular.

To conclude, the findings, along with issues mentioned above, suggest that the achievement of a more effective Grant 5B can only be achieved through a redesigning of the entire system of grant system currently working in the province of Trento. This should be flanked, especially in times of recession, by non-monetary programmes aimed at providing students and their families with a better knowledge of the benefits of education for individuals' life opportunities.

## Appendix A

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



In order to provide the absence of manipulation of the score variable, it is possible to carry out the so-called McCrary test (McCrary 2008), that is based on the comparison of the score variable distribution around the threshold. Figures A1 show the results regarding the test carried out on the four cohorts. Even if it is possible to notice a slight discontinuity on the threshold, this jump is not statistically significant. Furthermore, there are larger jumps at different values of the final mark (e.g. 70, 80, 100). 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.

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