Raising the Take-up of Higher Education Grants among Disadvantaged Students: Evidence from a Field Experiment*

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Abstract

Growing concerns about the capacity of grant policies to reduce the socioeconomic gap in college enrollment call to investigate the conditions required for these policies to reach their target. This paper aims at better understanding the role of information barriers in the low take-up of higher education grants among disadvantaged students. Based on a Canadian *lab-in-the-field* experiment, I model the demand for grants among high-school students as a function of their perceived utility of university, which depends on their level of information on higher education and on the labor market. I use the model to simulate the effects of several information policies that are commonly implemented in high schools to address the difficulties students may face in the transition to higher education, but are rarely studied. Results suggest that simply providing rural students with information on the financial aid system would be enough to close the take-up gap with non-rural students, while a combination of information policies is needed to close the gap between students with low-educated and high-educated parents. The simulations also show that the effect of information on the take-up of grants is equivalent to increasing the grant amounts by 13% for the general sample, and by 23% for rural students. Finally, I find that the willingness-to-pay for grants increases significantly when students are informed, with much stronger effects on disadvantaged students.

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1 Introduction

Grant policies are commonly used to facilitate access to higher education to low-income students. But empirical evidence suggests these policies do not always reach their target. In the US, various analyses find that gaps in college enrollment by family income did not close (or even increased) in the past decades, in spite of vast federal grant programs for low-income students (Kena et al. (2016), Bailey and Dynarski (2011), Belley and Lochner (2007)). Beyond the financial barriers to higher education, that have been extensively studied (see Deming and Dynarski (2009) for a review), an emerging literature investigates the informational barriers that disadvantaged students may face. These informational barriers can be multiple, ranging from lack of information on application procedures for college or financial aid to lack of information on the returns to higher education, and can jeopardize the capacity of financial aid policies to reach students who would benefit from them the most. Interventions providing information on the monetary returns and costs of education have been evaluated in various contexts (McGuigan et al. (2016), Wiswall and Zafar (2015), Bleemer and Zafar (2015), Hastings et al. (2015), Jensen (2010), Nguyen (2008)). However the effects of information policies that are commonly implemented by secondary schools to facilitate the transition to post-secondary education such as having a school counsellor that the students can meet, having working people intervening to present their job, offering skills and interests tests that students can take, or providing information on the financial aid system is less documented (see Page and Scott-Clayton (2016) for a review).

This paper assesses the capacity of such information policies to raise the take-up of grants among disadvantaged students. Although they do not necessarily aim at increasing college enrollments, which might not be desirable in general, they aim at helping students to make more informed education and work decisions. As such, they could be appropriate tools to reduce inequalities in the access to higher education that are attributable to inequalities in the access to information. Relying on a *lab-in-the-field* experiment that asks Canadian high-school students to choose between immediate cash payments and higher education grants, I define a choice model in which the take-up of the grants depends on the amount of grant offered and on the willingness to go to university. Thanks to a rich survey complementing the experiment, the willingness to go to university is modeled as a function of various socioeconomic factors, of the level of information students have, and of their perceptions of the returns and costs of university. In the policy simulations, I manipulate the level of information disadvantaged students have and assess which type of information policy or combination of policies would be needed to catch-up with the take-up of their more advantaged counterparts. To monetize the value of information, I also use the model to compute the variation in grant amounts that would be needed to reach the same take-up rates as when we inform students. Finally, I evaluate how the willingness-to-pay for grants varies with the level of information students have.

Five main findings come out of the analysis. First, the results show that the demand for grants is lower among rural students and students whose parents did not go to college, while it is higher for low-income students, controlling for the willingness to go to university. Second, the simulations suggest that by increasing the willingness to go to university, meeting a school counsellor, taking a test on skills and interests, and receiving information on financial aid allow to close the gap in the take-up of grants between students having none and at least one college-graduate parent. By contrast, receiving information on financial aid only is enough to close the gap between rural and non-rural students. Third, I find that an increase of 13% in the amounts of grant would be needed to reach the same take-up rates as when students benefit from the school counsellor meetings, the skills and interest test, and the information on financial aid. This increase is higher by 10 and 13 percentage points respectively for rural and low-income students, while it is

lower for students with low-educated parents. Fourth, the willingness-to-pay for grants increases by 32% when students benefit from the three types of information policies. Again this result is highly heterogeneous: the increase reaches 140% for rural students, and 65% for low-income students. Finally, taking a step back and looking at the determinants of the willingness to go to university, one surprising result is that non-monetary returns to university such as prestige or job satisfaction matter much more than monetary returns.

In comparison with the existing literature, the approach used in this paper is distinctive in three ways. First, it evaluates multiple information policies together and hence addresses multiple possible barriers to higher education. In their review of interventions aimed at favoring access to college, Page and Scott-Clayton (2016) stress that college affordability is only one of the different challenges high-school students may face, and that financial aid policies could fail to reach disadvantaged students if not complemented with information policies. In particular, as it can be difficult to navigate through the financial aid system, to master the procedures and understand (before applying to post-secondary institutions) the amount of aid one could expect to receive, several interventions have been tested to help students, and give encouraging results. Oreopoulos and Dunn (2013) find for example among students attending disadvantaged high schools in Toronto that providing information on both the benefits of post-secondary education and financial aid (through a calculator) increases students' willingness to get post-secondary education and reduces their concerns about costs. In Chile, Dinkelman and Martínez (2014) find that providing 8th graders attending poor urban schools with information on financial aid for post-secondary education increases their knowledge about the different financial aid sources and reduces absenteeism, nonetheless it does not improve test scores or enrollment in 9th grade. In the U.S., Hoxby et al. (2013) show that high-achieving, low-income students who benefited from individualized information on application process and colleges' net costs as well as no-paperwork application fee waivers apply and are admitted to more colleges, and enroll in better colleges. Coupling tax preparation help with assistance to complete the Free Application for Federal Student Aid (FAFSA) and with provision of information on aid estimates and colleges tuition fees, Bettinger et al. (2012) find that FAFSA submissions, aid receipt and college attendance and completion increase. However, providing information only, without assistance, is proved to be ineffective. This result suggests that in a school context, combining financial aid information with meetings with a school counsellor who would guide students through the application process for instance could be relevant.

There is little evidence on the impact of counsellors on schooling decisions although they are privileged interlocutors for the students, and can deliver individualized and comprehensive information. Owen (2012) studies the impact of raising school counsellors awareness about FAFSA completion and college enrollment in high schools in New Mexico and reports positive effects on both outcomes. In the U.S. again, Hurwitz and Howell (2014) also find that increasing the number of high-school counsellors leads to higher college enrollment rates. But the mechanisms are unclear since school counsellors can help students on a large range of issues. By contrast, Avery (2010) finds no significant impact of offering high-school students ten hours of individualized meetings with college counsellors, but the sample is very small, limiting the capacity to detect small effects. In a similar spirit, we can mention the analyses of College Advising Corps (CAC) that find positive impacts of CAC counsellors on FAFSA filling and college enrollment, in particular among low-income high-school students (Bettinger et al. (2010), Bettinger and Evans (2015)).[1]

The second distinctive feature of this paper it to rely on a laboratory experiment implemented on

[1]College Advising Corps is an independent, non-profit U.S. organization aimed at recruiting recent college graduates to help high-school students with the nonacademic barriers they could face in the process of college application and enrollment, it is targeted to low-income, first-generation college, and underrepresented students.

high-school students from various parts of Canada and with heterogeneous socioeconomic backgrounds, while most of the recent laboratory evidence on higher education decisions comes from undergraduate students concentrated in a few elite universities. As pointed in Scott-Clayton (2012) review, data on high-school students' expectations about higher education are rare, yet better understanding their expectations is crucial to better understanding their decision to pursue higher education or not. A series of studies find evidence that high-school students and their parents tend to overestimate the tuition costs of college in the U.S. (Horn et al. (2003), Ikenberry and Hartle (2000), Ikenberry and Hartle (1998)) but also in Canada (Usher (2005)). However, these studies do not explicitly test the relation between information, perceptions and schooling decisions. Evidence on this relation in developed countries rather concerns undergraduate students, as will be discussed below. Moreover, in the laboratory experiment I examine in this paper, students come from a diversity of areas and socioeconomic environments, and are thus heterogeneous in terms of access to information on higher education and on labor market. In that respect, it corresponds to what is sometimes called an *artefactual field experiment* (Harrison and List (2004)), or a *lab-in-the-field experiment* (Gneezy and Imas (2017)). Such experiments have in common with natural field experiments that the sample is drawn from the population of interest, and share with laboratory experiments the use of standardized rules and framing. These specific features allow me to study whether responses to information vary across students from different backgrounds, and whether information policies can close the gap between disadvantaged and more privileged students in the take-up of grants.

Finally, the third originality of this paper is to study the role of subjective perceptions of *non-monetary* returns and costs of university, which are often omitted in the modeling of schooling decisions. Papers using subjective data on the monetary returns to schooling are numerous, see for example Schweri and Hartog (2017), Bleemer and Zafar (2015), Wiswall and Zafar (2014), Attanasio and Kaufmann (2014), Arcidiacono et al. (2014), Kaufmann (2014), Arcidiacono et al. (2012), Jensen (2010), Nguyen (2008), Avery and Kane (2004), Dominitz and Manski (1996), Betts (1996). But none of these papers use subjective data on non-monetary returns. Recent exceptions include Belfield et al. (2016) who find that the perceived consumption value of education (course enjoyment) matters much more than perceived monetary returns in the decision to continue in full-time education, Zafar (2013) who finds that the strongest determinants of the choice of major are expectations about coursework enjoyment, fulfillment in future jobs, and parents approval, Wiswall and Zafar (2016) who find that family expectations (marriage, fertility) also matter in the choice of major, and Delavande and Zafar (2014) who find that school's ideology as well as parental approval again strongly determine the type of university students choose. In the data I use, in addition to monetary costs and returns, students are asked about their perceptions of the returns to university in terms of prestige, enrichment, job satisfaction or fulfillment, and these aspects turn out to be strong determinants of the willingness to go to university. I also use perceptions of the non-monetary costs of university such as social stigma or identity confusion associated with social mobility. These perceived costs are rarely measured yet I find that they play a significant role too in the willingness to go to university.

The rest of the paper is organized as follows. Section 2 describes the experiment and the data collected. Section 3 provides a descriptive analysis of the main variables of interest. Section 4 defines the model. Section 5 presents the estimates and the policy simulations. Finally, section 6 concludes.

2 Experiment

2.1 Context

The experiment was financed by the Canada Millennium Scholarship Foundation, and conducted by the Social Research and Demonstration Corporation (SRDC) and the Centre Interuniversitaire de Recherche en Analyse des Organisations (CIRANO) in 2008 and 2009 in four Canadian provinces: Manitoba, Ontario, Quebec, and Saskatchewan.[2] It was part of a series of research projects aimed at favoring access to post-secondary education for Canadian students. Although the vast majority of post-secondary institutions in Canada are public and benefit from government funding, higher education systems differ from one province to another in terms of the amount of funding public universities receive and in terms of the tuition fees they charge. But due to tuition regulations, tuition fees are similar across universities within each province. Average annual undergraduate tuition fees for Canadian full-time students in 2008-2009 were 3228 CAD in Manitoba, 5667 CAD in Ontario, 2180 CAD in Quebec, and 5064 CAD in Saskatchewan.[3] Financial aid policies in Canada are mainly need-based, but also differ between the four provinces, Quebec being particularly generous in terms of both the income exemption threshold and the maximum amount of financial aid a student can receive.
Based on the 2010 Youth in Transition Survey, Belley et al. (2014) find that post-secondary attendance in Canada was around 60% for students whose parental annual income was $20 000 or less while it was almost 85% for those whose parental annual income was between $80 000 and $100 000 (see their paper for a detailed description of the Canadian post-secondary system, and a comparison with the US system).

2.2 Data

The sample consists of 1248 Canadian senior high-school students distributed over the four provinces. Sampling was made so that a minimum of 200 students were recruited per population group of interest: high versus low socioeconomic status, aboriginals, and rural versus urban schools (see Johnson and Montmarquette (2015) for a detailed description of the sampling). The rural participating high-schools were at most four hours driving from the urban high-schools. The criteria used to define a school as rural was that it was located at least 40 km far from a university. Within high-schools, senior students were recruited on a voluntary basis, parental and participant consents were required. Table 10 in Appendix A provides a short description of the sample. It shows that high-school students in the sample are on average 17.2 years old, and a bit more than a half are girls. In terms of socioeconomic characteristics, relatively large shares of students have low-educated or low-income parents, and 19.6% attend a rural school. 60.1% of the students declare having a job, which is another possible indication of difficult financial situations.

The data are cross sectional and comes from three sources: two surveys followed by a laboratory experiment.[4] A short parental survey was implemented by telephone mainly asking about income, education, immigration status and expectations concerning child achievement. Students were also surveyed through a web platform on a broad set of dimensions: their health, their aspirations

[2] The data are available on request from SRDC.
[3] Source: http://www.statcan.gc.ca/daily-quotidien/091020/t091020b1-eng.htm
[4] The possibility to get follow-up data is under investigation.

and attitudes towards education, the perceived barriers to the pursuit of higher education, their level of information on higher education, their school engagement, their income and job (if any), their perceptions of the costs and returns to higher education, their attitudes towards finances and their debt experience, their alcohol and drug consumption, and they were evaluated through three psychometric scales on their perceived level of mastery, their temporal orientation and their risk attitudes. Many questions of the student survey were adapted from the Youth in Transition Survey (YITS), the Post Secondary Education Survey (PEPS) and Survey of Labor and Income Dynamics (SLID). In this paper, I focus on two original aspects of the student survey: the level of information on higher education and labor market students have and their perceptions of the costs and returns to higher education (section 3 gives a detailed descriptive analysis of these variables).

The laboratory experiment is the main originality of the data. It was conducted after the students filled the survey and contains three parts: two series of questions aimed at measuring time and risk preferences, and a series of 22 binary choices between different amounts of cash to be provided within a week, and different types and amounts of financial aid (grants, loans, mixtures of grants and loans) to be provided conditionally on enrolling in full-time post-secondary education or training (which could be cumulated with public financial aid outside the experiment). In this paper I only use the series of questions between cash and grants.[5]

Table 1 gives the amounts of cash and grants as well as the proportion of students who chose the grant. At the end of the experiment, one of the 22 choices was randomly picked and the corresponding amount of cash or aid was given to the student, ensuring that choices were incentivized. Unsurprisingly, for a fixed amount of grant ($1000), as the amount of cash increases, the take-up of the grant decreases, and symmetrically, for a fixed amount of cash ($300), as the amount of the grant increases, the take-up increases.[6] It should be noted that the amounts of grant offered in the experiment are high given tuition fees in Canada (see section 2.1). A $2000 grant for example would cover approximately one year of undergraduate studies in Quebec.

Table 1: Amount of cash and grant and take-up of grant for each binary choice

Cash (CAD)	Grant (CAD)	Choose grant (%)
25	1 000	88.6
100	1 000	82.7
300	1 000	68.7
700	1 000	41.3
300	500	38.5
300	2 000	76.4
300	4 000	83.6

[5] Belzil et al. (2017) already use the data to study the role of time and risk preferences in the willingness-to-pay for financial aid, with a focus on loans and credit constraints, and Johnson and Montmarquette (2015) use the data to study the extent of loan aversion among Canadian students.

[6] Among the seven choices between cash and grant, 4.5% of the students made at least one inconsistent choice, for example choosing $300 of cash over $1000 of grant and then choosing $1000 of grant over $700 of cash.

In this experiment, although an abstract framing was used and a set of rules was imposed as in conventional laboratory experiments, the subject pool was drawn from the population of interest, which is very valuable to study more particularly disadvantaged students. This type of framework is sometimes referred to as an *artefactual field experiment* (Harrison and List (2004)) or *lab-in-the field experiment* (Gneezy and Imas (2017)).

Finally, after the experiment, students were assessed on their numeracy skills through a series of 28 open-response questions evaluating how adept a participant is at using mathematics in real-life situations. There is no missing observation in the student survey due to the online format, and there is no missing observation in the experiment and numerical assessment because the staff in charge of implementing the questionnaires made sure students were answering all the questions. Nonetheless there are around 10 to 15% of missing observations depending on the question in the parental survey.

3 Descriptive analysis

This section aims to provide a description of the main variables used in the model of choice between grant and cash and to present the reduced-form articulations between its different components.

Absence of correlation between parental income and grant take-up

To give a first insight on the way socioeconomic background correlates with the take-up of grants, Table 2 presents the results of seven separate regressions of each binary choice between grant and cash on three binary variables likely to reflect a disadvantaged socioeconomic background as well as the standardized numeracy score. To capture disadvantaged situations in terms of access to higher education, I first use the binary variable indicating whether student's school is located in a rural area since geographical isolation could be associated with low access to information on college and financial aid system (see Hoxby and Avery (2013)). I also use the binary variable indicating whether at least one parent went to university, which is another source of influence and information on the university application process in particular, as well as the binary variable indicating whether parents annual income is less than $40 000. Hence the constant gives the take-up of grants for students attending a school located in an urban area, having at least one parent who went to university, whose parents annual income is higher than $40 000 and whose numeracy score is the sample mean. It can be noted that the take-up of grant for this more advantaged subpopulation is systematically higher than the average take-up presented in Table 1. Columns 3 and 4 show that while having no parent who went to university is always negatively correlated with the take-up of grants, attending a rural school has no significant effect (in parentheses are the p-values). Surprisingly, parents income has no significant correlation with the demand for grants, and if anything, low income seems to be negatively correlated with the choice of the grant, which is puzzling given that we are controlling for (numerical) ability and other socioeconomic characteristics.

Table 2: How the take-up of grant correlates with socioeconomic background, controlling for numerical ability

Chooses:	Constant	School in rural area	No parent went to univ	Parents annual income <40K
1000G over 25C	0.914	0.037*	-0.058***	-0.008
		(0.097)	(0.003)	(0.755)
1000G over 100C	0.863	0.041	-0.073***	-0.023
		(0.137)	(0.002)	(0.468)
1000G over 300C	0.737	0.012	-0.086***	-0.038
		(0.725)	(0.003)	(0.314)
1000G over 700C	0.449	0.039	-0.044	-0.060
		(0.294)	(0.179)	(0.135)
500G over 300C	0.450	0.055	-0.089***	-0.054
		(0.135)	(0.006)	(0.166)
2000G over 300C	0.813	0.027	-0.081***	-0.045
		(0.389)	(0.002)	(0.208)
4000G over 300C	0.879	0.023	-0.070***	-0.006
		(0.406)	(0.002)	(0.857)

Note: Regression of each variable in column 1 on the three binary variables indicating whether student school is located in a rural area (column 3), whether none of his parents has been to university (column 4), and whether parents annual income is less than 40K (column 5), controlling for numerical ability. P-values are in parentheses (robust standard errors). * stands for p-value<0.1, ** for p-value<0.05 and *** for p-value<0.01. N = 1035 observations.

Since the main determinant of the demand for grant is expected to be the willingness to pursue post-secondary education, Table 3 presents the same regressions, but instead of the binary choices between grant and cash, the explained variables are variables capturing the willingness to go to university. It may be reflected by three variables in the student survey: whether the students declare they would like to go to university, whether they think they will get to university, and whether they think their family expects them to go to university. Whether parents went to university is again a strong determinant of the student's willingness to go to university, going in the same direction as previously, and parents income again has no significant effect. However, school geographical situation matters now, students attending a rural school being less willing to go to university, again keeping numerical ability constant.

Table 3: How the willingness to go to university correlates with socioeconomic background, controlling for numerical ability

Variable	Constant	School in rural area	No parent went to univ	Parents annual income<40K
1 if would like to go to univ	0.878	-0.161***	-0.180***	-0.044

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... table 3 continued

Variable	Constant	School in rural area	No parent went to univ	Parents annual income<40K
		(0.000)	(0.000)	(0.236)
1 if think will get to univ	0.812	-0.184***	-0.230***	-0.050
		(0.000)	(0.000)	(0.186)
1 if family expects univ	0.835	-0.141***	-0.099***	-0.017
		(0.000)	(0.000)	(0.646)

Note: Regression of each variable in column 1 on the three binary variables indicating whether student school is located in a rural area (column 3), whether none of his parents has been to university (column 4), and whether parents annual income is less than 40K (column 5), controlling for numerical ability. P-values are in parentheses (robust standard errors). * stands for p-value<0.1, ** for p-value<0.05 and *** for p-value<0.01. N = 1035 observations.

Different perceived costs and returns and information level for disadvantaged students

To investigate the correlation between socioeconomic background and the willingness to go to university, I use variables from the student survey that measure the perceptions students have of the returns and costs of university. The survey gives a rich description of these perceptions, evaluating both monetary and non-monetary returns and costs such as the prestige associated with jobs one could obtain with a university degree or the social stigma one could suffer from when going to university while his (her) family and peers did not.[7] Table 4 presents the list of binary variables capturing perceived monetary and non-monetary returns, as well as monetary and non-monetary costs.[8] Almost systematically, students attending a rural school and students whose parents did not go to university have lower perceived monetary and non-monetary returns, controlling for numerical ability. On the contrary, monetary and non-monetary costs associated with university tend be be seen as higher for students whose parents did not go to university, for students whose parents annual income is below $40 000, and to a smaller extent by students attending a rural school.

The existence of errors in the perceptions of returns to post-secondary education among disadvantaged students is documented in Baker et al. (2017) who analyze community colleges students' perceptions of wage and probability of being employed in different majors. They find that low-income students tend to underestimate the probability of employment to a larger extent than their better-off peers. Bleemer and Zafar (2015) also show that beliefs about costs and returns to college among US households are severely biased (overestimation of costs and underestimation of returns), in particular for low-income and non-college households. In a different context, Jensen (2010) finds that eighth-graders in the Dominican Republic tend to underestimate the returns to secondary school. Using another survey commissioned by the Canada Millennium Scholarship

[7] This type of perceived non-monetary cost is somehow reminiscent of the perceived parents approval Zafar (2013) and Delavande and Zafar (2014) find to be a strong determinant of the choice of major or university.

[8] In the survey, the answers are on a five-level Likert scale ranging from "Strongly agree" to "Strongly disagree", I dichotomize them in Table 4, giving value 0 to the middle answer, "Uncertain". I also present Z-scores for each dimension, that correspond to the sum of the standardized binary variables divided by the number of variables in the score (see Kling et al. (2007) for an example of use of this aggregation method). The survey questions corresponding to the variables used are presented in Appendix B.

Foundation in 2003 among the general Canadian population, Usher (2005) also observes that low-income Canadians tend to overestimate university costs more than higher-income individuals, and underestimate university returns more as well. Part of the reasons why students tend to overestimate the costs of university is that they lack information on financial aid opportunities (Hoxby et al. (2013), Horn et al. (2003)).

In the last section of the table, we investigate this hypothesis by presenting the differences between socioeconomic groups in terms of level of information on higher education and on the labor market. In the student survey, we observe whether students benefited from four types of information policies implemented at school: meeting a school counsellor to talk about future education or work, completing a questionnaire about interests and abilities, obtaining information on student financing (grants or loans), attending a presentation by people working in different types of jobs[9]. We can first notice that on average, the proportions of students who received the four types of information are high, but the lowest proportion, 44.4%, concerns financial aid. There is no significant differences between socioeconomic groups on the probability to meet a school counsellor. Nonetheless rural students are much more likely to receive information on financial aid, and less likely to attend a presentation of jobs by working people. Students whose parents did not go to university have a slightly higher probability to fill a questionnaire on interests and abilities, while low-income students are less likely to do so. In the next table, I examine whether the effect of socioeconomic background on the willingness to go to university differs between informed and uninformed students for the four types of information presented here.

Table 4: How perceived returns and costs of university and level of information correlate with socioeconomic background, controlling for numerical ability

Variable	Constant	School in rural area	No parent went to univ	Parents annual income <40K
Perceived monetary returns :				
1 if univ pays more than HS	0.930	-0.072**	-0.056***	0.002
		(0.010)	(0.007)	(0.939)
1 if univ costly but more money	0.918	-0.071**	-0.029	-0.038
		(0.012)	(0.163)	(0.193)
1 if univ=effort but more money	0.905	0.005	-0.037*	0.005
		(0.851)	(0.071)	(0.845)
1 if univ leads to better paying job	0.914	-0.012	-0.051**	0.012
		(0.629)	(0.013)	(0.647)
Z-score monetary returns univ	0.115	-0.115**	-0.134***	-0.013
		(0.047)	(0.004)	(0.820)
Perceived non-monetary returns :				
1 if univ leads to enjoyable job	0.855	-0.075**	-0.082***	-0.044
		(0.025)	(0.002)	(0.214)
1 if univ leads to satisfying job	0.763	-0.039	-0.043	0.022
		(0.261)	(0.132)	(0.542)
1 if cannot learn w/o univ	0.355	0.034	0.065**	-0.044
		(0.352)	(0.044)	(0.263)

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[9]The wording here exactly corresponds to the four binary survey questions asking students whether they benefited from each type of information. We do not have more precisions about the content of the information provided.

... table 4 continued

Variable	Constant	School in rural area	No parent went to univ	Parents annual income <40K
1 if prestigious job after univ	0.883	-0.067**	-0.061**	-0.038
		(0.031)	(0.014)	(0.257)
1 if univ => fulfilling job	0.634	-0.041	-0.081**	-0.021
		(0.276)	(0.014)	(0.603)
Z-score non-monetary returns univ	0.090	-0.091**	-0.097***	-0.058
		(0.034)	(0.005)	(0.197)
Perceived monetary costs :				
1 if not sure univ pays off given costs	0.112	0.058*	0.055**	0.066*
		(0.061)	(0.022)	(0.056)
1 if better get a job given univ costs	0.161	0.037	0.106***	0.025
		(0.274)	(0.000)	(0.481)
1 if indebted after univ	0.239	0.028	0.114***	0.119***
		(0.441)	(0.000)	(0.004)
1 if costs outweigh benefits of univ	0.194	0.044	0.041	0.062*
		(0.181)	(0.138)	(0.100)
Z-score monetary costs univ	-0.171	0.100*	0.182***	0.157***
		(0.058)	(0.000)	(0.008)
Perceived non-monetary costs :				
1 if friends rivalry if univ	0.068	0.045*	0.012	0.069**
		(0.069)	(0.518)	(0.017)
1 if univ would confuse identity	0.059	-0.017	0.021	0.036
		(0.372)	(0.193)	(0.132)
1 if univ => tensions w/ community	0.027	-0.013	0.021*	0.046**
		(0.386)	(0.084)	(0.031)
1 if univ => tensions w/ parents	0.017	0.030*	0.019	0.056**
		(0.088)	(0.103)	(0.013)
Z-score non-monetary costs univ	-0.097	0.043	0.077**	0.216***
		(0.412)	(0.049)	(0.004)
Level of information :				
1 if met school counsellor	0.734	-0.054	0.012	-0.004
		(0.118)	(0.679)	(0.915)
1 if questionnaire interests/abilities	0.676	-0.014	0.056*	-0.086**
		(0.693)	(0.067)	(0.029)
1 if info on financial aid	0.444	0.116***	-0.013	0.035
		(0.002)	(0.693)	(0.391)
1 if attended presentation working people	0.659	-0.086**	-0.036	0.012
		(0.022)	(0.255)	(0.756)

Note: Regression of each variable in column 1 on the three binary variables indicating whether student school is located in a rural area (column 3), whether none of his parents has been to university (column 4), and whether parents annual income is less than 40K (column 5), controlling for numerical ability. Column 2 gives the constant. P-values are in parentheses (robust standard errors). * stands for p-value<0.1, ** for p-value<0.05 and *** for p-value<0.01. N = 1035 observations.

Can information policies mitigate the effect of socioeconomic status?

Through the model, I simulate different information policies and evaluate whether they can mitigate the negative effect of disadvantaged socioeconomic background on the willingness to go to university, and subsequently on the demand for grants. Table 5 gives a first insight on the effect of the four types of information policies earlier described on the willingness to go to university. The table presents the results of four regressions (one for each information policy) of the binary variable indicating whether student would like to go to university on the binary variables indicating whether student's school is located in a rural area, whether one of his (her) parents went to university, whether their annual income is less than $40 000, whether (s)he benefited from the information under study, and the interactions between each of the background variables and the information variable, still controlling for numerical ability. For each type of information, the table gives first the effect of background variables for uninformed students, and below the difference with students who received the information. A positive difference thus means that the information policy mitigates the negative effect of low socioeconomic status on the willingness to go to university. Attending a rural school is associated with a decrease of 0.262 of the probability to be willing to go to university for students who did not meet a school counsellor. For students who met a school counsellor, the decrease is of 0.112 only (-0.262+0.150). This information policy does not significantly reduce the negative effects of parental education or income. Completing a questionnaire about interests and abilities also reduces the negative effect of attending a rural school (with a p-value for the difference close to 10%), but does not significantly alter the effect of parental education or income. Receiving information on financial aid significantly mitigates the negative effect of low parental education only (the p-value is 10.1%). Finally, attending a job presentation significantly attenuates the negative effect of low parental income and surprisingly reinforces the negative effect of attending a rural school (negative difference, with a p-value of 10.7%).

Table 5: How different is the effect of disadvantaged socioeconomic background on the willingness to go to university for informed and uninformed students

Dependent variable: *willingness to go to university*	School in rural area	No parent went to univ	Parents annual income<40K
School counsellor meeting :			
-Effect on those who do not benefit from it	-0.262***	-0.165***	-0.068
	(0.000)	(0.002)	(0.347)
-Difference with those who benefit from it	0.150*	-0.021	0.038
	(0.053)	(0.728)	(0.648)
Questionnaire abilities/interests :			
-Effect on those who do not benefit from it	-0.240***	-0.201***	-0.062
	(0.000)	(0.000)	(0.310)
-Difference with those who benefit from it	0.117	0.030	0.035
	(0.123)	(0.609)	(0.645)
Information on financial aid :			
-Effect on those who do not benefit from it	-0.222***	-0.219***	-0.008
	(0.000)	(0.000)	(0.887)
-Difference with those who benefit from it	0.078	0.084	-0.070

Continued on next page...

... table 5 continued

Dependent variable: *willingness to go to university*	School in rural area	No parent went to univ	Parents annual income<40K
	(0.259)	(0.101)	(0.329)
Job presentation by working people :			
-Effect on those who do not benefit from it	-0.094*	-0.202***	-0.128**
	(0.071)	(0.000)	(0.031)
-Difference with those who benefit from it	-0.113	0.035	0.135*
	(0.107)	(0.511)	(0.073)

Note: Regressions of binary variable indicating whether student would like to go to university on the three binary variables indicating whether student school is located in a rural area (column 1), whether none of his parents has been to university (column 2), whether parents annual income is less than 40K (column 3), whether he received the information, as well as the interaction terms between bakcground variables and the information variable, seperately for each of the four types of information, controlling for numerical ability. P-values are in parentheses (robust standard errors). * stands for p-value<0.1, ** for p-value<0.05 and *** for p-value<0.01. N = 1035 observations.

The model presented in the next section combines these different elements – level of information, socioeconomic background, and perceptions of costs and returns to university, in a model of choice between grant and cash. In contrast with the descriptive analysis presented above, the model explicitly connects the different steps of the decision to choose the grant over the cash together. It also takes into account the intertemporal dimension of the decision and the uncertainty associated with the post-high school period (when the grant will be used). Finally it exploits the school-level design of the sampling procedure to create exogenous variation in the level of information students have. The model is then used to simulate the effect of the different types of information policies described above on the gap in the take-up of grants between socioeconomic subgroups, and on students' willingness-to-pay for grants.

4 Model

4.1 Setting

The model uses mainly two parts of the data. From the survey, it uses questions on the willingness to go to university, the perceptions of costs and returns to university, and the level of information students have. From the laboratory experiment, it uses the series of seven binary choices between different amounts of grant to be paid conditional on starting post-secondary education or training and different amounts of cash to be paid immediately and unconditionally.

The model says that the *ex ante* willingness to go to university is a function of the perceptions of costs and returns to university, as well as of the different types of information student may get at school.[10] The decision to take the grant or the cash is modeled as an intertemporal decision

[10]The *ex ante* willingness to go to university is the willingness to go to university before the experiment takes place, documented in the survey.

that depends on the *ex ante* perceived utility of university, and on the amount of cash and grant offered in the experiment.

4.2 Specification of the components of the model

Specification of the willingness to go to university

When answering whether they would like to go to university or not ($D1_i \in \{0,1\}$), I assume students are influenced by their perceptions of the returns (R) and costs (C) of university, which can be decomposed into monetary (R^M, C^M) and non-monetary (R^N, C^N) components, as well as several types of information they may have (I^C, I^Q, I^A, I^P):

$$\begin{aligned} D1_i = \mathbb{1}\{&\alpha_0 + \alpha_1 R_i^M + \alpha_2 R_i^N + \alpha_3 C_i^M + \alpha_4 C_i^N \\ &+ \alpha_5 I_i^C + \alpha_6 I_i^Q + \alpha_7 I_i^A + \alpha_8 I_i^P + X_i\beta + \upsilon_i > 0\} \end{aligned} \tag{1}$$

where R^M, R^N, C^M, and C^N are Z-scores built from four series of four or five measurements (see Table 4), I^C is a binary variable standing for meeting a school counsellor, I^Q is a binary variable standing for filling a questionnaire on abilities and interests, I^A is a binary variable standing for getting information on financial aid, I^P is a binary variable standing for attending a presentation by people working in different types of jobs.[11] X is a vector of control variables including numerical skills, parents education, expectations, and income, and whether the student school is located in a rural area. υ_i contains the remaining unobserved determinants of the willingness to go to university.

Parameters α_1, α_2, α_3, and α_4 give the respective importance of monetary versus non-monetary returns and costs in the perceived utility of university, which is one of the most original features of the survey, and parameters α_5, α_6, α_7, and α_8 give the importance of the different types of information policies.

To account for the endogeneity of the level of information students have, and because the information coefficients will be crucial for policy simulations, I model each type of information variable as a function of the proportion of students who received the information in the school ($Prop_i^j$ with $j \in \{C, Q, A, P\}$) and the same set of control variables X. The proportion of students who received the information at the school level is likely to be highly correlated with the probability that student i receives the information since it reflects how actively the school implements the information policy, but it is unlikely to be directly correlated with student i's willingness to go to university.[12]

$$I_i^j = \mathbb{1}\{\theta_0^j + \theta_1^j Prop_i^j + X_i\theta^j + \epsilon_i^j > 0\} \tag{2}$$

Specification of the choice between grant and cash

[11] As the information provided were not explicitly on returns and costs of university and as the information variables are indeed weakly correlated with the perceptions variables in the data, information variables directly affect the willingness to go to university in the model instead of going through the perceptions of costs and returns.

[12] Results are similar when I include in equation (2) school-level variables that one could think as being correlated with both the proportion of students receiving information in the school and student i's willingness to go to university, namely: average numeracy score, average income of the parents, and average proportion of low-educated parents.

When choosing between grant and cash ($D2_{iq} \in \{G, C\}$ with $q \in \{1, ..., 7\}$), I assume students consider two periods: the present period corresponding to the time between the experiment and high-school graduation, and the future period corresponding to the first years of post-secondary education (the model only considers the period when the grant will be consumed and not the whole residual lifetime).[13] The present utility of each alternative depends on the amount of money students receive at the moment they choose (c_q if they choose the cash, 0 if they choose the grant). The future utility depends on whether they will go to university or not (($univ_i \in \{0, 1\}$). This is uncertain at the moment they choose to take the grant or not so this future utility is expressed as the *expected* maximum value between two possible utilities: utility associated with university enrollment, and utility associate with the outside option:[14]

$$\begin{aligned} U(D2_{iq} = G) &= ln(C_i^p + 0) + \psi_{iq}^G \\ &\quad + \beta Emax(U(univ_i = 1|D2_{iq} = G, W_i), U(univ_i = 0|D2_{iq} = G, W_i)|\mathcal{I}_{0i}) \end{aligned}$$

$$\begin{aligned} U(D2_{iq} = C) &= ln(C_i^p + c_q) + \psi_{iq}^C \\ &\quad + \beta Emax(U(univ_i = 1|D2_{iq} = C, W_i), U(univ_i = 0|D2_{iq} = C, W_i)|\mathcal{I}_{0i}) \end{aligned}$$

$$D2_{iq} = G \iff U(D2_{iq} = G) \geq U(D2_{iq} = C) \tag{3}$$

with C_i^p the present consumption, which is modeled as a share of parental income ($C_i^p = \gamma Inc_i$), $\psi_{iq} = \{\psi_{iq}^G, \psi_{iq}^C\}$ an individual-question specific random shock on the utility of $D2_{iq}$ observed by the agent only, β the discount factor, assumed to be homogeneous across individuals, W_i the determinants of the utility of university from equation (1) (R_i^M, R_i^N, ..., I_i^P, X_i), observed by both the agent and the econometrician. $\mathcal{I}_{0i}$ is the agent information set in the present period, it contains ψ_{iq} and all the agent's observed characteristics.

This simple specification assumes that students are slighly risk averse (the utility function is slightly concave in consumption due to the logarithm), and that C_i^p and c_q are completely consumed in the first period (no overlap with the second period).

4.3 Identification and estimation

The two main equations of interest are equations (1) and (3). Parameters in equation (1) are identified from the variation across individuals in the survey data and from the assumption that υ_i is independent across individuals and identically distributed according to a standard normal distribution. The causal interpretation of the parameters associated with the different types of information hinges on the capacity of variables $Prop^C$, $Prop^Q$, $Prop^A$, $Prop^P$ in equation (2) to generate exogenous variation in the level of information students have.[15]

Under the aforementioned assumptions, the probability that a student i declares (s)he would like

[13] We do not have follow-up data on enrollments and labor-market outcomes for the moment, so modeling these later periods as in a standard dynamic discrete choice model of schooling decision is unfeasible.

[14] In other words, if we were to define these two utilities, they would contain a random shock that would be unobserved by the agent in the present period and that makes it uncertain which of the two utilities is the highest. Since the difference between the two Emax will be approximated (see section 4.3), I do not explicitly define these utilities here.

[15] Equation (2) is estimated assuming that ϵ_i^j is independent across individuals and identically distributed according to a standard normal distribution.

to go to university is:

$$\begin{aligned} &Pr(D1_i = 1) \\ &= \Phi(\alpha_0 + \alpha_1 R_i^M + \alpha_2 R_i^N + \alpha_3 C_i^M + \alpha_4 C_i^N + \alpha_5 I_i^C + \alpha_6 I_i^Q + \alpha_7 I_i^A + \alpha_8 I_i^P + X_i\beta) \end{aligned} \tag{4}$$

Parameters in equation (3) are identified both from the variation across individuals and from the variation in the amounts of grant and cash in the series of binary choices within individuals. Rewriting equation (3) as a probability, we get:

$$\begin{aligned} Pr(D2_{iq} = G) \quad = \quad & Pr\Big(\psi_{iq}^C - \psi_{iq}^G \leq ln(\gamma Inc_i) - ln(\gamma Inc_i + c_q) \\ + \quad & \beta Emax(U(univ_i = 1|D2_{iq} = G, W_i), U(univ_i = 0|D2_{iq} = G, W_i)|\mathcal{I}_{0i}) \\ - \quad & \beta Emax(U(univ_i = 1|D2_{iq} = C, W_i), U(univ_i = 0|D2_{iq} = C, W_i)|\mathcal{I}_{0i}) \Big) \end{aligned}$$

In the spirit of Geweke and Keane (2000) and in line with Belzil et al. (2017), instead of assuming a specific parametric form for future utilities and a specific distribution for their random shock, I approximate the difference between the two $Emax$ in $Pr(D2_{iq} = G|m)$ by a polynomial. As this polynomial approximates the marginal utility of accepting the grant, I include in it the amount of the grant g_q offered in the experiment, its square, the (*ex ante*) perceived utility of university, measured by the latent variable $D1_i^*$, province fixed effects P_i^O, P_i^Q, and P_i^S that capture contextual differences (see section 2.1; I take Manitoba as the reference province) and the binary variable Fin_i indicating whether financial situation is a barrier to university according to the student:

$$\begin{aligned} Pr(D2_{iq} = G) = Pr\Big(& \psi_{iq}^C - \psi_{iq}^G \leq ln(\gamma Inc_i) - ln(\gamma Inc_i + c_q) \\ & + \delta_0 + \delta_1 g_q + \delta_2 g_q^2 + \delta_3 D1_i^* + \sum_{p \in \{O,Q,S\}} \delta_4^p P_i^p + \delta_5 Fin_i \Big) \end{aligned}$$

To allow that present consumption does not represent the same share of parental income across students, and that the financial barrier does not have the same importance in the marginal utility of the grant, I assume there are two (unobserved) types of individuals in the data for whom the parameters γ and δ_5 may differ.[16]

Then assuming $\psi_{iq}^C - \psi_{iq}^G = \psi_i \overset{iid}{\sim} \mathcal{N}(0,1)$, the probability to choose the grant at question q for an individual i of heterogeneity type m ($m \in \{1,2\}$) is:

$$\begin{aligned} Pr(D2_{iq} = G|m) = \Phi\Big(& ln(\gamma^m Inc_i) - ln(\gamma^m Inc_i + c_q) \\ & + \delta_0 + \delta_1 g_q + \delta_2 g_q^2 + \delta_3 D1_i^* + \sum_{p \in \{O,Q,S\}} \delta_4^p P_i^p + \delta_5^m Fin_i \Big) \end{aligned} \tag{5}$$

[16] With more than two types, one of the share is estimated to be one, which is unrealistic, so I stop at two types. Results are robust to allowing other parameters to be heterogeneous (Appendix C.2.3). See Keane and Wolpin (1997) for an example of use of a fixed number of types to allow for unobserved heterogeneity in a discrete choice model.

Assuming independence across questions for the error term is questionable but observed individual characteristics as well as unobserved heterogeneity allow the choices to be correlated across questions.

In this specification, the four types of information are assumed to affect the decision to take the grant through the willingness to go to university, as $D1^*$ is a synthetic index of several factors including the four information variables (see equation (1)). However, receiving information on financial aid could also directly affect the decision to take the grant, in at least two opposite ways. It could affect it positively if receiving information on financial aid increases the familiarity with the procedures and reduces the administrative difficulties associated with taking the grant. But it could also affect it negatively if the information the student received on financial aid made him (her) realize that (s)he would obtain a grant outside the experiment and then does not need to take the grants offered in the experiment. I will thus check the robustness of the results to an alternative specification where information variable I^A appears both in $D1^*$ and directly in the polynomial.

All the parameters are estimated jointly through maximum likelihood technique, using the Broyden-Fletcher-Goldfarb-Shanno (BFGS) algorithm for the numerical maximization of the following log-likelihood function:

$$lnL = \sum_{i=1}^{1248} ln\left(\sum_{m=1}^{2} p_m.(\prod_{q=1}^{7} L_{iq|m}) \right)$$

with

$$L_{iq|m} = LD1_i.LI_i^C.LI_i^Q.LI_i^A.LI_i^P.LD2_{iq|m}$$

where p_m is the probability of being of type m, $LD1_i$ is the likelihood function corresponding to the binary probit of whether student would like to go to university on perceived costs and returns, the four types of information and covariates, LI_i^C, LI_i^Q, LI_i^A, LI_i^P are the likelihood functions corresponding to binary probit of the four types of information on the proportion of students having the information in the school and covariates, and $LD2_{iq|m}$ is the likelihood function corresponding to the binary decision of taking the grant or the cash.

5 Results

5.1 Fit

To assess the capacity of the model to yield predictions that are consistent with observed behaviors, I compare the predicted take-up of the grant with the observed proportion of students choosing the grant in the sample, for each of the seven binary choices between grant and cash. The specification presented in the previous section is the one that fits the data the best (see Appendix C.2 for a presentation of alternative specifications).[17] Table 6 shows that the model fits the data quite well for the choices of a grant of \$1000 over \$25 and \$700 of cash, of \$500 over

[17] It can be noted that allowing for two unobserved types instead of one improves the capacity of the model to get close to the observed proportions of students choosing the grant (see Table 12 in Appendix C.2.1): the sum of the absolute differences is 0.283 compared to 0.333 with only one type, and the biggest difference is 0.082 versus 0.102 with one type.

$300, of $2000 over $300, and of $4000 over $300. It underestimates the take-up by more than 4 percentage points for the choices of a grant of $1000 over $100 and $300 of cash.

Table 6: Fit

Choice	Observed proportion	Estimated proportion
1000G over 25C	0.886	0.909
1000G over 100C	0.827	0.762
1000G over 300C	0.687	0.605
1000G over 700C	0.413	0.450
500G over 300C	0.385	0.425
2000G over 300C	0.764	0.791
4000G over 300C	0.836	0.827

5.2 Estimates

This section presents the estimates of the two main equations of the model: the estimates for the willingness to go to university (equation (4)), and the estimates for the choice between grant and cash (equation (5)).

Willingness to go to university

Table 7 gives the average marginal effects of perception and information variables (equation (4)). It shows first that the estimates associated with perceived returns and costs have the expected signs: the two types of returns increase the willingness to go to university while the costs reduce it. Nonetheless non-monetary returns matter much more than monetary returns: a marginal increase in the non-monetary returns Z-score is associated with an increase of 10.3 percentage points in the probability that the student declares (s)he would like to go to university, which is almost four times bigger than the increase associated with a marginal increase in the monetary returns Z-score. This result goes in the same direction as Belfield et al. (2016), Zafar (2013), Wiswall and Zafar (2016) and Delavande and Zafar (2014) who also find that different types of subjective expectations on non-monetary returns of education such as expectations on fertility, fulfillment, parents approval, play an important role in schooling decisions. Here the non-monetary returns score includes work enjoyability, satisfaction, knowledge, prestige, and fulfillment measures (see Appendix B for the list of survey questions used in the Z-scores). When we look at costs, on the contrary, monetary costs play a bigger role than non-monetary costs (that mainly correspond to social stigma, see Appendix B). It should be reminded that the effects of perceptions on the willingness to go to university are freed from confounding variation in the level of information, in ability, in parental education, income and expectations for their child education, that are controlled for.

Table 7 also gives the impact of the four types of information policies on the willingness to go

to university.[18] All the significant information variables positively affect the willingness to go to university. Receiving information on financial aid has a strong impact, increasing the probability to be willing to go to university by 11.3 percentage points, which suggests that the lack of information on loans and grants could be an important barrier to university enrollment. Benefiting from a meeting with a school counsellor who is supposed to provide comprehensive individualized guidance on a large range of issues related to the transition from high-school to post-secondary education (including college and financial aid application typically) or labor market, also significantly increases the willingness to go to university, which is in line with Hurwitz and Howell (2014). Learning about one's skills and interests through a questionnaire has a weaker positive impact, but it is likely to mix positive and negative heterogeneous effects: positive for students who underestimate their academic skills, and negative for those who overestimate them. When we look at the impact of the questionnaire on disadvantaged students, we see that it is higher than in the general population: the questionnaire increases the willingness to go to university by 9 percentage points for rural students (see Table 18 in Appendix C.3), by 4.3 percentage points for students whose parents did not go to college (Table 20), and by 5.2 percentage points for low-income students (Table 22), compared to 3 percentage points in the general population. This could suggest that disadvantaged students rather tend to underestimate their academic skills. When we compare descriptively the score of the numeracy test students took with their own assessment of their numerical skills, we also see that disadvantaged students tend to underestimate their skills, which is consistent with this interpretation, although it only concerns numeracy skills.[19] Learning about the labor market through a job presentation by working people has a close-to-zero effect, which is not significant. As we do not know what kind of jobs these working people have, and as it may vary a lot between schools, this effect is hard to interpret.

Table 7: Willingness to go to university estimates (equation (4))

Variable	Average marginal effect (stand. error)
Z-score monetary returns univ	0.026**
	(0.012)
Z-score non-monetary returns univ	0.103***
	(0.019)
Z-score monetary costs univ	-0.049***
	(0.012)
Z-score non-monetary costs univ	-0.019*
	(0.011)
School counsellor meeting	0.066***
	(0.016)
Questionnaire ability/interests	0.030*
	(0.017)

Continued on next page...

[18] Appendix C.1 confirms that the excluded variables used to generate exogenous variation in the level of information (the proportion of students who received the information in the school) are strongly correlated with the level of information students have.

[19] In the survey, students are asked to rate their mathematical abilities from Poor, Good, Very good to Excellent, I consider that they underestimate their level when they score above the sample mean at the numeracy test and rate their mathematical abilities as Poor.

... table 7 continued

Variable	Average marginal effect (stand. error)
Information financial aid	0.113***
	(0.015)
Job presentation by working people	-0.006
	(0.016)

Note: Likelihood estimation of the willingness to go to university equation. Numerical ability, parental education, income and expectations, and school rurality controlled for. Standard errors computed with the Delta method. * stands for p-value<0.1, ** for p-value<0.05 and *** for p-value<0.01.

Examining the robustness of the results to changes in the specification of the model, Table 13 in Appendix C.2.1 shows that the importance of the monetary returns is even lower without unobserved heterogeneity, while the effect of non-monetary costs is greater. The information estimates are all attenuated. But the main messages are unchanged. When we add the information on financial aid in the grant choice equation (equation (5)) so that it can directly affect the demand for grants (rather than only through the willingness to go to university), the results are also quite robust (see Appendix C.2.2). Other robustness checks confirmed that these results were not sensitive to small changes in the specification of the model (see Appendix C.2.3).

Choice between grant and cash

Table 8 presents the estimates of the grant choice equation (equation (5)). Unsurprisingly, the amount of the grant has a strong positive effect on the demand for grant, which diminishes as the amount increases. The *ex ante* perceived utility of university, measured as the latent variable corresponding to the binary variable indicating whether the student would like to go to university (independently of the experiment), is also positively associated with the choice of the grant over the cash, which was expected as well. It is not surprising either that Ontarians have higher demand for grant since tuition fees tend to be higher in this province compared to Manitoba, the reference province here (see section 2.1). University studies in Saskatchewan are more expensive as well so we could have expected a positive sign, but the estimate is negative. Nonetheless it should be noted that there is no control here for whether students consider changing province after high-school so these results should be interpreted with caution. If students see their financial situation as a barrier for university enrollment, they are also more likely to choose the grant rather than the cash, keeping in particular the perceived utility of university constant. This parameter exhibits some heterogeneity between the two unobserved types of students in the sample (that divide the sample in two shares of 31 and 69%).

These results are again relatively robust, except for the specification without unobserved heterogeneity where the constant switch sign and the other parameters tend to have smaller magnitude (see Table 14 in Appendix C.2.1). It can be noted that when we allow information on financial aid to affect the demand for grant both through the willingness to go to university and directly, the direct effect is significantly positive (see Table 17 in Appendix C.2.2), which could support

the interpretation that receiving information on financial aid makes the financial aid system more familiar and increases the appeal of grants offered is the experiment, while the indirect effect is attenuated (see Table 16 in Appendix C.2.2).

Table 8: Future component estimates and share of parental income for present consumption (equation (5))

Variable (parameter)	Estimate (stand. error)	
Constant (δ_0)	0.604**	
	(0.280)	
Grant amount (δ_1)	2.354***	
	(0.108)	
Grant amount^2 (δ_2)	-0.368***	
	(0.023)	
Ex ante perceived utility univ (δ_3)	0.720***	
	(0.070)	
Ontario (δ_4^O)	0.642***	
	(0.094)	
Quebec (δ_4^Q)	-0.036	
	(0.078)	
Saskatchewan (δ_4^S)	-0.344***	
	(0.087)	
Financial barrier type 1 (δ_5^1)	0.390***	
	(0.094)	
Financial barrier type 2 (δ_5^2)	0.479***	
	(0.069)	
Share parental income type 1 (γ^1) (*transformed*)	-9.698***	(*0.000*)
	(0.304)	
Share parental income type 2 (γ^2) (*transformed*)	-6.758***	(*0.001*)
	(0.317)	

Note: Likelihood estimation of future component and share of parental income. The shares are estimated as $\gamma = exp(\tilde{\gamma})/(1 + exp(\tilde{\gamma}))$: $\tilde{\gamma}$ is presented with its standard error, and γ is in parentheses. Proportion of type 1 students is 0.310. * stands for p-value<0.1, ** for p-value<0.05 and *** for p-value<0.01.

5.3 Policy simulations

The simulations aim to answer three types of questions. First I examine whether information policies can close the gap in the take-up of grants between students who are equally able but have different socioeconomic backgrounds. Then to give some insights on the relative cost effectiveness of a policy consisting in increasing the grant amounts and a policy consisting in informing students, I play with the amounts of grant in the model and calculate the amounts that would be needed to obtain the same take-up rates as when we just inform students and keep

the amounts offered in the experiment fixed. Finally, playing with the amounts of cash offered, I compute the change in the value students give to grants when they are better informed.
In each of the three cases, I take the estimates of the parameters presented in the previous section, and manipulate different variables of equations (4) and (5). In the first case, I manipulate variables I^C, I^Q, I^A, and I^P in equation (4). In the second and last case, I respectively manipulate the variables g_q and c_q in equation (5).

Can information policies close the socioeconomic gap in the take-up of grants?

Just as in the descriptive analysis, I focus on three socioeconomic characteristics that are likely to generate heterogeneity in the access to information and demand for grants (see Table 4, section 3): attending a school located in a rural area, having no parent who went to college, and having low-income parents.[20] Before starting manipulating the level of information students have, Table 9 first presents the estimated take-up rates of the grant for each subpopulation (with their observed level of information). It shows that students whose school is located in a rural area and students whose parents did not go to college have lower demand for grants, even controlling for their skills (through the numeracy assessment) and their perceived costs and returns to university. On the contrary, low-income students have higher demand for grant, which is expected and goes against the descriptive analysis that was not taking into consideration the perceived utility of university.

Table 9: Comparison of the estimated take-up rates for disadvantaged students and their more advantaged counterparts

Students socioeconomic characteristics	1000G vs 25C	1000G vs 100C	1000G vs 300C	1000G vs 700C	500G vs 300C	2000G vs 300C	4000G vs 300C
Rural school	0.899	0.750	0.591	0.436	0.409	0.783	0.819
Non-rural school	0.911	0.763	0.607	0.453	0.425	0.793	0.830
Low-educated parents	0.899	0.747	0.587	0.428	0.401	0.778	0.815
High-educated parents	0.925	0.785	0.634	0.484	0.458	0.811	0.846
Low-income parents	0.932	0.806	0.659	0.518	0.498	0.829	0.861
High-income parents	0.901	0.750	0.589	0.433	0.409	0.779	0.815

Note: Estimated take-up rates, controlling in particular for students numerical skills and perceptions of the costs and returns to university.

[20] For the simulations, I interact in the model presented above the four information variables with the socioeconomic characteristic under study, see Appendix C.3.

Suppose now that we are interested in the information policies that would be needed to equalize the take-up rates of students from different socioeconomic groups. Manipulating the four binary variables stating whether students received each type of information or not, I find that in order to close the gap between rural and non-rural students, providing information on financial aid only would be enough. Rural students take-up rates when informed on financial aid are (in the usual order) 0.927, 0.790, 0.640, 0.493, 0.467, 0.817, and 0.851, which is even above the take-up rates of non-rural students (with their observed level of information). Meeting a school counsellor or filling a questionnaire on abilities and interests would also induce rural students to catch-up with non-rural take-up rates, but the increase in the take-up rates is not as high.[21]

For students whose parents did not go to college, only the most effective combination of policies (meeting a school counsellor, filling a questionnaire on abilities and interests, and receiving information on financial aid) allows to raise their take-up rates enough so that they reach the take-up rates of students having at least one parent who went to college. Students with non-college-educated parents take-up rates when getting the three types of information policies together are (in the usual order) 0.926, 0.785, 0.634, 0.485, 0.459, 0.812, and 0.846, which is approximately equal to the take-up rates of students who have at least one parent who went to college. [22]

By how much should grants be increased to reach the take-up rates of informed students?

Another computation we can make with the model is to find the amount of grant that would be necessary to obtain the take-up rates we get when informing students. Playing with g_q in equation (5), we find that grant amounts should be raised by approximately 13% on average in order to equalize the take-up rates of students who met a school counsellor, filled a questionnaire on their abilities and interests and received information on the financial aid system.[23]
In terms of policy perspective, this result suggests that if implementing the three information programs is less expensive than increasing the amount of the grants by approximately 13%, then combining these three information policies would be more cost effective to raise the take-up of grants.

Focusing on disadvantaged subpopulations, we find that the cost would be even higher for rural and low-income students to reach the take-up rates of their informed counterparts (still considering the combination of the three information policies). For them, the amounts of grant provided in the experiment should be raised by respectively 23 and 26%.[24] By contrast, for students whose parents did not go to college, the grant amounts should be raised by 5% only to equalize the take-up rates of their fully informed counterparts.[25] The latter result is in line with the previous conclusion that for these students, information policies are not as effective to

[21] Table 18 in Appendix C.3 gives the average marginal effects associated with the four information variables for rural students, and Table 19 C.3 gives the variation of the observed take-up rates (as a percentage of the observed take-up rates), with each type of information.

[22] See Tables 20 and 21 in Appendix C.3 for the effect of each information policy separately.

[23] More precisely, the vector of grant amounts needed to to equalize the take-up rates of informed students is [1180,1165,1170,1165,635,2340,3210] instead of [1000,1000,1000,1000,500,2000,4000] for students having only the level of information observed in the sample. The last amount of grant ($3210) is lower because the effect of the grant amount is concave and $4000, the amount in the experiment, is above the turning point.

[24] The corresponding vectors of grant amounts are respectively [1290,1265,1265,1265,710,2600,3250] and [1330,1295,1280,1285,728,2700,3200].

[25] The corresponding vector of grant amounts is [1100,1060,1060,1053,537,2100,3810].

raise the take-up of grants as for rural students in particular.

By how much does the willingness-to-pay for grants increase when we inform students?

Playing now with the amount of cash in the model (c_q in equation (5)), we find that for students who met a school counsellor, filled a questionnaire on their abilities and interests and received information on the financial aid system to equalize the take-up rates of students having only the level of information observed in the sample, the vector of cash amounts should be raised by approximately 32%.[26] In other words, the willingness-to-pay for grants among high-school students increases as they get informed. Here again, we can note that this result is highly heterogeneous. The willingness-to-pay for grants increases much more for rural and low-income students, the vector of cash amounts having to be raised by respectively 140 and 65%. For students whose parents did not go to college, the vector of cash amounts needed to equalize the take-up rates of their partially informed counterparts should be raised by only 34%, which is close to the general sample.

6 Conclusion

A key result of this paper is that simple and low-cost information policies that are commonly implemented in schools have the potential to close socioeconomic gaps in the take-up of grants for higher education. In other words, such information policies can increase the capacity of grant policy to reach disadvantaged students. This result advocates for a coordination of the different policies aimed at favoring access to higher education in order to take into account the multiple barriers high school students may face in the transition to post-secondary education. If disadvantaged students lack information on the financial aid system, or if they underestimate their chances to succeed in college because they underestimate their skills, then grant policy alone might be ineffective in reducing the socioeconomic gaps in college enrollment.
One limitation of the paper is to study the decision to take a grant without being able to assess whether taking it indeed affects college enrollments and later on, labor market outcomes. As one of the choices made by the students in the laboratory experiment has been randomly picked and the corresponding amount of cash or grant that the students chose has been given to them, there is exogenous variation in the amount of financial aid students received. This variation could be exploited to evaluate the impact of financial aid on students' education and career choices. The next step is hence to collect follow-up data in order to address these questions.

[26] The vector of cash amounts should be [34,133,399,912,397,388,390] instead of [25,100,300,700,300,300,300].

Appendix

A Sample description

Table 10: Sample description

Variable	Mean	N
Age	17.191	1248
1 if female	0.538	1248
1 if no parent went to college	0.587	1104
1 if parents annual income <40K	0.184	1036
1 if school in rural area	0.196	1248
1 if immigrant	0.063	1248
1 if has a job	0.601	1248
1 if single parent family	0.099	1248
1 if lives in Manitoba	0.276	1248
1 if lives in Ontario	0.291	1248
1 if lives in Quebec	0.304	1248
1 if lives in Saskatchewan	0.130	1248

Note: Mean corresponds to proportion of people for each binary variable (all variables except age). N is the number of people who answered the question in the survey (except for provinces, not from survey).

B Survey questions used for perceptions of returns and costs of university

Monetary returns:

- People who get a university education will make more money over their lifetime than those who just get a high school education.
- Although university can be costly, I believe that I would make more money in the long run.
- I think that if I were to put the time and effort into getting a good university education, I would make a lot more money in the long run.
- I am confident that a university education would lead me to a better paying job.

Non-monetary returns:

- Getting a university education will lead me to find work that I really enjoy doing.

- People who have a university education get jobs that are much more satisfying.
- You can learn enough about the real world without a university education. (*reversed*)
- The best way to get a prestigious job is through a university education.
- I don't think I would ever find fulfilling work if I didn't get a university education.

Monetary costs:

- I'm not sure that a university education would pay off even in the long run, given how costly it is these days.
- Given the high costs of a university education and the time it takes to complete it, you are really no further ahead financially than if you get a job right after high school.
- I'm hesitant to undertake a university education because of the amount of debt I'm likely to accumulate by the time I graduate.
- The costs of a university education have become so high that they outweigh any future financial benefits.

Non-monetary costs:

- If I were to pursue a university education, my friends would think that I'm trying to be better than them.
- If I pursued university education, I'm afraid that it would confuse me about "who I am."
- I'm hesitant to pursue a university education because it would create tensions with the people I grew up with.
- I'm hesitant to pursue a university education because it would create tensions between my parents and me.

C Complements for the Results section

C.1 Strength of the instruments

Table 11: Information equations, strength of the instruments (equation (2))

	Estimate (stand. error)
Proportion - School counsellor meeting (θ_1^C)	3.219***
	(0.259)
Proportion - Questionnaire abilities/interests (θ_1^Q)	2.906***
	(0.283)
Proportion - Information financial aid (θ_1^A)	2.842***
	(0.338)
Proportion - Job presentation by working people (θ_1^P)	2.734***
	(0.430)

Note: Likelihood estimation of information equations. Each line corresponds to one equation. Numerical ability, parental education, income and expectations, and school rurality controlled for. * stands for p-value<0.1, ** for p-value<0.05 and *** for p-value<0.01.

C.2 Robustness to alternative specifications

C.2.1 Results with only one type (no unobserved heterogeneity)

Table 12: Fit

Choice	Observed proportion	Estimated proportion
1000G over 25C	0.886	0.860
1000G over 100C	0.827	0.798
1000G over 300C	0.687	0.660
1000G over 700C	0.413	0.474
500G over 300C	0.385	0.487
2000G over 300C	0.764	0.842
4000G over 300C	0.836	0.846

Table 13: Willingness to go to university estimates, no unobserved heterogeneity

Variable	Average marginal effect (Delta-method stand. error)
Z-score monetary returns univ	0.013
	(0.009)

Continued on next page...

... table 13 continued

Variable	Average marginal effect (Delta-method stand. error)
Z-score non-monetary returns univ	0.108***
	(0.015)
Z-score monetary costs univ	-0.057***
	(0.010)
Z-score non-monetary costs univ	-0.043***
	(0.009)
School counsellor meeting	0.046***
	(0.013)
Questionnaire ability/interests	0.020
	(0.013)
Information financial aid	0.100***
	(0.012)
Job presentation by working people	-0.002
	(0.013)

Note: Likelihood estimation of the willingness to go to university equation. Numerical ability, parental education, income and expectations, and school rurality controlled for. * stands for p-value<0.1, ** for p-value<0.05 and *** for p-value<0.01.

Table 14: Future component estimates and share of parental income for present consumption

Variable (parameter)	Estimate (stand. error)	
Constant (δ'_0)	-0.533***	
	(0.088)	
Grant amount (δ'_1)	1.347***	
	(0.078)	
Grant amount^2 (δ'_2)	-0.223***	
	(0.017)	
Ex ante perceived utility univ (δ'_3)	0.595***	
	(0.048)	
Ontario (δ'^O_4)	0.269***	
	(0.045)	
Quebec (δ'^Q_4)	0.126***	
	(0.042)	
Saskatchewan (δ'^S_4)	-0.234***	
	(0.052)	
Financial barrier (δ'_5)	0.282***	
	(0.033)	
Share parental income (γ) (*transformed*)	-4.891***	(*0.007*)
	(0.094)	

Continued on next page...

... table 14 continued

Variable (parameter)	Estimate (stand. error)

Note: Likelihood estimation of future component and share of parental income. The share is estimated as $\gamma = exp(\tilde{\gamma})/(1+exp(\tilde{\gamma}))$: $\tilde{\gamma}$ is presented with its standard error, and γ is in parentheses. * stands for p-value<0.1, ** for p-value<0.05 and *** for p-value<0.01.

C.2.2 With information on financial aid as a direct determinant of the marginal utility of the grant

The only part of the likelihood that changes is equation (5), that becomes:

$$\begin{aligned} Pr(D2_{iq} = G|m) &= \Phi\Bigg(ln(\gamma'^{m} Inc_i) - ln(\gamma'^{m} Inc_i + c_q) \\ &+ \delta''_0 + \delta''_1 g_q + \delta''_2 g_q^2 + \delta''_3 D1_i^* + \sum_{p\in\{O,Q,S\}} \delta''^{p}_4 P_i^p + \delta''^{m}_5 Fin_i + \delta''_6 I_i^A \Bigg) \end{aligned}$$

Below are presented the fit table and the two results tables.

Table 15: Fit, information on aid in polynomial

Choice	Observed proportion	Estimated proportion
1000G over 25C	0.886	0.910
1000G over 100C	0.827	0.763
1000G over 300C	0.687	0.606
1000G over 700C	0.413	0.450
500G over 300C	0.385	0.424
2000G over 300C	0.764	0.793
4000G over 300C	0.836	0.829

Table 16: Willingness to go to university estimates, information on aid in polynomial

Variable	Average marginal effect (stand. error)
Z-score monetary returns univ	0.015
	(0.012)

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... table 16 continued

Variable	Average marginal effect (stand. error)
Z-score non-monetary returns univ	0.121***
	(0.019)
Z-score monetary costs univ	-0.046***
	(0.012)
Z-score non-monetary costs univ	-0.023**
	(0.011)
School counsellor meeting	0.065***
	(0.016)
Questionnaire ability/interests	0.025
	(0.017)
Information financial aid	0.089***
	(0.021)
Job presentation by working people	-0.000
	(0.016)

Note: Likelihood estimation of the willingness to go to university equation. Numerical ability, parental education, income and expectations, and school rurality controlled for. Standard errors computed with the Delta method. * stands for p-value<0.1, ** for p-value<0.05 and *** for p-value<0.01.

Table 17: Future component estimates and share of parental income, information on aid in polynomial

Variable (parameter)	Estimate (stand. error)
Constant (δ_0'')	0.497*
	(0.275)
Grant amount (δ_1'')	2.359***
	(0.108)
Grant amount^2 (δ_2'')	-0.369***
	(0.023)
Ex ante perceived utility univ (δ_3'')	0.692***
	(0.072)
Ontario ($\delta_4''^O$)	0.395***
	(0.107)
Quebec ($\delta_4''^Q$)	-0.129*
	(0.078)
Saskatchewan ($\delta_4''^S$)	-0.344***
	(0.089)
Financial barrier type 1 ($\delta_5''^1$)	0.271***
	(0.103)
Financial barrier type 2 ($\delta_5''^2$)	0.411***
	(0.072)
Information financial aid (δ_6'')	0.188**

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... table 17 continued

Variable (parameter)	Estimate (stand. error)	
	(0.094)	
Share parental income type 1 (γ^1) (*transformed*)	-9.653***	(*0.000*)
	(0.297)	
Share parental income type 2 (γ^2) (*transformed*)	-6.737***	(*0.001*)
	(0.311)	

Note: Likelihood estimation of future component and share of parental income. The shares are estimated as $\gamma = exp(\tilde{\gamma})/(1 + exp(\tilde{\gamma}))$: $\tilde{\gamma}$ is presented with its standard error, and γ is in parentheses. Proportion of type 1 students is 0.306. * stands for p-value<0.1, ** for p-value<0.05 and *** for p-value<0.01.

C.2.3 Other robustness checks

I checked the robustness of the results to six other specifications (tables available on request). The results are similar when unobserved heterogeneity is on the share of parental income and on the constants of the information equations, and when it is on the share of parental income and on the polynomial constant. They are also similar when we replace the binary variable indicating whether the financial situation is a barrier to university according to the student by the binary variable indicating whether low expenses is very important in choosing a university (from the student survey as well) or by the binary variable indicating whether the student considers his personal level of debt to be a burden, which also capture financial difficulties perceived by the student. Results are stable if we use an alternative measure of the willingness to go to university: the binary variable indicating whether the student thinks he will go to university (instead of whether he would like to go to university in the main specification). Finally, if we believe the marginal utility of the grant can only be positive and hence force the polynomial to be positive in equation (5) (by taking its exponential), results are again robust.

C.3 Results with interactions

To estimate the effects on disadvantaged students, I re-estimate the model, interacting in equation (4) the different information variables with each of the three socioeconomic characteristics considered:

$$\begin{aligned} Pr(D1_i = 1) = \Phi(&\alpha_0''' + \alpha_1''' R_i^M + \alpha_2''' R_i^N + \alpha_3''' C_i^M + \alpha_4''' C_i^N \\ &+ \alpha_5''' I_i^C.Disad_i + \alpha_6''' I_i^Q.Disad_i + \alpha_7''' I_i^A.Disad_i + \alpha_8''' I_i^P.Disad_i + X_i\beta''') \end{aligned} \quad (6)$$

where $Disad_i$ corresponds either to the dummy indicating whether the school is rural, or whether parents did not go to college, or whether their annual income is below $40 000. Then to simulate for example the effect of providing rural students with information on both the financial aid system and different types of jobs, I fix $Disad_i$, I_i^A and I_i^P to one and compute the predicted proportions of students choosing the grant for each of the seven questions.

Below are presented the estimates of equation (6).[27]

C.3.1 School located in rural area

Table 18: Willingness to go to university estimates, with interactions with rural school

Variable	Average marginal effect (stand. error)
Z-score monetary returns univ	0.019*
	(0.011)
Z-score non-monetary returns univ	0.091***
	(0.016)
Z-score monetary costs univ	-0.042***
	(0.010)
Z-score non-monetary costs univ	-0.014
	(0.010)
School counsellor meeting	0.047
	(0.031)
Questionnaire ability/interests	0.090***
	(0.031)
Information financial aid	0.151***
	(0.027)
Job presentation by working people	-0.123***
	(0.036)

Note: Likelihood estimation of the willingness to go to university equation for students whose school is located in a rural area. Numerical ability, parental education, income and expectations controlled for. Standard errors computed with the Delta method. * stands for p-value<0.1, ** for p-value<0.05 and *** for p-value<0.01.

Table 19: Simulation of information policies for students whose school is located in a rural area

Information	1000G vs 25C	1000G vs 100C	1000G vs 300C	1000G vs 700C	500G vs 300C	2000G vs 300C	4000G vs 300C
Benchmark	0.899	0.750	0.591	0.436	0.409	0.783	0.819
Counsellor (C)	+ 0.5%	+ 0.8%	+ 1.3%	+ 2.0%	+ 2.2%	+ 0.7%	+ 0.6%
Questionnaire (Q)	+ 1.0%	+ 1.7%	+ 2.6%	+ 4.0%	+ 4.3%	+ 1.4%	+ 1.2%
Information aid (A)	+ 3.0%	+ 5.3%	+ 8.3%	+13.1%	+14.3%	+ 4.4%	+ 3.9%
Job presentation (P)	-1.8%	-3.1%	-4.8%	-7.3%	-7.9%	-2.6%	-2.2%

Continued on next page...

[27] The fit and the future component estimates are in the three cases very close to Tables 6 and 8 so they are not presented (available on request).

... table 19 continued

Level of Information	1000G vs 25C	1000G vs 100C	1000G vs 300C	1000G vs 700C	500G vs 300C	2000G vs 300C	4000G vs 300C

Note: The benchmark level of information is the level information observed in the data for students whose school is located in a rural area. The following lines gives the variation of the benchmark take-up of grants (in %) when these students all benefit from the policy indicated on the line.

C.3.2 Parents did not go to college

Table 20: Willingness to go to university estimates, with interactions with parents education

Variable	Average marginal effect (stand. error)
Z-score monetary returns univ	0.019*
	(0.011)
Z-score non-monetary returns univ	0.092***
	(0.017)
Z-score monetary costs univ	-0.044***
	(0.011)
Z-score non-monetary costs univ	-0.019*
	(0.011)
School counsellor meeting	0.067***
	(0.019)
Questionnaire ability/interests	0.043**
	(0.019)
Information financial aid	0.092***
	(0.018)
Job presentation by working people	-0.011
	(0.019)

Note: Likelihood estimation of the willingness to go to university equation for students whose parents did not go to college. Numerical ability, parental income and expectations, and school rurality controlled for. Standard errors computed with the Delta method. * stands for p-value<0.1, ** for p-value<0.05 and *** for p-value<0.01.

Table 21: Simulation of information policies for students whose parents did not go to college

Information	1000G vs 25C	1000G vs 100C	1000G vs 300C	1000G vs 700C	500G vs 300C	2000G vs 300C	4000G vs 300C
Benchmark	0.899	0.747	0.587	0.428	0.401	0.778	0.815
Counsellor (C)	+ 0.8%	+ 1.2%	+ 1.9%	+ 3.0%	+ 3.2%	+ 1.0%	+ 0.9%
Questionnaire (Q)	+ 0.5%	+ 0.8%	+ 1.3%	+ 2.0%	+ 2.2%	+ 0.7%	+ 0.6%
Information aid (A)	+ 1.9%	+ 3.2%	+ 5.1%	+ 8.2%	+ 8.9%	+ 2.7%	+ 2.4%
Job presentation (P)	-0.2%	-0.3%	-0.4%	-0.6%	-0.7%	-0.2%	-0.2%

Note: The benchmark level of information is the level information observed in the data for students whose parents did not go to college. The following lines gives the variation of the benchmark take-up of grants (in %) when these students all benefit from the policy indicated on the line.

C.3.3 Parents annual income below 40K

Table 22: Willingness to go to university estimates, with interactions with parents income

Variable	Average marginal effect (stand. error)
Z-score monetary returns univ	0.016**
	(0.008)
Z-score non-monetary returns univ	0.079***
	(0.012)
Z-score monetary costs univ	-0.034***
	(0.008)
Z-score non-monetary costs univ	-0.015*
	(0.008)
School counsellor meeting	0.093***
	(0.023)
Questionnaire ability/interests	0.052**
	(0.024)
Information financial aid	0.105***
	(0.019)
Job presentation by working people	-0.031
	(0.026)

Note: Likelihood estimation of the willingness to go to university equation for students whose parents annual income is less than 40K. Numerical ability, parental education and expectations, and school rurality controlled for. Standard errors computed with the Delta method. * stands for p-value<0.1, ** for p-value<0.05 and *** for p-value<0.01.

Table 23: Simulation of information policies for students whose parents annual income is less than 40K

Information	1000G vs 25C	1000G vs 100C	1000G vs 300C	1000G vs 700C	500G vs 300C	2000G vs 300C	4000G vs 300C
Benchmark	0.932	0.806	0.659	0.518	0.498	0.829	0.861
Counsellor (C)	+ 0.9%	+ 1.7%	+ 2.6%	+ 3.9%	+ 4.2%	+ 1.5%	+ 1.3%
Questionnaire (Q)	+ 0.6%	+ 1.0%	+ 1.6%	+ 2.4%	+ 2.5%	+ 0.9%	+ 0.8%
Information aid (A)	+ 2.0%	+ 3.9%	+ 6.0%	+ 9.2%	+ 9.9%	+ 3.4%	+ 3.0%
Job presentation (P)	-0.4%	-0.8%	-1.2%	-1.8%	-1.9%	-0.7%	-0.6%

Note: The benchmark level of information is the level information observed in the data for students whose parents annual income is less than 40K. The following lines gives the variation of the benchmark take-up of grants (in %) when these students all benefit from the policy indicated on the line.

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