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FACULTY OF ECONOMICS AND BUSINESS



DISCUSSION PAPER SERIES DPS 24.07

July 2024

Can information change preferences for higher education? Evidence from a randomised experiment in Colombia[1, 2]

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Abstract

In the present study, a randomised controlled trial was conducted to investigate the impact of providing information on students' higher education preferences. These preferences were elicited using a discrete choice experiment. The study included 2652 10th-grade low-income Colombian students, all of whom intended to pursue tertiary education. The findings indicate that students who received basic information about higher education, with a focus on financial aid and tuition costs, exhibited an increased preference for higher-quality institutions and a decreased preference for public institutions. Furthermore, changes in preferences were observed, particularly among females and individuals from the most vulnerable backgrounds. A follow-up was also conducted on the actual choices made by the surveyed individuals, which were documented in administrative records. Despite the limited statistical power, given that only 29.7% of the surveyed individuals ultimately enrolled in higher education, it was found that these actual choices were indeed related to the preferences that had been elicited.

JEL classification: C25, I23, I25, I28

Keywords: provision of information, college financial aid, demand for higher education, higher education preferences, students' choices, discrete choice experiment.

[1] To carry out this research we received the approval from the ethics committee at the Economics and Business Faculty at Javeriana University, registry: FCEA-DF-0128-2018. The study was also registered in the AEA RCT under the unique identifier AEARCTR-0003726 in December 27, 2018, retrospectively registered. The data for this study is protected by a confidentiality agreement and we are impeding from sharing the data with others. Readers who are interested can contact the corresponding author for information on how to obtain access to the data.

[2] Acknowledgments: We would like to thank to ICFES for their collaboration in this project. The analysis, views, and opinions expressed in this article are those of the authors and do not necessarily represent those of ICFES. WKristof De Witte acknowledges financial support from Horizon Europe project EFFEct (grant 101129146). Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the granting authority. Neither the European Union nor the granting authority can be held responsible for them. We are also grateful to seminar participants at the Association for Education Finance and Policy (AEFP) 44th Annual Conference, the 24th Annual Latin American and Caribbean Economic Association (LACEA) Meeting, the 5th LEER Workshop on Education Economics, the UNU-MERIT workshop, the Banco de la República seminar, Medellín and Bogotá, and the 10° Seminario Internacional de Investigación ICFES, for their valuable comments and suggestions. Special thanks to Mindel van de Laar for her comments on the manuscript.

1. Introduction

The provision of information can impact the decision-making processes of students concerning choices in higher education, particularly among those from lower-income backgrounds. In many developing countries, lower-income students often lack essential knowledge about their nation's higher education system, its benefits, and available resources, such as financial aid (Peter and Zambre, 2017). Understanding and bridging this knowledge gap is crucial as it can lead to significant shifts in their preferences and decision-making regarding higher education.

Recent literature has made strides in measuring the impact of the provision of information to high school seniors on actual choices (e.g. Booij, Leuven, & Oosterbeek, 2012; Fryer, 2016; Hastings, Neilson, & Zimmerman, 2015). However, less is known about how information shapes the demand for higher education for people who are interested in pursuing it, but choose not to do so mainly because of financial limitations, in part because these people will be absent from administrative choice records. In contexts such as Colombia, where roughly 70% of low-income students do not enter higher education, eliciting their preferences and showing whether the provision of information changes their educational decisions is highly relevant, especially to the formulation of policies to increase their representation in tertiary education.

The present study utilizes a unique combination of a randomised controlled trial (RCT) and a discrete choice experiment (DCE) to estimate the causal influence of providing information on the preferences for higher education among low-income students. This combination enhances our comprehension of these individuals' choices, trade-offs, and decision-making processes regarding higher education options when information is made

available. Our fused approach helped us surpass the constraints of prior research that heavily depended on higher education choice records.

The sample involved 2652 10th-grade low-income Colombian students within 102 schools. For the RCT, students were assigned to two treatment arms and provided with seven statements that presented basic definitions and general facts about higher education. The information provided to students in the first treatment group emphasised on the returns to attending and the enrolment rates of accredited higher education institutions (HEIs), whereas the information in the second treatment group emphasised on financial aid and tuition costs at such HEIs. No information was provided to the students in a control group.

The outcomes of the RCT were assessed by measuring students' preferences both with and without the provision of information. Their preferences concerning five higher education attributes: institution quality, institution location, institution type (public or private), scholarship size, and living expense stipend size, were elicited using the DCE methodology. With this approach, changes in the relative importance assigned to these attributes by the students could be determined through the introduction of information. Additionally, an administrative data link was employed in the present study to measure the actual choices made by the individuals regarding higher education within two years after the intervention. This allowed for the assessment of the impact of the intervention on their subsequent decisions.

It was found that low-income students are susceptible to changing their preferences with regard to higher education by means of the provision of information. In particular, compared to the control group, students treated with general facts about higher education with an emphasis on financial aid and tuition costs (treatment 2), displayed a significant increased preference for higher-quality institutions and a decreased preference for public

institutions. If the information provided had an emphasis on the returns to attending and enrolment rates of (treatment 1), individuals displayed a decreased preference for public institutions. In terms of the willingness to give up, students showed that they highly valued the quality of the institution: they were willing to give up 36% of a full scholarship (and have a debt contingent to future income instead) in order to switch from a low-quality institution to the highest-quality institution. This percentage is 9 percentage points more for those in the treatment 2 group only.

Moreover, the data from the RCT and DCE were merged with the actual choices of the surveyed individuals in administrative records, it was found that only 29.7% of participants actually enrolled in higher education in a scope period of two years after the intervention. Despite the limited statistical power and the fact that college enrolment did not occur as initially predicted, a connection was observed between the actual choices made by those who enrolled in college and the preferences we elicited: compared to the control group, treated students were moderately more likely to enrol in tertiary education and choose accredited universities and less likely to enrol in public institutions. Based on these insights, this study makes a direct contribution to the design of policies aimed at increasing efficiency and equity in the provision of higher education in general and in developing countries in particular.

The paper is structured as follows: A review of the relevant literature is presented in Section 2. In Section 3, the contextual background is delved into. Details about the intervention and sample selection are provided in Section 4, while the methodology is outlined in Section 5. The data and results are presented in Section 6, followed by a discussion of the findings and concluding remarks in Section 7.

2. Selected Literature

Recent literature has made strides in measuring the impact of the provision of information to high school seniors on their actual choices (e.g. Booij, Leuven, & Oosterbeek, 2012; Fryer, 2016; Hastings, Neilson, & Zimmerman, 2015). However, there is limited understanding of how information influences the demand for higher education among individuals interested in pursuing it but are deterred primarily due to financial constraints. This knowledge gap exists partly because these individuals are often absent from administrative choice records.

Our paper fits in two strands of the existing literature. First, it relates to previous studies that use RCTs to test the effect of information provided to high school seniors on their college enrolment decisions (or intentions to enrol). Various studies have assessed whether information on returns and available financial aid affect students' higher education choices. Although differences in context and methods make it difficult to put forth definite conclusions across studies, it generally appears that the provision of information on available financial aid might increase enrolment in higher education (e.g. Herber, 2018; Dinkelman et al., 2014; Bonilla-Mejía, Bottan & Ham, 2019; Loyalka, Song, Wei, Zhong & Rozelle, 2015). By contrast, provision of information on returns has either no effect on enrolment (e.g. Avitabile & De Hoyos Navarro, 2018; Fryer, 2016; Rao, 2016; Kerr, Pekkarinen, Sarvimäki & Uusitalo, 2020; Peter et al., 2021; Busso, Dinkelman, Martínez & Romero, 2017) or a substantial positive effect (Hastings, Neilson, Ramirez, & Zimmerman 2016; Oreopoulos & Dunn, 2013; Hurwitz & Smith, 2018). It also appears that these positive effects depend on the socioeconomic characteristics of students. It should be noted that randomised studies

concerning the provision of information on enrolment rates, university quality, and living/moving costs are scarce.

Second, this paper relates to studies using DCE to elicit student preferences and potential decisions for higher education (Walsh, Flannery & Cullinan, 2018; Moorhouse, Dunnett, & Barry, 2015; Dunnett, Moorhouse, Walsh, & Barry, 2012; Czajkowski, Gajderowicz, Giergiczny, Grotkowska & Sztandar-Sztanderska, 2020). This strand of research assesses the importance of attributes related to quality or reputation, location, and fees of the HEIs. Walsh et al. (2018) and Dunnett et al. (2012) observe that while quality/reputation is an important factor in students' decisions, low-socioeconomic-status (low-SES) students are more sensitive to higher fees. Czajkowski et al. (2020) find that the 'salary after 5 years of graduation' weighs the most in students' preferences. Finally, our research adds to the small number of human capital studies that connect stated preferences to actual decisions (Wiswall & Zafar, 2018; Mas & Pallais, 2017; Maestas et al., 2018). This paper marks the first attempt to link an RCT and DCE in assessing the impact of providing information on students' higher education preferences, and it also innovatively extends this connection to higher education choices.

3. Context

Enrolment rates in tertiary education are low in Colombia. According to the OECD (2016), the level of tertiary education attainment among Colombians between 25 and 34 years old is 27.4%, while the average for OECD countries is 42.1%. Paradoxically, the percentage of youths who expect to complete a university degree in Colombia is 76.3%, one of the highest among PISA-participant countries in 2015. For most low-income high school students in the

country (about 360,000 every year), their desire to pursue tertiary education cannot be satisfied. Following historical data of the last decade, only 1 out of 10 will complete higher education.

To enrol in higher education, high school students need to apply to either vocational or academic degrees. Although there are 297 HEIs (211 technical institutes and 86 universities) throughout Colombia, 68% are located in the four largest cities of the country: Bogotá, Medellín, Cali, and Barranquilla. Moreover, just 18% of the total HEIs are nationally accredited by the Ministry of Education (i.e. they meet national quality standards in terms of curriculum, professors, infrastructure, job placement of alumnae, etc.). Due to higher demand for public universities, admitted/subscribed rates are generally lower in public institutions.

The HEIs are heterogeneous in terms of costs and quality. For public universities, in 2018, tuition fees are set according to a progressive system that considers family income, and students can pay as low as about 0 USD per semester. Tuition costs per semester at private universities vary from 400 to 7750 USD (not correcting for purchasing power parity).[3] Financial aid is available through a governmental entity responsible for funding higher education, Instituto Colombiano de Crédito Educativo y Estudios Técnicos en el Exterior (ICETEX), which grants interest-free loans to low-income students. Recent low-income borrowers are subject to contingent-income policy (decree 1009, 2022), which was planned since 2018. That is, debtors pay back the loan for study by giving up a percentage of their salary over a set number of years when working as professionals. The percentage and timeline vary according to the initial socioeconomic conditions of the borrower. However, the amount

[3] Assuming an exchange rate in 2018 of 3000 COP to 1 USD.

paid does not depend on the amount borrowed or on the tuition fees of the HEI.[4] In other words, the payment is conditional on future income and not on the amount borrowed. This is important for the design of the DCE, in which the monetary variable (tuition) is defined as a percentage of tuition rather than a specific figure.

Scholarships for underprivileged high school students have been scarce, with the one exception of the 'Ser Pilo Paga' (SPP). The SPP was a merit-income-based nationwide scholarship program launched in 2014 that benefited about 40,000 students in 4 years by paying the 100% of the tuition fees for accredited universities and providing living-expense stipends in some cases before being ended in September 2018 due to cost overruns. This program inspired the present research. For example, the information provided to the participants in the experiment reflected questions that awardees had asked when deciding which college option to choose (e.g. what is an accredited university?). Moreover, the attributes in the DCE were closed to the trade-offs students faced when choosing the ideal institutional qualities (e.g. moving away from home, public vs. private institution).

4. Methods

4.1. Experimental Design

The survey. The instrument was crafted to explore how students prioritize various attributes of higher education in their decision-making process and to assess how the provision of information may alter these priorities. Ultimately, the instrument serves as a tool to illuminate how the dissemination of information regarding higher education can influence the demand

[4] For example, a typical low-income borrower with an income of 1000 USD per month will pay 20% of the salary earned over a term of 5 years. Ignoring inflation and interest rates, that works out to a total of 12000 USD. The amount of this payment is independent of the amount of the tuition fee or the credit.

for such education in hypothetical scenarios. We designed a one-time, online survey in the second semester of 2018.[5] The survey contained three main sections. The intervention section, comprised the provision of information experiment presented to the two treatment groups only. The DCE section, which displayed the choice sets to elicit students' preferences in terms of higher education attributes, was delivered to all participants. The output section, gave all students the opportunity to declare interest in receiving extra information from a list of higher education system topics (such as the list of public/accredited institutions). The other four sections of the survey included questions on socioeconomic and personality characteristics as well as expectations regarding higher education, among others. Students could leave responses blank in the survey except for the intervention section. At the end of the questionnaire, all students were shown links to official websites that have orientations on higher education (i.e. ICETEX, Ministry of Education, etc.). Neither schools nor students were made aware of the purposes or hypotheses being tested in order to minimise the potential for performance and expectancy bias.

The information experiment. Students were assigned to one of two treatment arms in order to be presented with different types of information, all extracted from official sources. In both treatment groups, students in the randomly selected schools read seven statements related to higher education. Some of the information provided consisted of definitions and some other facts: (i) definition of the types of national degree (universities versus technical technological), (ii) the definition of a nationally accredited HEIs, (iii) the percentage of HEIs located in the country's 5 main cities, (iv) the rate of acceptance for public versus private universities, (v) the percentage of loans granted to low-income students by the government,

[5] For those schools without internet access, a paper version of the survey was designed.

(vi) the average capability of students to pay back a loan after graduation, (vii) the average cost of living in the country's main cities. Two additional statements were presented, the content of which differed between the treatment groups. Treatment group 1 read a statement on the returns of accredited versus non-accredited HEIs (viii-t1) and enrolment rates for accredited institutions (ix-t1). Treatment group 2, on the other hand, read a statement on preferential credits to students who enrol in accredited HEIs (viii-t2) and one on the tuition fees of accredited HEIs (ix-t2) (the text of the statements is presented in Appendix, Table A). Note that though both treatment groups were presented with general information concerning higher education, the information treatment group 1 saw emphasised the returns to higher education and enrolment rates for accredited institutions, whereas the information treatment group 2 saw emphasised financial aid and the tuition costs of accredited institutions.

To boost the attention level of the students and increase the likelihood that students would effectively absorb the information, the statements were provided to the students in a 'Myth or reality' format. Students were presented with a statement and asked to vote whether it was a 'myth' or 'reality' according to their beliefs. Immediately after voting each item, students were informed whether their answer was correct or not, and additional information concerning and/or explanation of the statement was provided. For example, one statement was 'Myth or reality? Higher education institutions that are accredited have higher quality standards than other institutions that do not have this acknowledgment, according to the Ministry of Education.' After a student voted for the correct option, the following information appeared: 'Reality! The national government gives the acknowledgment of accredited institutions to those HESs that meet all quality standards (in terms of curriculum, professors, infrastructure, labour conditions of alumnae . . .).' Otherwise, the screen shows 'Myth! The national government gives the acknowledgment of accredited institutions to those HEIs that

meet all quality standards (in terms of curriculum, professors, infrastructure, labour conditions of alumnae . . .) (Appendix Figure A). Participants could not skip answers in order to advance in the survey.

The discrete choice experiment**.** The five attributes for the information experiment and the DCE were institution quality, location, type (public versus private), scholarship (tuition fee) and living expense stipend relate with the information provided in the information experiment and with the national context.[6] These were inspired by the SPP financial aid program that was then underway. The program, colloquially known as "it pays to be smart," marked the inception of the first nationwide large-scale university scholarship initiative. Eligible students were required to achieve scores above the 90th percentile on the national exit examination test Saber11 and also belong to a low socioeconomic status as determined by the poverty index, Sisben (for further details, see Bernal & Penney, 2019). Over a span of four years, the scholarship benefitted approximately 40,000 students by covering 100% of their tuition fees at accredited (i.e., high-quality) universities, whether private or public. Additionally, the scholarship provided stipends for students who needed to relocate from one city to another in order to attend college. However, despite this financial support, the stipend provided was generally insufficient to cover moving expenses, food, and other essential living costs for students.

[6] The use of the discrete choice methodology resolves concerns of endogeneity and collinearity that might be present in the actual records of higher education choices (Angrist & Pischke 2010; Freeman, Herriges, & Kling, 2014; Phaneuf & Requate 2016). That is, all of the choice sets are orthogonal to students' characteristics, which allows us disentangle the presence of particular higher education attributes from the unobserved student characteristics.

For choosing the attributes (institution quality, location, type of HEI, scholarship tuition fee, and living expenses subsidy), we relied on reviews of factors influencing college choice (Bergerson, 2009; Hemsley-Brown, 2015). Moreover, we used data from the National Department of Planning of Colombia and ICFES to gain a closer insight into categories within these attributes. We also interviewed two government agencies responsible for programs involving financial aid for higher education. Two small-scale pilots were run of the DCE and a pilot of the full online survey in two low-income high schools in Colombia. The attributes were utilized to measure the multi-dimensional trade-off in student choices. The alternatives within the attributes (the levels) were designed to be as realistic as possible. Nine choice sets, each with 2 possible bundles, were presented to students. Figure 1 illustrates both the instructions for the DCE and 1 (out of 9) of the choices that were presented to students to elicit their preferences in terms of higher education attributes. Students were to choose their preferred option between each pair of higher education bundles. The attributes and their corresponding levels used in the DCE are summarized in Figure 2 and elaborated upon below.

<Figure 1 and Figure 2 about here >

1) Institution Quality: This attribute was measured in stars, ranging from 2 stars to 5 stars, with 4 and 5 stars representing accredited universities.

2) Location: Location was assessed through 5 options: 0, 2, 4, 10, and 14 (or more) hours from home. These values were determined based on the average travel time by bus from the five largest cities to the capital of Colombia, Bogotá.

3) Type of Universities: The type of universities was categorized as either public or private.

4) Scholarship: Scholarships ranged from 0% to 100% of tuition fees, at intervals of 25%. The values of 25% and 75% coincided with the offerings of the governmental loan agency, ICETEX, at the time of this study.[7, 8]

5) Living Expenses Stipend: The living expenses stipend was set at 312,000 COP (104 USD) and was either offered or not, indicated as 'yes' or 'no'. This amount was determined based on the stipend provided by the SPP program

To reduce the number of choice sets, a statistically efficient design was employed, resulting in 18 scenarios split into 2 blocks of 9 scenarios. Each student answered only 1 of the blocks, consisting of 9 choice sets.

5. Statistical analysis

Although the evaluation of a RCT is straightforward, its interaction with a DCE presents a more complicated analytical task. To evaluate the influence of information provision on students' higher education preferences in the DCE, we proceed with the assumption that students select their preferred option from each choice set. This approach aligns with the random utility model, wherein the bundle that offers the highest utility to individuals is chosen (McFadden, 1974). Utility is determined by the attributes linked to each bundle. By including varying attribute levels within the choice sets, the influence of each attribute level on the likelihood of students selecting a specific bundle can be quantified.

[7] The percentage of the salary and the amount of time that would be needed to pay off the remaining debt were calculated according to real information on returns combined with the credits calculator from ICETEX.

[8] Importantly, we used percentage of tuition rather than a fixed amount for the scholarship in consistency with the income contingent policy (see the context section for more detail).

Furthermore, to investigate the causal effect of information on the importance of each higher education attribute, interaction terms are introduced for each treatment. These terms are denoted as T1 for treatment arm 1 and T2 for treatment arm 2, in conjunction with each attribute. The resulting model incorporates these interaction terms and can be expressed as Equation 1.

$$Unjk = \beta n' Anjk + T_1 * \delta n' Anjk + T_2 * \delta n' Anjk + \gamma + \varepsilon njk \qquad \text{Equation (1)}$$

where $Unjk$ represents the utility experienced by student (n) when making a choice within a specific choice set. The choice set (j) ranges from 1 to 9, and there are two alternatives (k=1 or 2) within each choice set. The dependent variable is the choice made by each student for each choice set: $Unjk$ takes the value of 1 if the individual chooses a specific alternative and 0 otherwise. $Anjk$ represents a vector of attributes linked to the selected alternative, with each attribute-level encoded as dummy variables. βn signifies the unobservable, individual-specific coefficient that varies among individuals in the population. On the other hand, γt stands for the fixed effects associated with the choice sets, which accommodate unobservable variations unique to each choice set. Finally, εnjk denotes the unmeasured variations in preferences that are independent and identically distributed and γ_x represents the choice set fixed effects in order to capture observed and unobserved heterogeneity at the individual level. The reference group for each attribute corresponds to a two-star HEI, same city as home, public institution, 0% scholarship, and no stipend. The reference group for T_1 and T_2 is the control group, who did not receive any information.

The estimated coefficients β_n represent the preferences and choice for the attribute A_{njk}. A positive sign of the coefficient implies that the attribute has a positive impact on the take-up of a given higher education bundle, conditional on treatment effects. Higher

coefficients indicate a greater importance of the attribute on the decision-making. The interaction coefficients δn estimate the causal effect of information on students' choices for treatment groups, separately. These coefficients identify the extent to which student preferences are influenced by the provided information (treatment 1 or 2) compared to the control group. Significant and positive coefficients of these interactions suggest that the treatment was effective in modifying the importance of the attributes in the choice of higher education packages. The model is estimated by both linear regression and a mixed logit model. The latter allows for preference heterogeneity in the sample by treating the coefficients as random rather than fixed (Kruk et al., 2010).

Moreover, to understand how students value different components of the higher education bundles, the willingness to give up was calculated (i.e. the opposite of willingness to pay) for the assessed attributes. Each coefficient has been divided by the scholarship coefficient to calculate what percentage of the full scholarship students were willing to give up for a unit change in the characteristics. In other words, the willingness to pay answers questions such as 'What percentage of the scholarship are individuals willing to sacrifice—and take out a loan instead—in order to upgrade from pass from a 3-star HEI to a 4-star one?'

6. Data and results

6.1. Data

The data used in this study had two sources. The first was the survey designed by the researchers (see the experimental design section for more details) and administered in collaboration with the Instituto Colombiano para la Evaluación de la Educación (ICFES) to a sample of high schools from among those that reported having a proportion of low-income

students over 30%. Low-income students were defined as those who had a Sisben poverty index below a specific threshold.[9] Using a stratified random sample, the sample was made broadly representative of the population of schools across geographic locations (the 5 macro-regions in the country). ICFES invited 331 schools to participate through phone calls (see Figure 3).[10] If they accepted, a link with instructions, consents forms, and surveys were sent by email. The schools were randomly assigned to three different groups (i.e. control group, treatment 1, and treatment 2). Randomisation was at the school level to best mimic a potential policy measure and to avoid peer effects and spillovers within schools. The survey was administered virtually or in a paper-based form according to whether or not a school had access to the internet.

<Figure 3 about here>

The second source of data was the Sistema Nacional de Información de la Educación Superior (SNIES) of Colombia, which provided information concerning whether the surveyed students had enrolled in higher education (e.g. public, private, or accredited institution) in 2019 and 2020.

6.2. Descriptive analysis

Among the 331 invited schools 102 agreed to take part in the survey (42, 35, and 25 schools in the control, treatment 1 group, and treatment 2 group, respectively), representing a 30.8% response rate (see Figure 3). The final sample included 2652 students in the 102 schools.

[9] In defining students as low income, we used the thresholds that the SPP did to establish eligibility: these were a poverty index (Sisben) score of 57.21 if the student lived in one of Colombia's 14 major cities, 56.32 if the student lived in another metropolitan area, and 40.75 the student lived in a rural area.

[10] The power analysis suggested that with a planned number of 100 clusters, a power parameter equal to 0.9 and a type I error of 0.05, it was necessary to have on average 5 students per cluster.

The questionnaire was initiated by 3554 senior high school students. A total of 543 respondents were excluded due to a large number of missing variables (i.e., more than 62% of questions were not answered) or the incomplete DCE section (n = 259). Next, to ensure internal validity, students who always chose either 'package A' or 'package B' for all nine choices (n = 32) were removed, as they had failed the test of choice consistency (i.e., the selection of the package for which every attribute had levels superior to those of the other option). Subsequently, individuals who did not wish to enroll in an HEI were excluded as well, considering their limited number (n = 68).

The resulting dataset comprised 2652 respondents who evaluated the 9 choice sets (each containing 2 bundles), resulting in a panel with 47,736 observations (2652*9*2). The usable response rate for the individual surveys was 74.6%.

<Table 1a & Table 1b about here>

Column 5 in Table 1a shows the difference in the statistics between complier (column 1) and non-complier schools. Except for a slightly higher proportion of public schools in the non-complier group (0.06), there are no systematic differences in observable characteristics between the two groups of schools. Based on observables, the final school sample was fairly representative of the schools initially targeted.[11]

To obtain a rich set of covariates, the survey was linked with administrative data on the students. Table 1a also shows school-level descriptive statistics by treatment, with Column 1 showing the statistics of the complete sample. Overall, the schools had a high population of low-income children (with 71.4% eligible on the basis of household income level for governmental financial aid), were mainly public (94.1%), academic oriented (46%),

[11] Note that the variables shown in Table 1a and 1b are from administrative data sets that were merged with the study's survey data.

coeducational (97.1%), located in urban areas (72.5%), and attended in the morning shift (59.8%). Columns 2, 3, and 4 show that randomisation at the school level was in general achieved for the observable characteristics. There were only a few exceptions in treatment group 1, which had a higher proportion of public schools (12.0 percentage points greater) and higher proportion of schools with less than 5 hours of meeting time (17.1 percentage points greater) compared to the control group average.

Table 1b displays the statistics at the student level. In general, most covariates balance across groups, with one exception. Compared to the control group, treatment groups 1 and 2 scored higher on the Sisben poverty index by 6.6 and 7.6 points, respectively, on a scale that went from 0 to 100. This suggests that the treatment groups included students who were slightly less poor than students in the control group.[12] In general, students in all groups were associated with low SES (average Sisben score of 31/100), a small percentage of mothers with tertiary education (19%), and a lack of internet access (57% coverage). Moreover, a large share of participants in our survey could be characterised as present oriented (54.6%) and many overestimated returns by more than 1 standard deviation (32.5%). Finally, it took the treatment groups more time to complete the survey (9.1 and 3.3 minutes for group 1 and group 2, respectively), which was expected due to the extra information provided.

Table 2 shows the proportion of correct answers for each statement presented in the format of 'myth or reality' to students in treatment groups 1 and 2 (see Appendix, Table A for the full version of the statements). The share of correct answers to each statement was similar between the treatment groups. That the scores in classifying the statements as myth or reality were far from perfect indicates that there is room to improve students' basic

[12] Fifteen percent of the students did not have Sisben scores because they were not classified as poor, a percentage that was not statistically different across groups.

awareness about higher education. The responses to two specific statements for treatment groups 1 and 2 revealed a lack of knowledge regarding accredited (high-standards) institutions. About 50% of the respondents in treatment 1 did not think that, on average, graduates from accredited universities earn more than those from non-accredited institutions, and 45% assumed the percentage of low-income students in accredited universities was less than 10% (it is actually 38%). Expectations about loans as evaluated by the information presented to treatment group 2 were more realistic: 71% thought there was preferential access to those who enrol in accredited universities (true), whereas 37% of students wrongly believed that the statement that the tuition fees of accredited HEIs were always more than 5,000,000 COP (1666 USD) per semester, in 2018 COP, was true.

<Table 2 about here>

6.3. Effect of information on student preferences for higher education

Figure 4 shows the estimation results of Equation (1). The results for the attribute-level coefficients, β_k (i.e. rows 1–10 in Figure 4), are in line with the intuition. Scholarship attributes have a positive sign, which suggests that students prefer packages that offer higher scholarships to packages that offer either lower scholarships or no scholarship at all. In fact, for scholarships valued at over 36.2% of tuition, the scholarship coefficient surpasses the magnitude of all other coefficients. In addition, the higher the quality of the HEI (represented by stars), the higher the coefficient, which is consistent with the monotonicity assumption of the random utility model (see section 3.2.). Moreover, in general, public universities are preferred over private, and receiving a stipend is preferred over not receiving one. Likewise, HEIs located further away from home (10 hours or 14 hours away) are less preferred to those

located near home. The difference between HEIs located less than 0 hours from home and those located either 2 or 4 hours away from home is insignificant. The full regression with the coefficients of Figure 4 is displayed in Table B in the Appendix. For simplicity's sake, and because the results are largely unchanged compared to the linear probability model, the logit model is reported in Figure B in the Appendix.

Due to the ordinal nature of the model, all else constant, the attributes ranked in the following order according to student preferences: scholarship (0.35 for a 50% scholarship), HEI quality (0.14 for 3 stars, 0.17 for 4 stars, and 0.52 for 5 stars), receiving a stipend (0.23), public HEI (0.19), and distance from home to the HEI (-0.09 for 10 hours away and -0.19 for 14 hours away).

<Figure 4 about here>

Next, the effect of the treatments on preferences were considered, that is, the interaction coefficients β_{1k} and β_{2k}. The former refers to the effect of 'demystifying' higher education statements with an emphasis on returns to and enrolment rates in accredited universities (treatment 1); the latter also refers the effect of demystifying higher education statements, but with an emphasis on financial aid and university costs in accredited universities (treatment 2). Figure 4 (rows 11 and onwards) shows that students reacted differently to some particular attributes compared to the control group, who were not exposed to information. Students in treatment group 1 were less likely to choose public institutions.[13] Students in treatment group 2 also displayed a lower preference for public institutions, but a stronger demand for HEIs of higher quality. The latter is represented by significant coefficients in each one of the interactions between treatment 2 and the levels of the quality

[13] The HEIs' being further away from home was significant for the main specification but not for others.

attribute (i.e. 3 stars, 4 stars, and 5 stars), compared to the control group. It should be noted that, due to the ordinal nature of the model, the interpretation of the magnitudes of the coefficients is not undertaken; instead, the analysis focuses on the willingness to give up.

< Figures 5a and 5b about here>

The willingness-to-give-up analysis, presented in Figures 5a and 5b, displays how much of a presumably 100% tuition scholarship students were willing to give up in terms of the attribute levels (i.e. HEI quality, stipend, public institution, and location). That is, assuming a baseline scenario where students hold a full scholarship to a 2-star private HEI, with no stipend and in the same city as they live, everything else constant, students were willing to give up 20% of a full scholarship in order to switch from a 2-star HEI to a 3-star one. Likewise, all else constant, students were willing to give up 24% of a full scholarship in order to switch from a 3-star HEI to a 4-star one.

Figures 5a and 5b display the effect in terms of willingness to give up of a 100% tuition scholarship caused by treatment 1 and treatment 2, respectively. When exposed to treatment 1 (Figure 5a) students preferred to be even more compensated (between 2 and 9 percentage points of a full scholarship) for choosing faraway HEIs compared to the control group. Similarly, when exposed to treatment 2 (Figure 5b), students were willing to give up an additional 9.6, 15.2, and 9.6 percentage points of a full scholarship (and take out a loan instead) in order to be switched from a 2- to a 3-, 4-, or 5-star HEI, respectively. In other words, treating students with information on governmental loans and the cost of attending accredited universities increases students' willingness to trade away some of their hypothetical scholarships for higher-quality options. In contrast, in both treatments (as shown in Figures 5a and 5b), students would need to be compensated by 9% of a full scholarship to

switch from private to public HEIs, indicating that both treatments decrease the preference for public institutions.

6.4. Heterogeneous effects

The investigation into heterogeneous effects was undertaken based on existing literature, which suggests that the impact of providing information on higher education preferences is more pronounced among females (e.g., Avitabile et al., 2018) and individuals from underprivileged socioeconomic backgrounds (e.g., Peter, Rusconi, Solga, Spieß, & Zambre, 2016), possibly due to their initially lower expectations of pursuing higher education. Figures 6a and 6b show how preferences varied across sex and socioeconomic status (SES), respectively. Female and low-SES students in treatment group 2 reacted more strongly to quality compared to their counterparts. However, females and students from above-average-SES backgrounds in both treatment groups 1 and 2 exhibited a lower preference for public universities, compared to their peers.

<Figure 6a & Figure 6b about here >

To test the strength of the results, several alternative model specifications were estimated. First, over the premise that provision of information should affect the less informed more, the sample were divided according to the number of correct answers in the myth/reality activity. After excluding the control group (because the activity was not provided to them), the participants were divided into 3 groups according the number of correct answers regarding the 9 myths: less informed (less than 5 correct answers), moderately informed (5 or 6 correct answers) and well informed (more than 6 correct answers). The results in Table 3 confirm that the preferences of the less-informed students

changed more than the preferences of the other groups, likely due to the latter´s awareness of higher education misperceptions.

<Table 3 about here >

Additionally, we took advantage of the fact that students had the option to express their interest in receiving additional information on various higher education system topics, such as the list of public/accredited institutions, at the end of the survey. Students in both treatment groups were generally more interested than students in the control group in information regarding quality and loans (Table 4, top panel), with the coefficients being larger for those who took the paper-based survey (Table 4, bottom panel). Interestingly, students in both treatment groups were more likely, by 7 to 12 percentage points, to ask for information on ICETEX loans, which corresponds to an increase in probability of 21.7% to 40.8% compared to the control group.

Finally, the coarsened exact matching (CEM) approach proposed by Iacus, King, and Porro (2012) were used to control for imbalanced covariates (maternal education and Sisben poverty index imbalances) at the baseline. The results (see Appendix, Figure C) are in line as those shown in Figure 4 without the matching.

<Table 4 about here >

6.5. Contrasting our findings to actual choices

As a DCE provides only hypothetical choices, it is interesting to see how the experiment influenced the actual choices of students. Therefore, Table 5 presents the actual choices made regarding higher education of the individuals who filled out the survey in 2018 and eventually enrolled in higher education in 2019 or 2020. Although *all* respondents

wanted to enrol in higher education, as of December 2020 only 29.7% (n = 787) of them had done so. Therefore, some of the following specifications were restricted only to these individuals. The administrative SNIES database enabled us to determine whether students had *enrolled* in HEIs, as well as the *type* (public or private) and *quality* (accredited or not accredited) of the institution. Three different specifications were run using each binary variable as a dependent variable in a linear regression model, with treatments as independent variables. In addition to naïve regressions, specifications with added controls and clustered standard errors at the school level were included.

<Table 5 about here >

Columns 1 and 2 show that students assigned to treatment group 2 were close to 5.8 percentage points more likely to enrol into the higher education system compared to their peers. A positive but not significant increase of 4 percentage points is also observed for the students randomly assigned to treatment group 1. Reducing the sample to those enrolled in the higher education system, columns 3–4 and 5–6 show that fewer students in the treatment groups chose public HEIs and more chose accredited HEIs compared to students in the control group. Although sufficient statistical power is lacking to test the significance of these coefficients, their magnitude and sign are both in line with the main findings as presented in section 5.3. That is, private and accredited institutions were more frequently chosen by treated students after the provision of information.

7. Discussion and conclusion

In conclusion, our randomised controlled trial has shed light on the significant impact of providing essential information to low-income Colombian 10th-grade students with

aspirations for higher education. Our innovative approach, combining a randomised information experiment with a DCE, allowed us to overcome certain limitations inherent in earlier research, which predominantly relied on higher education choice records as primary outcomes. Distinct from prior studies, our investigation delved into the intricate process of how students weigh the significance of various higher education attributes against each other. Building on the findings outlined in section 2 of the literature, our study highlights the significant importance students attribute to quality/reputation in their decision-making processes. However, a key sensitivity factor identified in our research is the attribute of financial aid. This is likely due to the overrepresentation of low-SES students in our study compared to others, many of whom face statistically low probabilities of attending college. Specific focus was placed on the decision-making patterns of low-income students, a group that is significantly underrepresented in administrative records. Furthermore, a vital connection was established between the preferences elicited through information provision and the tangible choices observed in higher education administrative data.

The results of the DCE suggest a ranking of student preferences with regard to attributes: scholarships were valued most, followed by HEI quality, a living stipend, HEI type (public/private), and finally HEI location (either 10 or 14 hours from home). As observed by Walsh et al. (2018) and Dunnett et al. (2012), quality and reputation play an important role in student preferences in terms of higher education.

In terms of the RCT, results indicate that low-income students are susceptible to changing their preferences with regard to higher education if information is provided, a low-cost intervention. In the experiment, we provided definitions and facts that are basic and publicly available, but concerning which some students had misperceptions. For instance, 4 out of 10 respondents were not aware that accredited universities are known to be of better

quality than non-accredited universities and 6 out of 10 were not aware that public universities admit a lower proportion of applicants compared to private. The low rates of correct answers show that there is room for correcting misperceptions regarding higher education among economically disadvantaged students.

Both treatment 1, which provided general information with an emphasis on returns and access to accredited HEIs and treatment 2, in which the emphasis was on governmental loans and the cost of attending accredited HEIs, boosted demand for private universities, compared to the control group. The coefficient is virtually the same for both treatments (-0.06). Although it cannot be determined which specific piece of information drives the change, it is likely that one of the statements presented to both groups, indicating that the admission rate was lower for public compared to private institutions (none of the other general statements referred to differences between public and private institutions), contributed to this effect. However, it should be noted that the reduction in the preference for public universities due to the intervention does not completely eliminate the general preference for public universities (the treatment effect is 0.06 compared to the coefficient for the preference of public universities of 0.19). After the intervention, it is probable that the perception of the difficulty of being accepted by a private institution relative to a public institution decreased among the treated individuals. Furthermore, aside from the decrease in preference for public universities among students in treatment 1, there were not identify any other significant and consistent effects on preferences related to other attributes in the DCE. In other words, the particular information provided regarding returns to and enrolment rates in accredited universities does not appear to have altered students' higher education preferences. A possible explanation put forth by Golsteyn, Grönqvist, and Lindhal (2014), and Cadena and Keys (2015), among others studies, is that a high discount factor makes

youth pay more attention to immediate restrictions. In other words, the students who took our survey might have perceived future earnings as irrelevant to their immediate choice decision.

By contrast, students in treatment group 2 had a significantly higher preference for high-quality HEIs (in addition to a lower preference for public HEIs compared to the control group. This group was exposed to general information regarding higher education (as was treatment group 1), but read two additional statements regarding the preferential access to credit by students in accredited HEIs and the range of fees of those institutions. These statements are drove the changes in the preferences in terms of the quality of the institution. As a possible explanation, information on financial aid and costs might have mitigated students' immediate concerns over financial constraints and access to higher education. This finding is in line with the literature measuring the impact of providing financial aid information on students' decisions in developing countries (e.g. Avitabile et al., 2018; Busso et al., 2017; Hastings et al., 2015; Hastings, 2016; Rao, 2016).

Moreover, subsample analysis suggests that students who were historically more likely not to attend college (i.e. those from the most vulnerable backgrounds) were the ones most likely to switch choices in reaction to the provision of information. However, they were less ambitious in terms of their demand for higher education than their peers, after controlling for financial restrictions. Females and low-SES students were particularly likely to change choices after receiving the information provided.

Analysing the effect of the provision of information on preferences and relating it to actual choices makes this research unique. Our results suggest that overcoming misperceptions concerning higher education (even when the information provided is basic and in small doses) can mediate students' choices, not only in hypothetical but also in real

scenarios. Because studies with low touch nudges tend to find null effects (Oreopoulos, 2020), it is notable that the present study finds significant effects, in both the short and long run, with a one-shot provision of information through an online format. We speculate that the effects are likely due to the feedback offered to the students in the experiment ('myth or reality' format with corrections) and the fact that participants probably cared about absorbing the information provided, because they explicitly manifested the wish to enrol higher education.

From a policy perspective, and for the particular case of the Colombian higher education system, there are many lessons. First, it is important to provide information about the basics of the higher education system, because doing so changes students' preferences and likely their educational decisions. Second, compared to the cancelled SPP program, which caused low-income students shift from low-quality universities to high-quality ones (Londoño-Velez et al., 2017), new scholarship programs could be less generous and still students would be take advantage of them. The SPP gave a 100% scholarship, which encouraged low-income students to switch from a low-quality university into a high-quality university; and do better on exit examinations (Bernal & Penney, 2019). Our results suggest that low-income students are willing to bear part of the higher cost of attending high-quality HEIs. For instance, participants were willing to forfeit 36% of a full scholarship (and accept debt contingent on future income) to switch from a low-quality institution to the highest-quality one. Equally important is the finding that students are willing to take on an additional 9.2 percentage points of debt if they become more aware of financial opportunities available at high-quality institutions, according to how the information was presented in this study. These findings are revealing, particularly as only 29.7% of the participants in this study pursued higher education, with a majority placed in low-quality institutions. Therefore, new

financial schemes not based on full tuition-free models (as exemplified by the SPP) could enhance placement in high-quality institutions and expand coverage over the current 29.7%. This approach could thereby improve social mobility, sustainability of the system, and its overall efficiency.

Moreover, there are other attributes such as subsidies for study expenditures that are well worth the sacrifice in the form of future debt. By removing barriers, such as the provision of living expenditures, students are willing to assume 'reasonable' future debt to access high-quality opportunities currently available. Moreover, informational barriers significantly influence low-income students' choices regarding higher education in general, and high-quality institutions in particular (Bernal, Abadía, Arango & DeWitte, 2024). Consequently, eliminating these information barriers is crucial for facilitating decision-making and serves as an effective, low-cost tool. Policies that inform students of the possibilities of accessing credit can effectively increasing students' interest in high-quality higher education. However, if tuition costs are excessively high, options such as high-quality HEIs may remain unfeasible. Determines what constitutes 'excessively high' tuition requires further research.

Disclosure IA: During the preparation of this work, the author(s) employed ChatGPT to enhance the grammar in a few paragraphs. After utilizing this tool/service, the author(s) meticulously reviewed and edited the content as necessary, assuming full responsibility for the publication's content. The first manuscript of the current research was published in 2021, predating the launch of ChatGPT. Hence, it can be contrasted that the current manuscript has undergone grammar modifications only, which pertain to only a portion of the entire content.

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Tables

Table 1. Covariate balance by treatment

Table 1a. School level

	(1)	(2)	(3)	(4)	(5)
	All compliers	**Control Group**	**Treatment Group 1**	**Treatment Group 2**	**Not compliers Schools**
	Mean	**Mean**	**Difference (T1-control)**	**Difference (T2-control)**	**Diff (All compliers – not compliers)**
Panel A - School Level					
Eligible for scholarship in 2014	0.714	0.726	-0.029	-0.007	-0.019
Public	0.941	0.881	0.119 *	0.079	-0.062 **
Academic track	0.461	0.405	0.024	0.195	0.041
Coeducational (gender mixed)	0.971	0.976	-0.005	-0.016	0.014
Urban área	0.725	0.667	0.104	0.093	-0.039
Shift					
Morning (5 hrs)	0.598	0.595	-0.024	0.045	-0.009
Full-day at sch (8hrs)	0.206	0.262	-0.148	-0.022	0.03
Other (less5 hrs)	0.196	0.143	0.171 **	-0.023	-0.021
Victim of conflict	0.076	0.0972	-0.0465	-0.0214	-0.0025
Failing some grade	0.0278	0.0255	0.008	-0.0019	-0.0026
Number of respondants	28.52	29.95	2.62	-9.51 *	na
N schools	102	42	35	25	331

Table 1b. Individual level

	(1)	(2)	(3)	(4)	(5)
		All compliers	**Control group**	**Treatment 1 group**	**Treatment 2 group**
	N	**Mean**	**Mean**	**Difference (T2-control)**	**Difference (T2-control)**
Panel B - Individual level					
Male	1.631	0.443	0.449	-0.012	-0.016
Age	1.631	16.846	16.836	0.021	-0.216
Poverty Index (Sisben from 1 to 100)	1.596	30.904	27.971	6.548 *	7.583 **
SES index by ICFES (0 to 100)	1.589	48.307	47.396	1.908	1.467
Higest mother´s level of education					
None	1,550	0.231	0.242	-0.023	-0.039
Primary	1,550	0.297	0.301	-0.009	-0.002
Secondary	1,550	0.283	0.265	0.038	0.067 *
Tertiary	1,550	0.189	0.192	-0.006	-0.026
Mother at home	1,586	0.422	0.455	-0.068	-0.045
N people at home	1,592	2.508	2.548	-0.085	-0.024
Internet access	1,549	0.566	0.505	0.125	0.143
Live close to school[ı]	2,144	0.580	0.607	-0.058	0.047
High discount factor[ı]	2,136	0.546	0.594	-0.104 *	-0.083
Overestimate returns[ı]	1,812	0.325	0.300	0.055	0.106
Duration in minutes[ı]	2,198	30.783	26.553	9.098 *	3.283
Number of students		2652	1176	1022	454

Notes: clustering ttest were applied for mean difference computation with significance * p<0.1, ** p<0.05, *** p<0.01. Panel a, columns (3) and (4) report the difference between treatment 1 or 2 group and control group, respectively. Column (5) shows the difference between all compliers and not compliers. The higher the percentage of students' income eligible for Ser Pilo Paga scholarship in 2014, the lower-income the school. Public high schools are publicly funded and hold lower quality on average than private schools. Academic track refers schools that does not have technical training. Victim of conflict is the percentage of students that are victims from the Colombian civil conflict. Panel b, paper-based surveys do not register duration filling in the survey; they are excluded in "duration in minutes variable". Tables 1 and 2 are mostly based on administrative dataset, except for those variables signalled with ı which are taken from the study survey.

Table 2. Percentage of correct answers for each one of the statements showed to treatment groups

Statement (reduced version)	Treatment 1	Treatment 2	Difference (T2-T1)
Types of degree are University, technical or technological (reality)	0.924	0.927	0.004
Accredited university are higher quality than non-accredited (reality)	0.586	0.581	-0.005
All higher education institutions are located in the 5 main cities of Colombia (myth)	0.602	0.608	0.006
Public universities admit a lower proportion of applicants compared to private (reality)	0.407	0.412	0.005
Less than 25% of governmental loans are granted to low-income students (myth)	0.365	0.394	0.029
The salary earn after higher education is not enough to pay educational loan (myth)	0.497	0.540	0.043
A subsidy of 312,000 COP (108USD) is not enough to cover living and board (reality)	0.830	0.802	-0.028
Graduates from accredited institutions earn more salary than those who do not (reality)	0.511	na	na
Percentage of low-SES students enrolled in accredited institutions is less than 10% (myth)	0.552	na	na
Preferential credits to students who enroll accredited institutions (reality)	na	0.705	na
Tuition fees of accredited HEI cost more than 5,000,000COP (1666 USD) per semester (myth)	na	0.628	na
Number of correct answer (max=9)	5.2730	5.5969	0.324
N	1022	454	

Note: clustering ttest were applied for mean difference computation with significance * p<0.1, ** p<0.05, *** p<0.01. Appendix Table A displays the full version of the statements.

Table 3. Heterogeneous effect of provision of information on student´s choices, by their level of (miss)information on the statements

	7, 8 or 9 correct		5 or 6 correct		< 5 correct	
	Choice	**s.e.**	**Choice**	**s.e.**	**Choice**	**s.e.**
ATTRIBUTES						
Levels						
Scholarship (% of tuition)						
Scholarship (in %)	0.00564***	(0.000492)	0.00649***	(0.000406)	0.00607***	(0.000460)
HEI Quality (ref: 2 stars)						
3 stars	0.138***	(0.0340)	0.119***	(0.0277)	0.0982***	(0.0298)
4 stars	0.230***	(0.0441)	0.243***	(0.0347)	0.209***	(0.0313)
5 stars	0.296***	(0.0426)	0.307***	(0.0405)	0.206***	(0.0328)
HEI Location (ref: same city)						
2 hours from home	-0.0221	(0.0358)	-0.00494	(0.0365)	-0.0225	(0.0359)
4 hours from home	0.0465	(0.0358)	0.0199	(0.0208)	0.0374	(0.0285)
10 hours from home	-0.234***	(0.0566)	-0.195***	(0.0359)	-0.208***	(0.0418)
14 hours from home	-0.207***	(0.0419)	-0.226***	(0.0406)	-0.243***	(0.0411)
HEI type (ref: private)						
Public	0.156***	(0.0308)	0.119***	(0.0178)	0.116***	(0.0178)
Stipend (ref: no stipend)						
Stipend	0.189***	(0.0312)	0.203***	(0.0228)	0.193***	(0.0226)
Constant	-0.166***	(0.0401)	-0.141***	(0.0296)	-0.0738**	(0.0334)
Treatment 2 vs treatment 1 effects						
Scholarship (%tuition) & T2						
Scholarship*T2	0.00251***	(0.000825)	0.000739	(0.000648)	-0.000657	(0.000716)
HEIs Quality & T2						
3 stars*T2	0.0975*	(0.0505)	0.0859	(0.0537)	0.123**	(0.0534)
4 stars*T2	0.0942	(0.0630)	0.0149	(0.0575)	0.101**	(0.0459)
5 stars*T2	0.0154	(0.0656)	0.0113	(0.0663)	0.174***	(0.0559)
HEIs Location & T2						
2 hrs_home*T2	0.0943	(0.0639)	0.0659	(0.0651)	0.119*	(0.0666)
4 hrs_home*T2	0.0806	(0.0698)	0.0423	(0.0515)	0.0364	(0.0761)
10 hrs_home*T2	0.0472	(0.0740)	0.111*	(0.0574)	0.0936	(0.0807)
14 hrs_home*T2	0.0818	(0.0611)	0.0815	(0.0732)	0.0476	(0.0747)
HEIs Type & T2						
Public*T2	-0.0234	(0.0429)	0.0362	(0.0294)	-0.0157	(0.0309)
Stipend & T2						
Stipend*T2	-0.0335	(0.0534)	0.00459	(0.0390)	0.0202	(0.0479)
Observations	7,110		10,998		8,460	
Number of obs_id	3,555		5,499		4,230	
R-squared	0.286		0.286		0.244	

Note: Significance levels report differences to the control group from least squared regression with choice-set fixed effects and standard errors clustered at school level, * p<0.1, ** p<0.05, *** p<0.01. Standard errors in parentheses.

Table 4. Effect of treatment on the types of information requested by students at the end of the survey

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Accredited IES	**Non_accredited IES**	**Prublic & privates IES**	**Returs by programs**	**Icetex credit**	**Fees of IES**	**Orientation test**
All students							
Treatment 1 (returns & access accredited institutions)	0.0487**	0.0610***	-0.0354*	0.0313	0.0693***	-0.0346*	-0.0660***
	-0.0213	-0.0174	-0.0213	-0.0212	-0.0204	-0.0209	-0.0206
Treatment 2 (credits & costos accredited institutions)	0.0637**	0.0624***	-0.00317	0.0254	0.0705***	-0.00841	-0.0359
	-0.0275	-0.0225	-0.0276	-0.0274	-0.0264	-0.027	-0.0266
Constant	0.421***	0.178***	0.486***	0.422***	0.317***	0.621***	0.666***
	-0.0145	-0.0119	-0.0146	-0.0145	-0.0139	-0.0142	-0.014
Observations	2,652	2,652	2,652	2,652	2,652	2,652	2,652
R-squared	0.003	0.006	0.001	0.001	0.005	0.001	0.004
Sub-group: students taking the paper-based survey							
Treatment 1 (returns & access accredited universities)	0.0929**	0.118***	0.0405	0.136***	0.0880**	0.0272	0.0177
	-0.0417	-0.0319	-0.0424	-0.0414	-0.04	-0.0405	-0.0386
Treatment 2 (credits & costos)	0.151***	0.107***	0.0667	0.136***	0.122***	0.119***	0.00782
	-0.0413	-0.0317	-0.042	-0.0411	-0.0397	-0.0402	-0.0383
Constant	0.380***	0.130***	0.465***	0.359***	0.299***	0.613***	0.703***
	-0.0209	-0.016	-0.0212	-0.0207	-0.02	-0.0203	-0.0193
Observations	931	931	931	931	931	931	931
R-squared	0.016	0.021	0.003	0.018	0.012	0.009	0

Note: Standard deviations in parentheses. Significance levels report differences to the control group from an OLS regression with standard errors clustered at school level, * p<0.1, ** p<0.05, *** p<0.01. The dependent variable is 1 if students check the box to receive information about the item, 0 otherwise. The list of items was nor excludable.

Table 5. Effect of treatments on the actual choices for higher education

	(1) Enrol HEI	(2) Enrol HEI	(3) Enrol public HEI	(4) Enrol public HEI	(5) Enrol accredited HEI	(6) Enrol accredited HEI
Treatment 1 (returns & access accredited institutions)	0.0593***	0.0403	-0.0581	-0.0542	0.0351	0.0531
	(0.0195)	(0.0320)	(0.0354)	(0.0487)	(0.0361)	(0.0633)
Treatment 2 (credits & costs accredited institutions)	0.0602**	0.0578*	-0.0642	-0.0780	0.0556	0.0636
	(0.0252)	(0.0348)	(0.0449)	(0.0591)	(0.0458)	(0.0930)
Constant	0.264***	0.253***	0.758***	0.986***	0.271***	0.356**
	(0.0133)	(0.0637)	(0.0254)	(0.134)	(0.0259)	(0.162)
Controls	no	yes	no	yes	no	yes
Observations	2,652	1,964	787	560	787	560
R-squared	0.004	0.068	0.004	0.122	0.002	0.060

Standard deviations in parentheses. Significance levels report differences to the control group from an OLS regression with standard errors clustered at school level, * p<0.1, ** p<0.05, *** p<0.01. The dependent variable is 1 if students fulfil the corresponding condition, 0 otherwise. Controls added: gender, socioeconomic status, mother education, older siblings' level of education. Columns 1 and 2 are all students who could be merged with the administrative dataset. Columns 3-4 are the subsample of students who actually enrolled higher education in the subsequent two years after the intervention. Data source: the Colombian System of Information on Higher Education, SNIES.

Figures

Figure 1. Activity instructions to the students before starting the DCE and an example of a DCE choice set.

ACTIVITY

In the next activity you have to choose the higher education bundle that, you would prefer (Bundle 1 or Bundle 2). The scenarios are imaginary, and refer to institutions of higher education (for example, universities or university of applied sciences). Each option has 5 attributes:

1. Quality of the Higher Education Institution: Where 5 stars is the highest quality and 2 stars is the minimum quality. The accredited higher education institutions have 4 or 5 stars and those not accredited have 2 or 3 stars.
2. Location of the higher education institution: This represents the number of hours by bus that you would have to take from your city of origin to the city where the higher education institution is located.
3. Type of higher education institution: public or private.
4. Scholarship for tuition payment: This represents the percentage that is given to subsidize your enrollment. If the scholarship is NOT 100%, you are supposed to pay the rest of the tuition when you graduate and receive a salary.
5. Support Subsidy: "YES" means that you are provided by a subsidy of $ 312,000 per month for transport, food and housing expenses. "NO" means that you do not receive extra money.

1/9. Assuming you´re accepted in the program you like the most (in 2 different institutions), which one of the following bundles would you prefer?

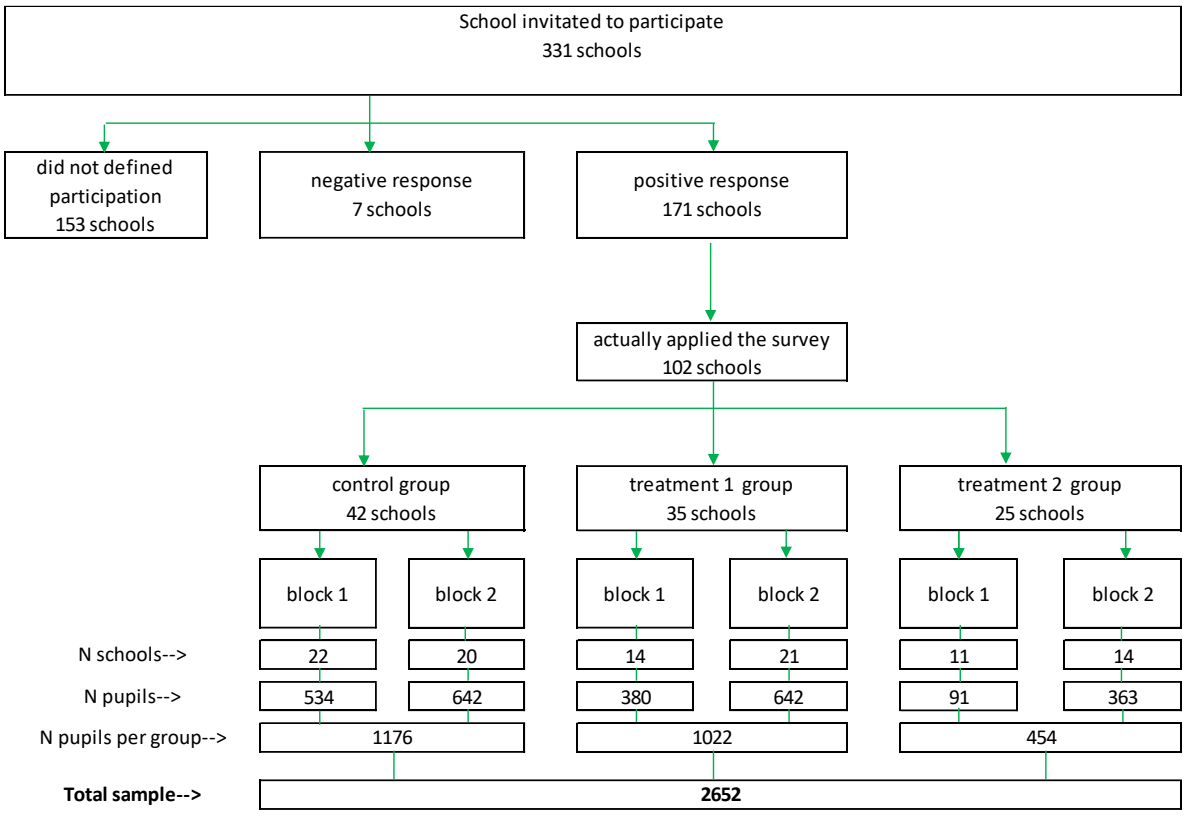
Attribute	Bundle 1	Bundle 2
Quality of HEIs		
Location of HEIs	The city where you live	2 hours in bus from where you live. Move or not.
Type of HEIs	Private	Public
Scholarship (%)	**Scholarship: 50%** 50% - The remaining 50%, you will be able to pay back by giving up 20% of your salary received for 5 years after graduation.	**Scholarship: 0%** 0% - The 100%, you will be able to pay back by giving up 20% of your salary received for 9 years after graduation.
Subsidy	NO	yes = $312.000 monthly (108USD)
Which one do you prefer?	☐	☐

Note: original text in Spanish. After instructions, and according to their preferences, students must choose between the two possible bundles of higher education displayed in each of the nine choicest.

Figure 2. Attributes and levels in the DCE

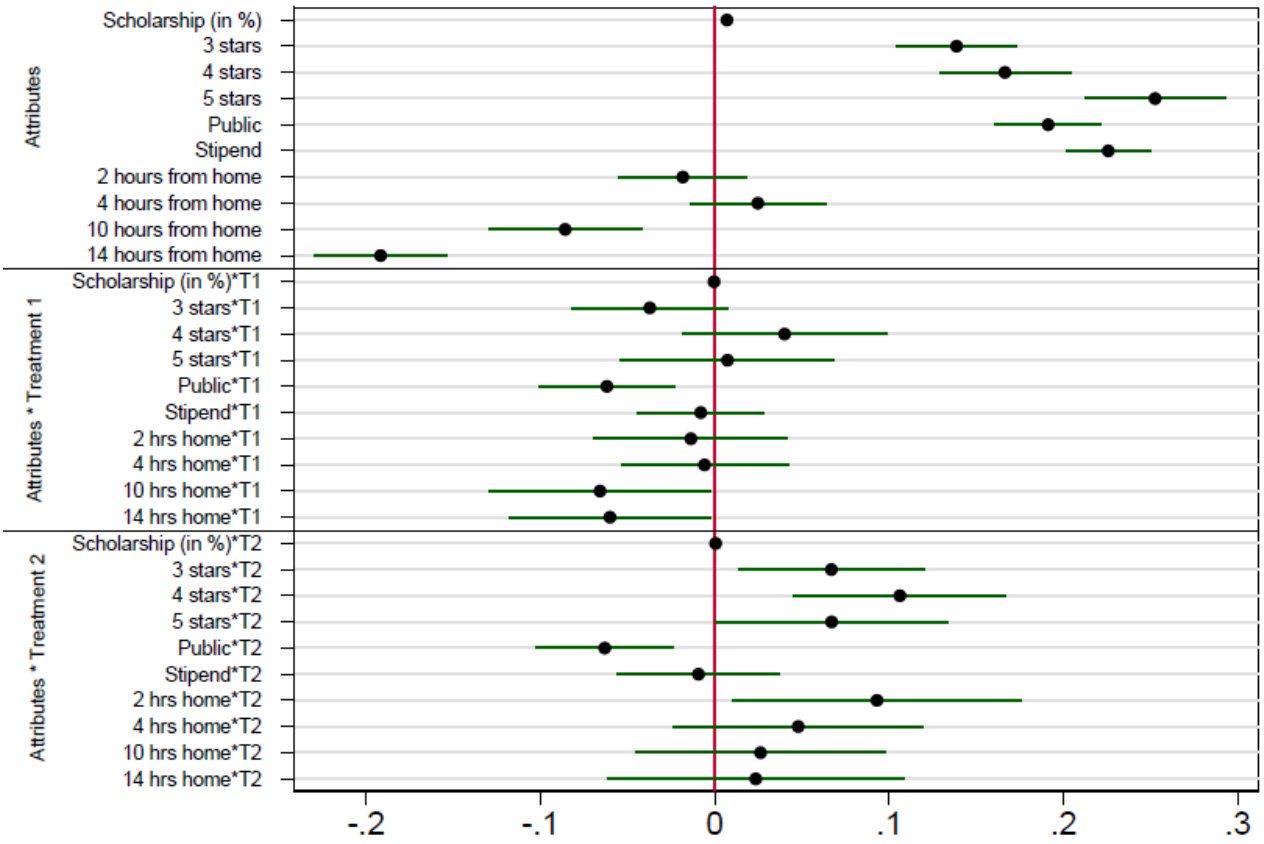
Attribute	Categories	Level coding
University quality 	5 stars (accredited) 4 stars (accredited) 3 stars (non-accredited) 2 stars (non-accredited)	5 4 3 2
Location	The city where your parents live. 2 hours by bus from where your parents live. You can choose to move or not. 4 hours by bus from where your parents live. You can choose to move or not. 10 hours by bus from where your parents live. You have to move. 14 hours or more by bus from where your parents live. You have to move.	0 2 4 10 14
University type	Public Private	1 0
Scholarship (tuition fee)	Scholarship of 100% of the tuition fee. Scholarship of 75% of the tuition fee. The remaining 25%, you will be able to pay back by giving up 20% of your salary received during 3 years after graduation. Scholarship of 50% of the tuition fee. The remaining 50%, you will be able to pay back by giving up 20% of your salary received during 5 years after graduation. Scholarship of 25% of the tuition fee. The remaining 75%, you will be able to pay back by giving up 20% of your salary received during 7 years after graduation. No scholarship. You will be able to pay the costs back by giving up 20% of your salary received during 9 years after graduation.	100 75 50 25 0
Living expense stipend	Yes (312.000 COP monthly – about 100USD) No	1 0

Figure 3. Sample distribution



Note: schools that "did not define participation" are schools who did not gave either a negative or positive response about participating in the experiment.

Figure 4. Effect of information on preferences for higher education attributes



Note: Treatment 1 offers general information of higher education with emphasis on returns and access. Treatment 2 offers general information of higher education with emphasis credits and costs. Dots with horizontal lines indicate point estimates with choice-set fixed effect, cluster standard error at school level and 90% confidence intervals from least squares regression. The references categories for each attribute-level is: 2 stars, private HEI, no stipend, 0 hours away from home, and the interaction of those reference categories times each treatment. Attributes*Treatment1 refers to the interaction between each attribute-level and treatment 1 dummy. Attributes*Treatment2 refers to the interaction between each attribute-level and treatment 2 dummy. Appendix Table B displays the underlying regression results.

Figure 5a. Willingness to give up (WTGU) a proportion of a full tuition scholarship. Coefficients of attributes and attributes*treatment 1 (returns & access)

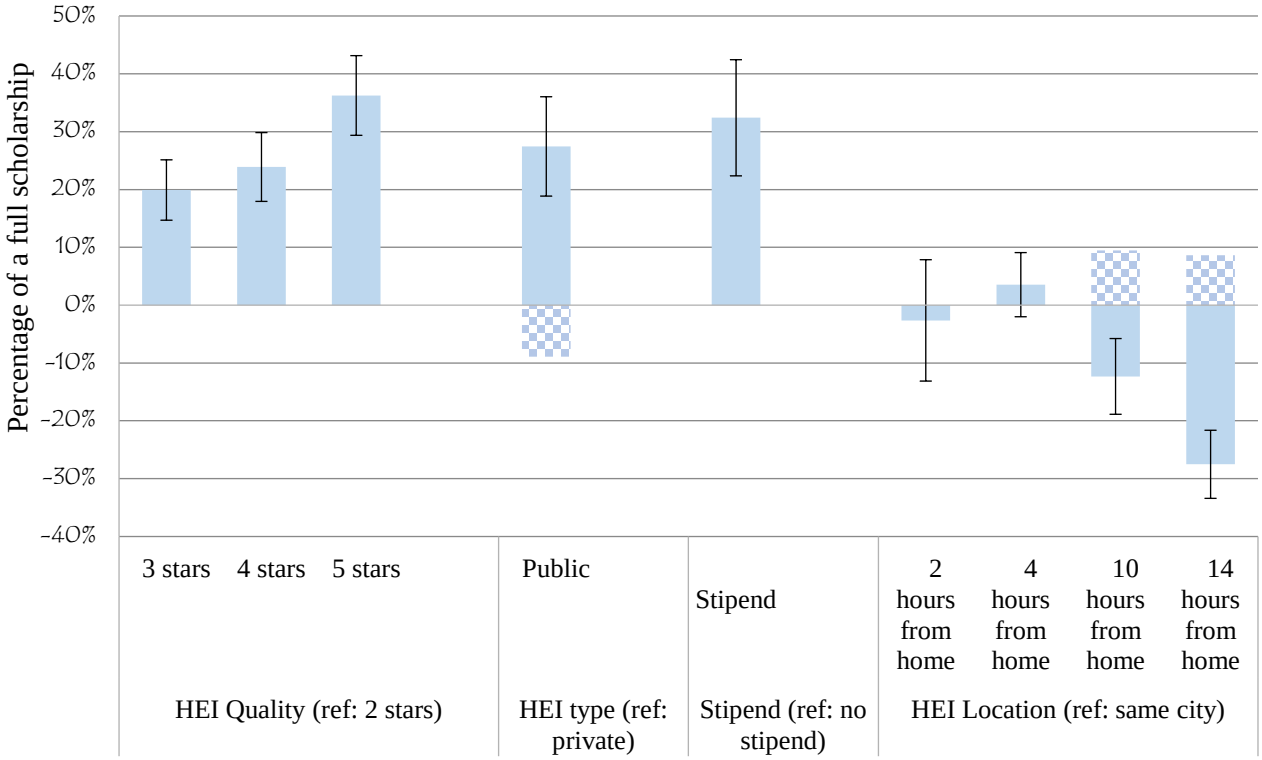
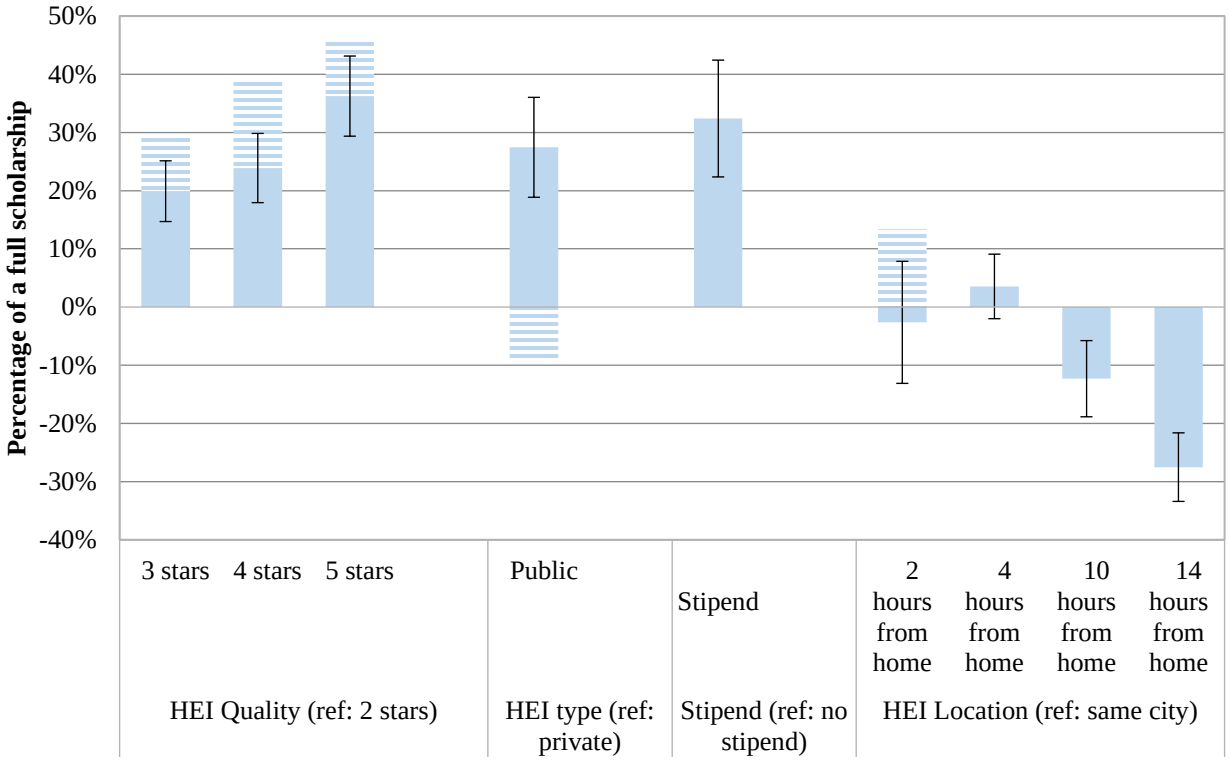


Figure 5b. Willingness to give up (WTGU) as a proportion of a full tuition scholarship. Coefficients of attributes and attributes*treatment 2 (credits & costs)



Notes: solid color bars indicate WTGU from a 100% tuition scholarship of each attribute-level. Estimates include choice-set fixed effect, cluster standard error at school level and 90% confidence intervals from least squares regression. The texture bars indicate the WTGU added by treatment 1, and only significant point-estimates at the 90% CI are shown. Note for interpretation: everything holding in the baseline category, students are on average willing to give up 27.5% of a 100% tuition scholarship in order to switch from a private to a public institution. Nevertheless, receiving information in treatment 1 (returns & access) causes a drop in this coefficient by 8.9 percentage points. Appendix Table B displays the underlying regression results.

Figure 6a. Effect of provision of information (treatment 1 and treatment 2) on preferences, by gender

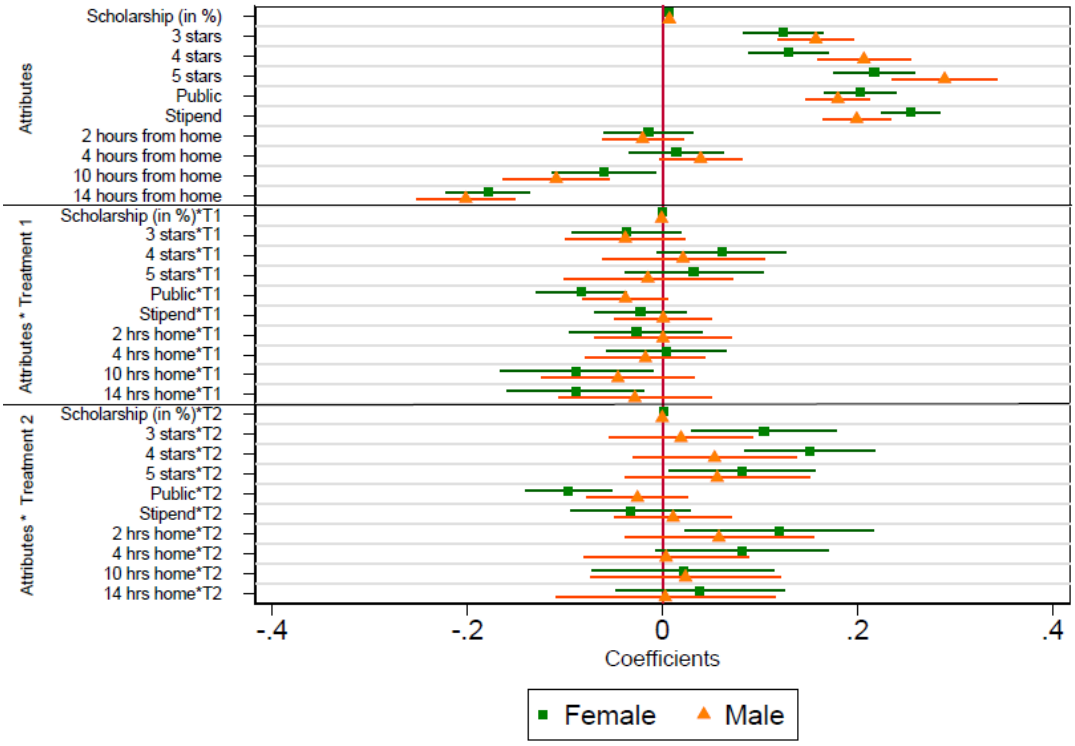
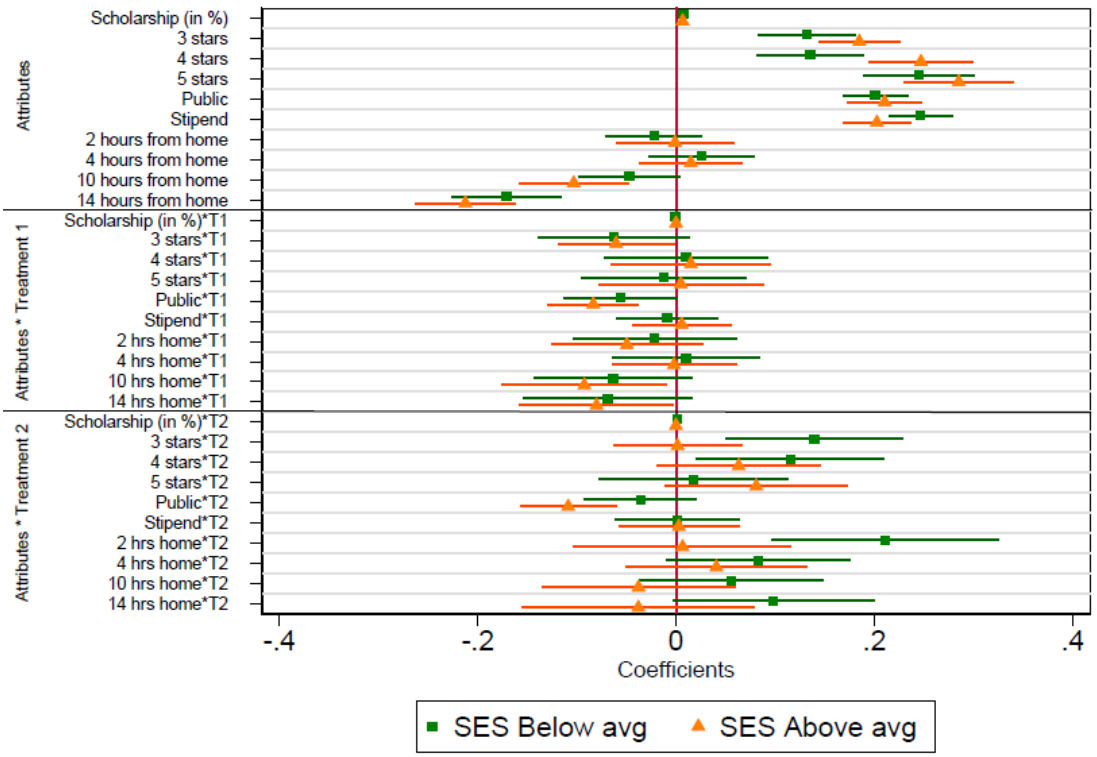


Figure 6b. Effect of provision of information (treatment 1 and treatment 2) on preferences, by socioeconomic status (SES)



Note**:** heterogeneous effect of provision of information on student´s preferences, by subgroups. Treatment 1: returns & access. Treatment 2: credits & costs. Dots with horizontal lines indicate point estimates with choice-set fixed effect, cluster standard error at school level and 90% confidence intervals from least squares regression. The references categories for each attribute-level is: 2 stars, private HEI, no stipend, 0 hours away from home, and the interaction of those reference categories times each treatment. Attributes*Treatment1 refers to the interaction between each attribute-level and treatment 1 dummy. Attributes*Treatment2 refers to the interaction between each attribute-level and treatment 2 dummy.

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